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eJournal of Tax Research

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EDITORS' NOTE

The *eJournal of Tax Research* is a refereed journal that publishes original, scholarly works on all aspects of taxation. It aims to promote timely dissemination of research and public discussion of tax-related issues, from both theoretical and practical perspectives. It provides a channel for academics, researchers, practitioners, administrators, judges and policy makers to enhance their understanding and knowledge of taxation. The journal emphasises the interdisciplinary nature of taxation.

SUBMISSION OF ORIGINAL MATERIAL

Submission of original contributions on any topic of tax interest is welcomed, and should be sent as an email attachment (Microsoft Word format) to the Production Editor at <ejtr@unsw.edu.au>. Submission of a manuscript is taken to imply that it is an unpublished work and has not already been submitted for publication elsewhere. Potential authors are requested to follow the "Notes to Authors", which is available from the journal's website.

WEBPAGE

Current and past issues of the *eJournal of Tax Research* are available via the journal's website: https://www.unsw.edu.au/business/our-research/research-environment/ejournal-tax-research.

Editorial note

There have been a number of important developments in the OECD's program to reform the international tax system on corporate taxation in light of the 'digitalisation and globalisation of the economy'. On 18 January 2023, the OECD issued a statement indicating that the estimated revenue from the proposed global minimum tax under Pillar 2 would be around USD 220 billion, revised up from the previously forecast USD 125 billion. On 3 February 2023, the OECD released the long-awaited 'Administrative Guidance on the Global Anti-Base Erosion Model Rules (Pillar Two)', pursuant to the GloBE rules, to facilitate a globally coordinated approach as countries work on their domestic implementation of Pillar 2.

The first two articles ('The geography of corporate tax avoidance' and 'A diagnostic tool for assessing the corporate income tax compliance burden: pilot study findings') broadly align with these developments as they focus on corporate income tax. The next three articles ('How tax gap can inform tax policy and administration: a case study of Australia's individual income tax', 'The impact of demographic variables on value-added tax compliance in South Africa', and 'Tax professionals' perceptions on Malaysian HNWIs' compliance behaviour') continue the themes of compliance and the focus on individuals.

This issue also begins an initiative, of actively promoting the work of early career researchers, that we are keen to continue at the *eJTR* into the future. The first article 'The geography of corporate tax avoidance' is the first published article for its lead author Yuan Helen Ping. Congratulations on this achievement! We wish her all the best with her PhD candidature.

On a separate note, Dr Alex Evans decided to resign from her position as co-editor of the *eJTR*. Alex joined the *eJTR* team as an associate editor in 2018 and has been a co-editor since January 2022. She has made important and immense contributions to the development of the *eJTR*. We wish to take this opportunity to thank her for her contributions and wish her all the best in her future endeavours.

It is also our sad duty to report the untimely passing of Emeritus Professor John Taylor, a co-editor of the *eJTR* from late 2013 to September 2021, covering publications from Volume 10 Issue 3 to Volume 19 Issue 1. To commemorate Professor Taylor's contributions to the development of the *eJTR*, a special issue that is to be co-edited by Emeritus Professor Chris Evans and Professor Binh Tran-Nam will be published in 2024.

Alex Evans, Youngdeok Lim and Yan Xu

The geography of corporate tax avoidance

Yuan Helen Ping,[*] Hai Wu[**] and Xiu-Ye Zhang[***]

Abstract

We empirically examine the relation between firms' headquarters location and their level of tax avoidance. Employing multiple measures of tax avoidance, we consistently find significant location fixed effects on firms' tax behaviour across different geographic areas in the US, after controlling for firm fixed effects, time-varying firm characteristics and state income tax rates. Additional analyses show that location fixed effects are more pronounced for firms that have been located in an area for a longer period and that have lower geographic diversification. We then explore a range of regional characteristics as determinants of location fixed effects and find some evidence that location-specific resources and risks factors, but not cultural factors, are associated with time-invariant differences in corporate tax avoidance across regions. Our study has important practical implications for tax authorities, suggesting that tax enforcement, education, and inspections should be tailored to take account of firms' geographical location.

Keywords: tax avoidance; geographic area; location fixed effects; location-based characteristics

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1.   INTRODUCTION

Geographical location affects individual decision-making, leading to uneven distributions of economic and social outcomes such as innovations, health, crime and violence, as well as pro- and anti-social behaviour (e.g., Shaw & McKay, 1942; Land, McCall & Cohen, 1990; Jaffe, Trajtenberg & Henderson, 1993; Glaeser, Sacerdote & Scheinkman, 1996; Weisburd, 2015). While social scientists use location as a common unit of analysis to study individual behaviour, business studies have just begun to explore how spatial variations affect corporate behaviour. Parsons, Sulaeman and Titman (2018) take an initial step towards documenting significant differences in firms' financial misconduct rates across cities in the US. In this study, we examine whether there is a spatial variation in corporate tax avoidance policy.

Tax avoidance can be broadly defined as strategies that reduce a firm's tax burden (Dyreng, Hanlon & Maydew, 2008; Hanlon & Heitzman, 2010), not necessarily indicating any corporate wrongdoing. However, the boundary between aggressive tax schemes and breaches of tax obligations can be crossed without a clear distinction, and the extreme forms of tax avoidance, including tax non-compliance, evasion, and sheltering, are of great interest to tax authorities (Hanlon & Heitzman, 2010). Prior studies have documented several space-related determinants of corporate tax avoidance, including information flow within corporate group (Su, Li & Ma, 2019; Chen et al., 2022) and between firms and regulators (Kubick et al., 2017), as well as social characteristics surrounding firms' headquarters (Hasan et al., 2017a). Our study makes a novel contribution by directly investigating if firms' location affects their level of tax avoidance, and thus provides evidence on whether geography is a potential factor explaining the observed persistent variation in corporate tax avoidance (Dyreng et al., 2008). We then investigate the extent to which the estimated time-invariant location fixed effects can be explained by a range of observable regional characteristics, including spatial differences in local information/human resources, risk and cultural factors.

Following prior literature (John, Knyazeva & Knyazeva, 2011; Arena & Dewally, 2012; Kedia & Rajgopal, 2011; Parsons et al., 2018), we argue that the spatial patterns that systematically affect corporate tax avoidance behaviour can arise through three channels. First, firms located in the same region are likely to obtain and share similar information and resources. Variations in access to information and resources (e.g., tax expertise) across locations can affect firms' capability to adopt complex tax strategies, resulting in different levels of tax avoidance across space. Second, firms that are located closely to one another are exposed to similar location-induced risk attitudes. These location-induced risk attitudes may alter the incentives and behaviour of managers when making corporate tax decisions. Third, firms located in the same community could be affected by similar social and ethical norms. Managers are likely to behave in a way consistent with the beliefs and behaviours of their social peers. Taking these arguments together, we predict that geographical differences in those factors could lead to spatial variation in corporate tax decisions.

We estimate location fixed effects on four measures of corporate tax avoidance to encompass an entire continuum of tax planning strategies that reduce tax payments. Following Dyreng, Hanlon and Maydew (2010), we first use two standard measures to capture tax avoidance broadly: firms' effective tax rate (ETR) and cash effective tax rate (CETR). Given that location-based factors can influence both firms' use of

questionable tax strategies and legitimate means to reduce tax burdens, it is important to study broad-based tax avoidance measures. We then look at the more aggressive end of the tax avoidance continuum by following prior studies which suggest that extreme unethical behaviours demonstrate high levels of geographic clustering (Glaeser et al., 1996; Parsons et al., 2018). Our third proxy for tax avoidance is the publicly disclosed tax reserves, i.e., the unrecognised tax benefits (hereafter UTB), made available through Financial Interpretation No. 48 (FIN 48). Lisowsky, Robinson and Schmidt (2013) suggest that the UTB is the most robust proxy for tax shelters. Last, we employ the long-run CETR measure to capture firms' ability to maintain aggressive tax positions for a much longer term of five years (CETR5, Dyreng et al., 2008) as we conjecture that the long-run CETR reflects persistent tax avoidance properties that are closely related to our objective of identifying time-invariant location fixed effects.

Our study focuses primarily on the US Metropolitan Statistical Area (MSA) in which firms' headquarters are located. We focus on the location of headquarters since the overall tax strategy of a firm is typically formulated and executed by the top management team (Hasan et al., 2017a; Dyreng et al., 2010). We regress the sample firms' ETR, CETR, UTB, and CETR5 respectively on location fixed effects after controlling for year and firm fixed effects as well as a set of time-varying firm-level characteristics and state corporate income tax rates. We obtain the location fixed effects by estimating the MSA-specific coefficients. There are two important features of our empirical design. First, we specifically control for firm fixed effects, thereby testing whether the within-firm variation in tax avoidance is systematically associated with the locations of firms' headquarters. Thus, our primary identification relies on observed changes of firm headquarters locations. Second, we specifically control for state-level corporate tax rates. Therefore, we only estimate tax-code unrelated variation in location effects on corporate tax behaviour.

Our empirical results show that the location of firm headquarters has a statistically and economically significant effect on the level of tax avoidance of firms. The estimated MSA fixed effects on ETR, CETR, UTB, and CETR5 are all jointly significant, regardless of whether tested individually or in the presence of other fixed effects. We find that the explanatory power of models including MSA fixed effects is in between that of those including year fixed effects and those including industry fixed effects. Moreover, the distribution of the MSA fixed effect coefficients reveals large and significant differences in tax avoidance behaviour across locations. In particular, moving between the top and bottom quartiles of MSAs results in an approximately 21% (14%) swing in CETRs (ETRs). Further evidence on the positively correlated relationship between the estimates of location fixed effects in neighbouring MSAs, and the over-time stability of location fixed effects affirms the validity of our identification on the location fixed effects. Furthermore, we conduct a number of robustness tests, such as, including loss firms in the sample, using alternative geographic units including state, county and zip code, splitting the sample to only firms that have changed headquarters location or those that have not changed location, and including executive fixed effects and controls of corporate governance and executive compensation, all of which consistently show significant effects of firm location on all of our tax avoidance variables, i.e., ETR, CETR, UTB, and CETR5. Our cross-sectional analyses by partitioning the sample based on length of time in the location and geographic diversification corroborate the main findings.

After establishing significant location fixed effects, we investigate whether these effects are associated with observable regional characteristics. Specifically, we regress the vectors of estimated MSA fixed effect coefficients obtained from the ETR, CETR, UTB, and CETR5 models on that particular MSA's: (1) information and resource factors (proxied by workforce population, education level, external accounting and finance expertise from audit firms, and geodesic proximity to Internal Revenue Service (IRS) local office); (2) economic, regulatory, and behavioural risk attitudes (as captured by average personal wage, GDP per capita, proximity to IRS, and weather pattern); and (3) social and cultural environment (including crime rates and religiosity).[1] We find evidence suggesting that locations with higher average education level and longer average daily sunlight are associated with higher corporate cash effective tax rates and lower reported tax reserves. Thus, the geographic variation in corporate tax avoidance is associated with information/resource and risk factors, while cultural factors exhibit little explanatory power. Furthermore, the low explanatory power of these regressions suggests that most of the common factors that would be able to explain location-specific tax avoidance are yet to be identified.

This study makes several contributions. First, it underscores the importance of firm location to corporate tax decisions. Prior research suggests that tax avoidance behaviour is related to several location-based characteristics (Kubick et al., 2017; Hasan et al., 2017a). Su et al. (2019) and Chen et al. (2022) find that tax avoidance is related to corporate geographical dispersion and intra-group geographic proximity. We extend this stream of literature by investigating and quantifying the overall location fixed effects on tax avoidance. This is a critical step towards a better understanding of the spatial differences in the tax avoidance undertaken by firms. Our results also suggest that little is known about the key determinants of spatial variation in corporate tax avoidance. Moreover, we do not find robust evidence confirming the effect of several previously examined location-based factors (e.g., social and culture factors) in our setting, suggesting that these results may be sensitive to research design and subject to possible time-variant omitted variables. These observations highlight the need for further research examining the effects of location-based factors on corporate tax avoidance.

Second, this research adds to the literature investigating the effects of corporate location on important corporate decisions. Prior studies document that geographic factors have an influence on individual behaviours (e.g., Land et al., 1990; Sampson, Raudenbush & Earls, 1997; Glaeser et al., 1996; Baller et al., 2001). Recent studies have emerged investigating their influence on corporate opportunistic reporting, which is related to local cultural characteristics (Parsons et al., 2018). We add to this research effort by examining whether there is a spatial variation in corporate tax avoidance activities. Financial misconduct is a clearly illegal decision, while our study shows that corporate location also matters for tax avoidance, which is a more common and recurring decision for firms. In the tax avoidance context, we find that local social and cultural characteristics are not the main determinants of spatial variation. Overall, our evidence not only indicates a more general inference regarding location effect on corporate decisions, but also suggests that different corporate policies may be driven by different location-based factors.

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[1] Several geographic factors are related to more than one channel. We explain these factors and the different predictions under the different channels in section 2.3.

Third, this study has important practical implications for tax authorities. Empirical evidence from the literature that links spatial distributions to location-based economic, social, and enforcement characteristics (Land et al., 1990; Sampson et al., 1997; Glaeser et al., 1996; Baller et al., 2001) has guided resource-constrained law enforcement agencies to develop spatially-based enforcement programs (Sherman & Weisburd, 1995), as well as programs focusing on social controls and community relationships (Skolnick & Bayley, 1986). Similarly, resource-constrained tax authorities need to identify high-risk targets for tax auditing and can adopt similar tactics by using spatially-based programs to target aggressive tax behaviour. The findings of our study suggest that tax authorities could place greater reliance on location-based analysis to identify aggressive corporate taxpayers headquartered in high-risk locations. Tax enforcement, education, and inspections should happen disproportionally across space.

In the next section, we provide a review of relevant studies and develop hypotheses to address the research questions. Section 3 describes the sample selection process and presents descriptive statistics. We discuss the main results from location fixed effects in section 4 together with the robustness tests and the cross-sectional tests. Section 5 reports the relationship between location fixed effects and the observable geographical characteristics. We conclude in Section 6.

2.   LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1   Prior literature on tax avoidance

Hanlon and Heitzman (2010) describe the term 'tax avoidance' as a continuum of tax strategies, with tax reductions that are squarely in compliance with the tax code at one end, and strategies such as so-called tax aggressiveness and tax sheltering residing closer to the other end of the continuum. We expect location-based factors can affect the entire spectrum of tax strategies. Thus, this study examines the broadly defined corporate tax avoidance, which encompasses anything that reduces a firm's tax burden, either in the short or long term (Dyreng et al., 2008), as well as the narrowly defined concept of tax sheltering, a more aggressive type of tax avoidance.

Prior studies show that the level of tax avoidance is significantly related to a wide range of firm-level factors, including size (Zimmerman, 1983; Gupta & Newberry, 1997), profitability (Gupta & Newberry, 1997; Richardson & Lanis, 2007), life cycle (Hasan et al., 2017b), ownership structure (Chen et al., 2010), asset mix (Gupta & Newberry, 1997; Richardson & Lanis, 2007), and foreign operations (Rego, 2003). Tax avoidance is also linked to management styles (Dyreng et al., 2010), governance structures (Desai & Dharmapala, 2006; Abdul Wahab and Holland, 2012), incentive compensation (Armstrong, Blouin & Larcker, 2012), and executives' personal tax behaviour (Hjelström et al., 2020).

Another line of studies shows that firms' tax avoidance decisions are also shaped by external factors such as tax enforcement (Hoopes, Mescall & Pittman, 2012), government policies (Clausing, 2009), and tax professionals (McGuire, Omer & Wang, 2012b). Because many external environmental factors vary systematically across space, several papers (Kubick et al., 2017; Hasan et al., 2017a) find that factors associated with corporate location are possible determinants of firms' tax avoidance decisions. Kubick et al. (2017) show that firms' proximity to the regulator appears to have a significant influence on tax avoidance. Hasan et al. (2017a) provide evidence that the social environment of a firm matters for its tax avoidance decisions. This study extends prior

literature to examine whether firms' geographic locations help explain persistent variation in tax avoidance that prior research has found across firms (Dyreng et al., 2008).

Our study is related to two recent studies (Chen et al., 2022, and Su et al., 2019) which examine the relation between geographical location and tax avoidance. Su et al. (2019) finds a negative effect of geographic dispersion on tax avoidance as the result of increased difficulty in intra-firm internal control and corporate governance. Chen et al. (2022), on the other hand, show a positive effect of geographic proximity between parent companies and subsidiaries on tax avoidance through intra-group income shifting to low-tax jurisdictions at lower costs. Both studies focus on the proximity/dispersion of firms or units in the same corporate group and how geography facilitates the internal information flow and coordination. Our study differs from their work as we focus our attention on investigating whether geography is an important factor influencing the tax avoidance of proximate firms regardless of whether they are in the same corporate structure. We also examine the relation of corporate tax avoidance with location-based resource, economic, risk and culture factors, rather than the geography-related internal information and coordination effects on corporate tax strategies.

2.2   The effects of firm location on corporate tax avoidance

The geographical effects on corporate decision-making have been well documented in many settings. For example, investors have stronger preferences for geographically local investment (e.g., Baik, Kang & Kim, 2010; Doukas & Pantzalis, 2003); auditors provide higher-quality audit services to local clients (e.g., Choi et al., 2012); analysts are more accurate in forecasting the performance of geographically proximate firms (e.g., Malloy, 2005); and regulators are more likely to investigate firms that are located closer to their local offices (e.g., Kedia & Rajgopal, 2011). The systematic geographic differences are also present in firm performance and corporate decisions, including innovative activities (Audretsch & Feldman, 1996; Jaffe et al., 1993), dividend decisions (John et al., 2011), investor clientele (Arena & Dewally, 2012), and corporate misconduct (Parsons et al., 2018; Kedia & Rajgopal, 2011). Based on this stream of literature, we believe there are at least three possible reasons why we may observe geographic variations in corporate tax decisions.

First, firm locations may be correlated with advantages in information and resources. We label this explanation as the 'information and resource channel'. Multiple studies have shown that firms located in different regions have different information sets about a range of stakeholders, including investors, creditors, and regulators (John et al., 2011; Arena & Dewally, 2012; Kedia & Rajgopal, 2011; Kubick et al., 2017). Acquisition of sensitive and informal ('soft') information is more likely to be facilitated by repeated social, civic, and business interactions and close spatial proximity between corporate managers and stakeholders (Audretsch & Stephan, 1996; Baik et al., 2010; Choi et al. 2012; Doukas & Pantzalis, 2003; Malloy, 2005). Firms located in the same area are likely to share similar information, hence making similar decisions. Furthermore, firms located in different areas may have access to different levels of resources. These resources include high-quality workforces, high-quality tax advisors, and better local infrastructure. This regional variation in business information and resources may account for the observed spatial differences in corporate behaviours and strategies.

Second, firms that are closely located to one another are exposed to similar regional risks, which alter the incentives and behaviour of managers when making risky tax

avoidance decisions. We label this explanation as the 'risk and attitude channel'. For example, firms may face more regulatory risks if they are geographically proximate to regulatory and enforcement bodies, such as the IRS, because those resource-constrained regulators are more likely to investigate firms located closer to their offices (Kedia & Rajgopal, 2011; Kubick et al., 2017). These spatial differences in enforcement and/or detection efforts may make firms perceive the probability of regulatory examination and the associated cost of committing a violation differently. Differences among firms in their cost-benefit analyses of a violation would in turn affect whether they decided to break the rules or respect them. In addition to enforcement, it is possible that firms' decisions to engage in certain corporate activities may be influenced by other regional factors that alter people's attitude towards risk, including those related to overall economic wellbeing and weather-induced psychological conditions in a particular region. The effects that risk attitudes have on corporate behaviours and strategies may partially explain why firms that are located close to each other behave similarly and those that are distant from each other behave differently.

Third, firm locations may be correlated with the cultural and ethical norms of local communities, which may differ widely across space (Parsons et al., 2018; Hasan et al., 2017a). This explanation is labelled as the 'social channel'. Different social environments result in different shared common beliefs and attitudes concerning the civic duty and acceptable behaviours of the residents, including corporations, located in the community. Inevitably, managers of firms could be affected by the local community's culture, and they are likely to behave in a way that is consistent with the beliefs and behaviours of their social peers. The anticipated reputational costs and social sanctions associated with norm-deviant behaviours inhibit managers from going against the expectations of the community when running corporations. Since corporate tax avoidance is a contentious issue that affects a firm and its top-level managers' reputations in their surrounding community, managers are likely to take account of local social norms in making tax avoidance decisions (Gallemore, Maydew & Thornock, 2014).

Taking the above arguments together, we posit that the level of tax avoidance activities undertaken by a given firm will depend on where the firm is located. This study attempts to estimate the fixed effects that firms' locations have on corporate tax avoidance practices.

Hypothesis: Firms' locations have significant fixed effects on corporate tax avoidance.

2.3   Location-based characteristics and location fixed effects

We further investigate whether location fixed effects are systematically associated with various location-based characteristics. In particular, we focus on measuring the three potential channels outlined above. We derive several factors that aim to capture these characteristics. As the current analysis is exploratory in nature, we provide arguments without formally developing hypotheses for each factor considered. We note that several factors are linked to more than one explanation outlined above. In these cases, we explore how different channels lead to different predictions of the relationship between these factors and tax avoidance.

We begin with geographic proximity to the IRS territory manager's office. This factor relates to both the information channel and the risk channel with different predictions. On the one hand, the proximity to the IRS can provide information advantages to

corporate taxpayers regarding local IRS enforcement methods and priorities (Kubick et al., 2017). This superior information could enable nearby companies to engage in more tax avoidance activities, as they could tailor their tax planning strategies to take advantage of additional information about regulatory scrutiny. On the other hand, because tax authorities have limited resources, enforcement risks decrease with geographical distance to the tax authorities. Firms anticipating a higher likelihood of IRS examination are less likely to take aggressive tax positions. Kubick et al. (2017) show that the effect of proximity to the IRS on corporate tax avoidance is more consistent with the information advantage argument.

Second, we consider local workforce education level. We argue that this factor also reflects both the information channel and the risk channel. Call et al. (2017) find that high-quality local workforces are associated with reduced errors in reporting. Education is particularly important for specialised work such as tax management, where employees are required to be familiar with complex tax codes and tax avoidance strategies. Thus, we expect highly educated employees to be better at coping with such complexity, which could help firms reduce their tax payments. Education may also affect workers' attitude towards tax avoidance risk. Highly educated workers may better understand the risk associated with tax avoidance, leading them to better comply with the tax code. Moreover, there is evidence that education is positively associated with risk aversion (Jung, 2015). Thus, the risk channel predicts a negative association between regional education level and tax avoidance. Therefore, whether education can be positively or negatively related to tax avoidance is an empirical question.

Third, we explore local economic conditions, proxied by average personal wages and gross domestic product (GDP) per capita. The risk-based explanation suggests that local economic conditions can affect firms' tax avoidance in two ways. On the one hand, firms located in less developed areas may be exposed to more financial risks, and this could provide managers with more incentives to avoid tax. On the other hand, less developed areas have a much larger need than well-developed areas for more tax revenue to invest in basic public goods and services, and this could result in local tax authorities' tightened monitoring and detection of any tax avoidance behaviours of corporate taxpayers. We note that local economic factors also indicate the resource level of a specific area.

The fourth factor we examine is local weather patterns. The impact of sunlight and cloud on economic activity and corporate decisions has been documented by several previous studies (Kamstra, Kramer & Levi, 2003; Goetzmann & Zhu, 2005; Goetzmann et al., 2015). Chen et al. (2019) argued that variations in weather conditions induce mood fluctuations, and mood affects individual and corporate decision-making. Specifically, reduced daily sunlight and increased cloud cover trigger managers' negative mood and pessimism which are more likely to lead them to perceive greater cash flow risks. Therefore, they may engage in more aggressive tax avoidance to preserve internally generated cash flows. We predict a negative association between tax avoidance and local daily sunlight.

Fifth, we investigate whether local tax expertise may affect location fixed effects of tax avoidance. Our variable is the presence of 'Big 4' audit firms' local offices. Audit firms provide tax consulting services to help clients with tax planning. Auditors' tax-specific expertise is associated with greater tax avoidance (McGuire et al., 2012b). Firms that are located in areas with local Big 4 audit offices have easier access to high quality tax consulting services. This local resource can assist firms with the design and

implementation of tax strategies. Thus, the information and resource channel suggests a positive relationship between the presence of Big 4 audit firms' local offices and tax avoidance.

Sixth, we investigate local criminal culture. The average crime rates of a region indicate local residents' general attitudes toward extreme and illegal behaviours (Parsons et al., 2018), which could be related to the more aggressive tax sheltering activities of some firms. Given that a substantial number of tax avoidance activities are perfectly legal and therefore not subject to formal enforcement, managers' decisions to engage in those activities could be affected by whether the local community at large views tax avoidance as misbehaviour and thereby infers any wrongdoing on the part of the firms. If a community has a widely shared belief that it is inappropriate and unacceptable for all residents, including corporate residents, to avoid paying any tax, it is likely that firms located in that community and their managers will bear higher social and reputational costs from engaging in any type of aggressive tax strategy, and this may alter their incentives regarding tax planning and avoidance (Hasan et al., 2017a).

Last, McGuire, Omer and Sharp (2012a) find that firms headquartered in MSAs with religiously adherent residents have fewer incidents of accounting fraud, and they conclude that religion acts as a substitute for regulatory monitoring. Thus, religiosity is an important component of local ethical culture. It is likely that firms located in these religious regions will be less tax aggressive, as a means of reducing the expected associated social costs.

3.   SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Our primary sample begins with all publicly listed firms with headquarters located in the US for the years 1994 to 2017. We obtain financial information from COMPUSTAT. Financial firms (SIC 6000-6999) and firms in the highly regulated industries (SIC 4400-5000) are excluded due to inherent regulatory and institutional differences. Due to data availability constraints, we construct different samples for the different measures of tax avoidance. There are four measures of tax avoidance, i.e., ETR, CETR, UTB, and CETR5. We elaborate upon the specific measurement in the next section and Table 7 (Variable Definitions, Appendix). For the analysis of ETR and CETR, we use the full sample period of 1994-2017. As firm-level UTB data only became publicly available for fiscal years beginning after December 2006, the UTB sample period is from 2007 to 2017. To ensure a valid economic interpretation of the ETR measures, we follow prior literature to exclude firm-year observations with negative pre-tax book income, negative income tax expense, and negative cash tax paid (Dyreng et al., 2010; Kubick et al., 2017). Requiring the ETRs to be within the range of 0 to 1 ensures valid interpretation of our results (Dyreng et al., 2010). In the final sample, we retain only firm-year observations that have the requisite data to construct all variables in our main analysis. We obtain historical headquarters addresses (zip codes) from firms' 10-K filings in the US Securities and Exchange Commission (SEC) EDGAR database. Firm-year observations with missing or invalid location data are also excluded. To eliminate the noise from the effects of MSAs in which only small numbers of firms are headquartered, we require each MSA to have at least two sample firms in each fiscal year.

The resulting primary sample for ETR/CETR comprises 29,293 firm-year observations, corresponding to 5,197 distinct firms with headquarters located in 218 MSAs, 50 states, and 557 counties, and having 2,769 zip codes. The UTB sample has 18,925 observations

in 158 MSAs, and the CETR5 sample has 20,707 observations in 164 MSAs. We report this sample selection process in Panel A, Table 1. Since we also aim to examine the possible geographic factors that may be associated with location effects, the number of MSAs in the sample is further reduced to 120 for the ETR/CETR sample (86 for the UTB sample and 77 for the CETR5 sample) due to missing data for some geography-based explanatory variables. Panel A in Table 1 (Sample Selection, Appendix) provides a description of the sample for this part of the examination.

Table 2 (Descriptive Statistics, Appendix) presents descriptive statistics for the variables in our samples. Following Kubick et al. (2017), all continuous tax and control variables are winsorised at the 1% and 99% levels to mitigate the influence of outliers. The ETR variable is measured as the ratio of total tax expense to pre-tax income. The mean ETR in the sample is 31.5%, with a median of 33.5%. The CETR variable is measured as the ratio of cash taxes paid to pre-tax income. The mean CETR is 25.9% and the median is 24.1%. The UTB variable is measured as the ratio of the end-of-year unrecognised tax benefits to total assets. The mean UTB is 1.2% and the median is 0.4%. The CETR5 variable is the long-run CETR, computed as the sum of cash tax paid over a five-year period divided by pre-tax income over the same period.[2] The mean CETR5 is 25.6% and the median is 26.8%. These statistics are comparable to those in prior studies (Dyreng et al., 2010; Kubick et al., 2017; Hasan et al., 2017a).

Both the mean and median values of ETR and CETR are lower than the US federal corporate tax rate (35%) during the sample period due to the numerous deduction provisions in the tax code. The observation that CETR is lower than ETR is consistent with prior research (Mills, 1998; Dyreng et al., 2010), which suggests that firms generally have lower taxable income than pre-tax book income. The distributions of CETR and CETR5 are comparable, indicating that a lot of tax planning strategies cannot be implemented within a short time frame and thus require multi-year engagement from the firm (Hoopes et al., 2012).

The distribution of these tax measures reveals that there is significant variation in tax avoidance. At the 25th percentile, CETR is only 10.2%, but is 34.9% at the 75th percentile. This means that there are many firms in the sample that have successfully engaged in substantial tax avoidance, but at the same time, there are also a large proportion of firms that appear to be engaging in little or no tax avoidance, and some even pay taxes in excess of the statutory tax rate of 35%. The evidence suggests that not all firms take advantage of tax avoidance opportunities to reduce their tax payments.

We also present a number of other variables in Table 2 that are used to capture time-varying characteristics of the sample firms, and differences in state corporate income tax rates. All of them are defined in Panel A of Table 7 (Variable Definitions, Appendix). The summary statistics for those control variables are in the range of those in the extant literature (e.g., Dyreng et al., 2010; Kubick et al., 2017; Hasan et al., 2017a).

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[2] To ensure a meaningful interpretation of the long-run effective tax rate measure, there needs to be a positive denominator. Following Dyreng et al. (2008), we require our sample firms' pre-tax income to be positive when summed over the five-year period (t-4 to t).

4.   MAIN RESULTS: LOCATION FIXED EFFECTS

4.1   Primary model specification

We first examine two widely used standard measures: ETR and CETR. It is important to note that neither of these measures is able to capture tax avoidance perfectly. ETR captures only permanent tax strategies and is affected by managerial decisions related to financial reporting for income taxes (De Simone et al., 2020). In contrast, CETR captures both permanent and temporary tax strategies, but is more volatile as it can be affected by any action that reduces a firm's explicit tax liability (Dyreng et al., 2010). Despite those limitations, ETR and CETR have been employed broadly to detect tax avoidance because they can be calculated easily using public financial statement information. The third measure, UTB, captures the tax practices designed principally to avoid or evade taxes (Lisowsky et al., 2013). UTB reflects more aggressive tax avoidance strategies which are arguably riskier and less ethical. Lastly, we examine location fixed effects on long run corporate tax avoidance. Following Dyreng et al. (2008), we measure the long run corporate tax avoidance with a five-year CETR, i.e., CETR5.[3]

Our basic geographic unit of analysis is the MSA. These areas have high levels of sociological and economic integration. As many regional characteristics are typically measured at the MSA level, it is a good unit to use as a proxy for local community characteristics. We use the MSA-State combination to attach a unique identifier to each MSA, and this MSA-State code is included in the regression model as a separate indicator variable for each MSA. These indicators are our test variables.

Following Parsons et al. (2018), we benchmark the size of the location fixed effects against year and industry fixed effects. With this comparison, we can articulate whether the location of a firm's headquarters is likely to contain as much information as its industry classification. In a similar approach to that of Dyreng et al. (2010), who estimate executives' fixed effects, we regress the firm's tax avoidance variables on location fixed effects after controlling for year, firm and industry fixed effects. By doing so, we control time-invariant firm (industry) characteristics through firm (industry) fixed effects, and time-specific effects on corporate tax avoidance through year fixed effects. Additionally, we also control for firm attributes, e.g., size, leverage, R&D, and state corporate income tax rates, which could plausibly be related to corporate tax avoidance. The model specification is as follows:

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[3] We have calculated CETR5 using (1) the sum of cash taxes paid in years t, t+1, t+2, t+3, and t+4, divided by pre-tax book income before special items in years t, t+1, t+2, t+3, and t+4; (2) the sum of cash taxes paid in years t, t-1, t-2, t-3, and t-4, divided by pre-tax book income before special items in years t, t-1, t-2, t-3, and t-4; and (3) the sum of cash taxes paid in years t-2, t-1, t, t+1, and t+2, divided by pre-tax book income before special items in years t-2, t-1, t, t+1, and t+2. The different measures all yield similar results. When CETR5 is the dependent variable, we use control variables for a firm i in year t, following prior studies such as Guenther, Matsunaga and Williams (2017) and Davis et al. (2016). In addition, we have also calculated controls based on the average of the five-year period mentioned above and the results are consistent when using controls measured at year t.

$$ETR_{it}(CETR_{it} \text{ or } UTB_{it} \text{ or } CETR5_{it-~\sim t})$$
$$= \alpha_0 + \Sigma_l \alpha_l LOC_l + \Sigma_t \alpha_t YEAR_t + \Sigma_i \alpha_i FIRM_i$$
$$+ \alpha_{str} STR_{it} + \Sigma_k \alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

(1)

ETR_{it}, $CETR_{it}$, UTB_{it} and $CETR5_{it-4\sim t}$ are tax avoidance measures for a firm i in year t. LOC_l is our main variable of interest, an indicator variable for the geographic unit, i.e., MSA, in our main regression, where we denote each specific unit (location fixed effects). If the coefficients on LOC_l are jointly significant, the results will support our hypothesis. $FIRM_i$ is an indicator variable for each firm i (firm fixed effects); $YEAR_t$ is an indicator variable for each year t (year fixed effects); and STR_{it} is included to control for the influence of state-level tax rates. $CONTROL_{it}^k$ is a vector of control variables that captures a range of time-varying firm characteristics and performance measures. ε_{it} is the error term. All variables are defined in Table 7 (Variable Definitions, Appendix).

4.2 Location fixed effects and corporate tax avoidance

Table 3 (MSA Fixed Effects on Tax Avoidance, Appendix) reports the estimates from fixed effect regressions predicting ETRs and unrecognised tax benefits. The independent variables include year, firm, industry, and MSA fixed effects. Panels A, B, C, and D present the results when using ETR, CETR, UTB, and CETR5 as the dependent variable, respectively. We examine the F-statistics to test the joint significance of particular sets of fixed effect coefficients.

Model 1 is a baseline regression that includes only the vector of time-varying firm-level controls, STR, and an intercept. Models 2-5 include only one set of fixed effects, the effects of time-varying firm-level controls, and STR. Moving to the right in Table 3, year fixed effects are reported in Model 2, firm fixed effects in Model 3, industry fixed effects in Model 4, and MSA fixed effects in Model 5. The final model, i.e., Model 6, estimates MSA fixed effects after controlling for year fixed effects, firm fixed effects,[4] and all the time-varying firm-level variables. The results for Model 5 show that MSA fixed effects are jointly significant in explaining all of our four measures of tax avoidance (F-statistic = 1.81, 2.22, 12.68, and 5.69 for the ETR, CETR, UTB, and CETR5, respectively). These effects remain significant at less than the 1% level in Model 6, where other fixed effects are also controlled (F-statistic = 2.48, 1.95, 3.22, and 4.85 for the ETR, CETR, UTB, and CETR5 regressions, respectively). The results indicate that the MSAs in which firms are located are jointly significant in explaining the variations in corporate tax avoidance.

The explanatory power of Model 5 is benchmarked against that of the other models. In Panel A, where ETR is the dependent variable, relative to Model 1, the inclusion of year fixed effects in Model 2 increases the R-squared by roughly 0.5 percentage points, the inclusion of industry fixed effects in Model 4 increases the R-squared by about 3.6 percentage points, and the inclusion of MSA fixed effects in Model 5 increases the R-

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[4] Industry fixed effects are subsumed by firm fixed effects.

squared by approximately 1.2 percentage points. The sizes of the incremental explanatory power from MSA fixed effects are similar for CETR and CETR5 as shown in Panels B and D. The impact of MSA fixed effects on the R-squared is consistently larger than that of year fixed effects, which could mean that regional variation is more important than the average differences observed across time in determining firms' ETRs. The improvements in R-squared are smaller with the MSA fixed effects than the industry fixed effects, suggesting that the location of a firm is less powerful than its industry classification in predicting how much tax the firm will avoid. However, as shown in Panel C, where UTB is the dependent variable, the R-squared increases more with MSA fixed effects than industry fixed effects. Firm fixed effects produce the largest improvement in the adjusted R-squared, as expected. However, the results from the inclusion of MSA, year and firm fixed effects in Model 6 suggest that those fixed effects are likely to capture distinctive effects on tax avoidance.

To specifically look at the explanatory power of the MSA fixed effects, we now summarise the R-squared of each model. When MSA fixed effects are added to the regressions, in comparison with the baseline model, i.e., Model 1, the R-squared increases from 7.1% to 8.3% for ETR, from 7.5% to 9.0% for CETR, from 9.4% to 18.1% for UTB, and from 16.9% to 20.5% for CETR5. This evidence is consistent with our prediction that different firm locations would at least partially account for the variations in both the one-year and long-run ETRs. It is interesting to note that including MSA fixed effects doubles the explanatory power of the UTB regression, suggesting that firm location is an important determinant of tax sheltering activity.[5]

With regard to the estimated coefficients on the firm-level control variables, most of them are statistically significant and consistent with prior studies (e.g., Gupta & Newberry, 1997; Chen et al., 2010; Dyreng et al., 2010). For example, when ETR is the dependent variable (Panel A of Table 3), the coefficients on SIZE and ROA are both positively significant at the 1% level across almost all models (except for Model 3), and this finding is consistent with larger and more profitable firms reporting more tax expenses. The estimated coefficients for ΔNOL, LEV, FI, GPPE, EQINC, MTB, R&D, CASH, ΔSALES, and ANALYST are all negative and significant, and the estimated coefficients for CAPEX, INSTPERC, SG&A and ALOCAL are positive and significant. Interestingly, the estimated coefficients on STR_{it} are not statistically significant in many of the models presented in Table 3. In particular, they are -0.061, -0.001, 0.000, and 0.000 in Model 6 for the ETR, CETR, UTB, and CETR5 regressions respectively. These results show that the corporate tax avoidance practices of the sample firms are not significantly associated with the levels of state corporate income tax rates imposed on those firms, after controlling for the effects of firm, year, and location, and this finding is consistent with Hasan et al. (2017a).

Having found statistically significant location fixed effects, we next examine the economic significance of the effects of firms' locations on tax avoidance. The focus is on the MSAs whose specific fixed effect coefficient is significant, i.e., where the t-

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[5] For robustness checks, we also cluster standard errors at the firm level, and then at the MSA level. We find clustering the standard errors does not change the coefficients on the fixed effects and controls variables, though has an impact on the t-statistics. In untabulated results, the F-statistics testing the joint significance of the location fixed effects are consistently significant across all regressions in the full models. In fact, in all cases, the F-statistics are slightly larger than those reported in Table 3. This suggests that our main results are robust to using clustered standard errors.

statistic on the particular coefficient is significant based on two-sided tests. Table 4 (Significance Levels of MSA Fixed Effects, Appendix) presents the numbers and percentages of individual MSAs with statistically significant fixed effects from Model 6 in Table 3 (for ETR, CETR, UTB, and CETR5 respectively). The primary sample contains a total of 142 MSA specific estimations of coefficients for which data are available.[6] In the results with ETR as the dependent variable, 49.3% of MSAs are significant at the 5% level and 35.9% do not have significant MSA fixed effect coefficients at the conventional level. The numbers of significant MSAs are larger for the CETR (93.7%) regression. For the UTB and CETR5 regressions, the percentage of location fixed effects that are significant at the 5% level are 48.1% and 62% respectively. The large numbers and percentages of significant MSAs suggest that the joint significance of the MSA fixed effect is unlikely to be driven by the influence of a few MSAs with significant coefficients.

Corresponding to this statistical significance, our results for the distribution of the MSA fixed effect coefficients estimated for ETR, CETR, UTB, and CETR5 also suggest the economic significance of the location fixed effect. The ETRs of firms located in the top 25% of MSAs are at least 13% higher than the ETRs of firms located in the bottom 25% of MSAs. This means that moving between the top and bottom quartiles of locations results in an approximately 13% swing in ETR. Given that the mean ETR is 31.5%, this difference is economically large and significant. We observe similarly sizable swings for CETR, UTB, and CETR5. We present these results in Table 6 Panel A (MSA Fixed Effects and MSA Characteristics, Appendix) for the purpose of collectively reporting the descriptive statistics for the second-stage examination. A visual depiction of the distribution of location fixed effects across the US is also provided in Figure 1 (Spatial Distribution of MSA Fixed Effect Coefficients, Appendix).

4.3   Robustness tests

We conduct a number of robustness tests on our main tests. The details of these tests are documented in the Supplementary Appendix. In the first set of tests, we include loss observations in our sample following recent studies such as Henry and Sansing (2018), and examine the location fixed effects on the tax avoidance behaviour of both profitable and loss firms. Results are consistent with our main findings which confirm that location fixed effects can be observed in a larger sample of firms. Second, we employ alternative measures of geographic unit, including states, counties, and the zip codes of the firms' headquarters, in estimating Equation (1). The significant location fixed effects are present when quantified using different geographic units.

Third, to address the selection bias concern given firms' change of location is not random, we split the primary sample into firms that have and firms that have not changed headquarters MSA locations and re-estimate Equation (1) using both sub-samples. Our findings that MSA fixed effects continue to be jointly significant in explaining tax avoidance activities suggest that location fixed effects are less likely to be affected by firms' decision on whether or not they change their headquarters locations. Fourth, we show that neighbouring MSAs which should have similar

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[6] The number of estimated MSA fixed effects is smaller in Model 6 (142) than Model 5 (218). This is due to the inclusion of firm fixed effects in Model 6. If no firm in an MSA changes its headquarters' location during the sample period, the corresponding MSA fixed effect is subsumed by the firm fixed effects. Thus, estimated MSA fixed effects capture the location effects on firms that have moved their headquarters.

geographical features tend to influence firms' tax decisions in a similar way. Results also indicate that there is no clear pattern of location fixed effects dominating in one period of time.

The fifth set of tests address omitted variable issues. We control for corporate governance factors, such as board size, percentage of independent directors, gender diversity on the board, CEO and chair duality, and CFOs' board membership and CEO total compensation (Armstrong et al., 2015; Gaertner, 2014). The location fixed effects remain significant after we include in Equation (1) executive fixed effects (Dyreng et al., 2010; Yonker, 2017).

4.4   Cross-sectional tests

We expect location fixed effects to be stronger for firms with lengthier durations in their current location and lower geographic diversification. We perform two cross-sectional tests by partitioning the sample based on how long the firm has been in a given location and whether it has material subsidiaries in another US state and/or foreign country. Table 5 (MSA Fixed Effects Variation: Length of Localisation and Geographical Diversification, Appendix) presents the results.

First, we test location fixed effects on corporate tax avoidance when the firm has been located in the same MSA for more than three years (*Long*) or less than or equal to three years (*Short*). As shown in Panel A of Table 5, we find that the location fixed effects are highly significant for the *Long* sample and less or even not significant for the *Short* sample, which is consistent with location fixed effects being affected by the length of time a firm has been located in a given location.

We conjecture that the location fixed effects could attenuate for geographically diversified firms with a material presence in locations other than their headquarters locations. This is so because the location of those diversified firms' subsidiaries could dilute the location fixed effects from the headquarters. We examine this possibility using data collected by Scott D Dyreng from Exhibit 21 in 10K filings for material subsidiary disclosures.[7] The main samples are divided into firms that have material subsidiaries in at least one state or country other than the headquarter location in a given year (*Diversified*) and those that do not (*Non-diversified*). Results are reported in Panel B, Table 5. Comparing the F-statistics for MSA fixed effects across the two sub-samples suggests that in the ETR and CETR models, the location fixed effects indeed attenuate when there is geographic diversification. In the UTB regression, we find that the location fixed effects are concentrated in the geographically dispersed subsample. It is possible that, since geographically diversified firms are exposed to a variety of tax avoidance strategies (e.g., using tax haven subsidiaries to engage in aggressive tax avoidance strategies: Dyreng, Hanlon & Maydew, 2019), these firms are likely to exhibit greater variation in tax avoidance, especially in more aggressive and uncertain tax arrangements. In the CETR5 regression, the location fixed effects are also stronger in the geographically diversified subsample. This somehow contradicts our conjecture but there is a possibility that CETR5 may not reflect the geographical diversification in the current year because CETR5 represents relatively dynamic tax aggressiveness positions incorporating the past four years.

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[7] See https://sites.google.com/site/scottdyreng/Home/data-and-code/EX21-Dataset.

5.   MSA CHARACTERISTICS AND MSA FIXED EFFECTS

So far, we have documented significant spatial variations in corporate tax avoidance. To further understand the geographic effects on tax avoidance behaviour, we examine some possible channels through which geographic locations might affect tax avoidance decisions. Accordingly, we obtain demographic, social, economic, regulatory, and weather information about each of the MSAs in the sample, and examine whether those MSA-level characteristics are associated with the MSA fixed effects on tax avoidance.

In order to determine the extent to which MSA characteristics explain the variation in tax avoidance across MSAs, we use the following multivariate OLS regression:

$$\hat{\alpha}_l^{ETR}(\hat{\alpha}_l^{CETR}/\hat{\alpha}_l^{UTB}/\hat{\alpha}_l^{CETR5})$$
$$= \beta_0 + \beta_1 LPOP_l + \beta_2 LWAGES_l + \beta_3 LGDP_l + \beta_4 EDUC_l$$
$$+ \beta_5 CRIMES_l + \beta_6 RELIGION_l + \beta_7 LAUDITOR_l$$
$$+ \beta_8 LDISTANCEIRS_l + \beta_9 LWEATHER_l + \beta_{10} LOSTFIRMPCT_l$$
$$+ \epsilon_l$$

$$(2)$$

The dependent variables $\hat{\alpha}_l^{ETR}$, $\hat{\alpha}_l^{CETR}$, $\hat{\alpha}_l^{UTB}$, and $\hat{\alpha}_l^{CETR5}$ represent coefficients estimated for MSA l's fixed effect when the dependent variables in Equation (1) are ETR, CETR, UTB, and CETR5 respectively. Recall that these coefficients are estimated while controlling for year and firm fixed effects. The independent variables include the workforce population, average personal wage of the workforce population, GDP per capita, education level of the workforce population, total crime rate, the importance of religion in people's daily life (religiosity), the number of Big 4 audit firms' local offices in the MSA, geodesic distance to IRS, and daily sunlight, for the MSAs during the sample period. Based on our discussion in section 2, we loosely group these variables into three categories: information and resource-based factors (workforce population, educational attainment, expertise from Big 4 audit firms, and proximity to IRS), factors influencing location-based risks (average personal wage, GDP per capita, and daily sunlight), and social factors (crime rates and religiosity). We also include the percentage of firms that report a negative pre-tax book income out of all firms in each MSA to proxy for the general financial performance pertained to the local area. All variables are averaged across the sample period for each MSA. Definitions and sources are provided in Panel B of Table 7 (Variable Definitions, Appendix). Table 6 (MSA Fixed Effects and MSA Characteristics, Appendix) presents the descriptive statistics for MSA characteristics, correlation between those characteristics and the relation between MSA fixed effects and MSA characteristics.

Panel A reports descriptive statistics on the regional characteristics of the MSAs in the sample for which data are available. For the 120 MSAs with available data, the average size of the workforce population is about 777,000.[8] The mean GDP per capita is USD

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[8] We describe workforce population in its raw value here for a meaningful economic interpretation of the variable, but we use the log transformation of this variable in our regressions. The same strategies have

46,925 and the mean annual personal income USD 41,814. The weighted average education level of workforce population in our sample swings from 7.26 in the bottom percentile to 7.78 in the top percentile. The median average crime rate is 3.45% of the population. In general, 65.3% of Gallup poll respondents indicate that religion is an important part of their daily life. The number of Big 4 auditor offices located in the MSAs range from 0 to 13. The sample firms are located on average approximately 93 miles from the nearest IRS territory manager's office. The average daily sunlight observed across the MSAs is 16,355 KJ/ m^2. About 6.7% of sample firms located in the MSAs report negative pre-tax book income in their financial statements.

Panel B presents the Pearson correlations for the variables in Equation (2). Overall, there appears to be some correlation between the MSA fixed effects and the location-based factors, but the correlation does not appear to be consistent across all four measures of tax avoidance.

Panel C shows the results of regressions of the MSA fixed effect coefficients on variables that capture the MSA attributes. We find the effects that firm locations have on tax avoidance to be unrelated to most of these location-based characteristics. Statistically significant coefficients are only found for the education level of the local workforce, and local sunshine coverage variables. The positive and significant coefficient estimated for $EDUC$ on the CETR and the UTB fixed effects suggests that firms located in MSAs with higher education level pay more taxes to the tax authorities and have lower tax reserves. This result is consistent with the risk explanation which suggests educated employees understand the tax risk better and are more likely comply with the tax code. Moreover, the significantly positive (negative) relation between the weather variable and the ETRs (UTB) supports the idea of a weather-induced positive mood is associated with a reduction in the risky tax avoidance activities of the firms (Chen et al., 2019).

The fact that the coefficients on most of the other independent variables in Equation (2) are insignificant suggests that, while there are significant geographic differences in tax avoidance among the MSAs in our sample, many previously examined location-related factors cannot explain these differences. The F-statistics that test the joint significance of all coefficients in each regression report a 5% significance for UTB fixed effects. The R-squareds of these models range between 7.6% (CETR5) and 16.8% (UTB). The relatively low explanatory power of all regressions indicates that the MSA characteristics studied do not account for much of the regional variation in tax avoidance observed across our sample of MSAs.

Overall, we find some evidence that location-based information and resource factors as well as risk factors are associated with persistent spatial variation in corporate tax avoidance, while local social and cultural characteristics exhibit little explanatory power. Nevertheless, we acknowledge that it is very difficult to fully identify and determine other factors that could actually account for the cross-sectional variation in tax avoidance observed across space.

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been adopted for GDP per capita, annual personal income, the presence of Big 4 audit office, distance to IRS, and average daily sunlight.

6.   CONCLUSION

This study examines whether firm location matters for tax avoidance decisions. Our findings suggest that firm location plays a significant role in predicting how much tax firms avoid, and those findings are robust across our validity tests, alternative measures tests, endogeneity tests and consistent with our cross-sectional analysis. In addition, we show that, while some observable location factors, such as education, and weather, are correlated with differences in tax avoidance across MSAs to a certain extent, much of this variation remains unexplained. Since the MSA characteristics that we examine constitute only the observable factors, there may be a set of unobservable factors that are relevant to tax avoidance decisions and tax planning activities but not captured in our models. This suggests that future studies are needed to further explore factors associated with the geographic differences in corporate tax avoidance.

Given the difficulty of identifying factors that can fully account for the substantial variation in tax avoidance across firms, documenting that firm location has a significant effect on tax avoidance and estimating the magnitude of that effect is an important step forward. Our research has implications for tax authorities, in deploying their constrained resources and coordinating their supervision efforts. The finding that firms located in some areas are more likely than others to pay lower taxes should help inform the regional enforcement of the IRS in those areas where more firms are using complex tax strategies to reduce taxes.

7.   REFERENCES

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8.   APPENDIX

Table 1: Sample Selection

Panel A: Sample Selection for the Primary Sample

	ETR/CETR	UTB	CETR5
Firm-year observations relating firms located in the US from 1993 (or 2006 for the UTB sample) to 2017 with sufficient data on COMPUSTAT (observations in 1993 (or 2006) are included for calculating lagged values)	220,282	95,271	220,282
Less: Financial companies (SIC 6000-6999) and highly regulated industry (SIC 4400-5000)	84,819	43,967	84,819
Less: Firm-year observations with missing or invalid location data (zip code, state, county, MSA)	39,555	9,909	39,555
Less: Firm-year observations with negative pre-tax book income, negative income tax expense, or negative cash taxes paid (for CETR5, observations with negative pre-tax income when summed over the five-year period, i.e. negative denominators)	47,849	----------	56,510
Less: Firm-year observations with insufficient data to calculate tax avoidance measures ETR and CETR (or CETR5 or UTB)	4,356	16,369	9,722
Less: Firm-year observations with insufficient data to calculate control variables	12,556	5,266	7,200
Less: MSAs with less than 2 firms in each year	1,854	835	1,769
Final Sample (firm-year)	29,293	18,925	20,707
Final Sample (firm)	5,197	3,322	3,248
Final Sample (MSA)	218	158	164

	ETR/CETR	UTB	CETR5
Final Sample (state)	50	44	47
Final Sample (county)	557	375	419
Final Sample (zip code)	2,769	1,814	2,046

Panel B: Sample Selection for the MSA Sample

	ETR/CETR	UTB	CETR5
MSAs with coefficients estimated in Equation (1)	218	158	164
Less: MSAs with missing fixed effect coefficients (MSA fixed effects subsumed by firm fixed effects)	76	54	72
Less: MSAs with missing values in Equation (2) variables	22	18	15
Final sample MSAs	120	86	77

Table 2: Descriptive Statistics

	N	Mean	Std. Dev.	25th Pctl	Median	75th Pctl
Dependent Variables						
ETR_{it}	29,293	0.315	0.174	0.241	0.335	0.381
$CETR_{it}$	29,293	0.259	0.227	0.102	0.241	0.349
UTB_{it}	18,925	0.012	0.023	0.000	0.004	0.013
$CETR5_{it-4\sim t}$	20,707	0.256	0.119	0.180	0.268	0.338
Control Variables						
$SIZE_{it}$	29,293	5.988	2.004	4.616	6.033	7.364
ROA_{it}	29,293	0.129	0.107	0.057	0.102	0.169
NOL_{it}	29,293	0.412	0.492	0.000	0.000	1.000
$\triangle NOL_{it}$	29,293	0.111	0.390	0.000	0.000	0.040
LEV_{it}	29,293	0.201	0.193	0.015	0.168	0.320
FI_{it}	29,293	0.018	0.037	0.000	0.000	0.021
$GPPE_{it}$	29,293	0.489	0.366	0.200	0.395	0.699
$INTANG_{it}$	29,293	0.164	0.182	0.010	0.098	0.267
$EQINC_{it}$	29,293	0.001	0.004	0.000	0.000	0.000
MTB_{it}	29,293	2.969	3.379	1.331	2.141	3.533
$R\&D_{it}$	29,293	0.032	0.059	0.000	0.000	0.034
$CASH_{it}$	29,293	0.162	0.177	0.027	0.095	0.240
$CAPEX_{it}$	29,293	0.128	0.097	0.062	0.100	0.163
ADV_{it}	29,293	0.011	0.026	0.000	0.000	0.008
$SG\&A_{it}$	29,293	0.239	0.167	0.112	0.212	0.330
$\triangle SALES_{it}$	29,293	0.154	0.284	0.013	0.093	0.215
$INSTPERC_{it}$	29,293	0.575	0.328	0.413	0.695	0.823
$MKTPRES_{it}$	29,293	1.947	4.777	0.000	0.000	2.000
$ANALYST_{it}$	29,293	1.796	1.470	0.000	2.079	3.045
$ALOCAL_{it}$	29,293	0.594	0.590	0.000	1.000	1.000
STR_{it}	29,293	6.774	3.032	6.000	7.500	8.840

This Table reports descriptive statistics for the variables used in our main analyses. All continuous tax and control variables (except for STR) are winsorised at the 1% and 99% level to mitigate the influence of outliers. All variables are defined in Panel A of Table 7.

Table 3: MSA Fixed Effects on Tax Avoidance

Panel A: MSA Fixed Effects on Effective Tax Rates (ETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		7.23***				7.56***
FIRM$_i$			3.01***			3.05***
IND$_i$				3.20***		----------
LOC$_l$ (MSA)					1.81***	2.48***
N	29,293	29,293	29,293	29,293	29,293	29,293
NYEARS		24				24
NFIRMS			5,197			5,197
NINDS				367		----------
NLOCS					218	218
RSQ	0.071	0.076	0.437	0.107	0.083	0.449
Estimated Coefficients (t-tests):						
Intercept	0.313***	0.340***	0.208***	0.160	0.352***	−0.733***
	(48.71)	(38.91)	(2.76)	(1.37)	(7.98)	(−3.35)
SIZE$_{it}$	0.005***	0.006***	0.004*	0.005***	0.005***	0.012***
	(6.29)	(7.05)	(1.69)	(5.81)	(6.18)	(4.43)
ROA$_{it}$	0.108***	0.107***	0.204***	0.114***	0.120***	0.205***
	(9.82)	(9.66)	(14.36)	(10.17)	(9.83)	(14.44)
NOL$_{it}$	−0.002	0.002	−0.006*	−0.001	−0.001	−0.002
	(−0.80)	(0.99)	(−1.90)	(−0.53)	(−0.44)	(−0.65)
Δ NOL$_{it}$	−0.065***	−0.064***	−0.059***	−0.067***	−0.067***	−0.054***
	(−22.83)	(−22.27)	(−12.33)	(−23.22)	(−23.18)	(−11.00)
LEV$_{it}$	−0.036***	−0.042***	0.028***	−0.031***	−0.035***	0.011
	(−6.00)	(−6.91)	(2.90)	(−4.85)	(−5.83)	(1.10)
FI$_{it}$	−0.369***	−0.365***	−0.325***	−0.299***	−0.373***	−0.307***
	(−12.66)	(−12.53)	(−7.01)	(−9.58)	(−12.53)	(−6.55)
GPPE$_{it}$	−0.033***	−0.031***	−0.038***	−0.038***	−0.031***	−0.026***
	(−9.68)	(−9.09)	(−4.30)	(−8.30)	(−8.80)	(−2.90)
INTANG$_{it}$	−0.013*	−0.002	−0.052***	−0.030***	−0.014**	−0.045***
	(−1.85)	(−0.36)	(−3.67)	(−3.78)	(−1.95)	(−3.16)
EQINC$_{it}$	−0.813***	−0.809***	−0.227	−0.802***	−0.801***	−0.230
	(−3.58)	(−3.57)	(−0.69)	(−3.35)	(−3.48)	(−0.70)
MTB$_{it}$	−0.001***	−0.001***	−0.002***	−0.002***	−0.001***	−0.002***
	(−4.44)	(−4.45)	(−5.01)	(−4.89)	(−4.54)	(−5.00)
R&D$_{it}$	−0.354***	−0.363***	−0.097	−0.213***	−0.347***	−0.119*
	(−15.65)	(−16.07)	(−1.54)	(−7.54)	(−14.50)	(−1.87)
CASH$_{it}$	−0.055***	−0.044***	−0.063***	−0.064***	−0.056***	−0.051***
	(−7.11)	(−5.50)	(−5.09)	(−7.61)	(−7.01)	(−4.03)
CAPEX$_{it}$	0.124***	0.112***	0.043***	0.106***	0.122***	0.027*
	(10.92)	(9.67)	(3.10)	(8.98)	(10.61)	(1.90)
ADV$_{it}$	0.018	0.031	0.117	−0.022	0.005	0.108
	(0.44)	(0.75)	(1.24)	(−0.47)	(0.12)	(1.14)

SG&A$_{it}$	0.041***	0.041***	0.038**	0.034***	0.042***	0.058***
	(5.06)	(5.04)	(2.02)	(3.67)	(5.06)	(3.07)
Δ SALES$_{it}$	−0.038***	−0.040***	−0.037***	−0.035***	−0.036***	−0.039***
	(−9.82)	(−10.18)	(−8.54)	(−8.90)	(−9.29)	(−8.93)
INSTPERC$_{it}$	0.020***	0.024***	0.004	0.021***	0.020***	0.010**
	(5.36)	(6.35)	(0.95)	(5.72)	(5.37)	(2.01)
MKTPRES$_{it}$	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(−0.41)	(−0.20)	(−0.48)	(−1.49)	(−0.29)	(−0.58)
ANALYST$_{it}$	−0.008***	−0.007***	−0.006***	−0.008***	−0.008***	−0.006***
	(−6.83)	(−6.23)	(−3.84)	(−7.17)	(−6.78)	(−3.45)
ALOCAL$_{it}$	0.007***	0.005***	0.001	0.007***	0.007***	0.003
	(3.49)	(2.71)	(0.23)	(3.30)	(3.37)	(0.95)
STR$_{it}$	0.000	−0.000	0.000	0.000	0.091	−0.061
	(0.87)	(−0.02)	(0.06)	(0.22)	(1.11)	(−0.69)

Panel B: MSA Fixed Effects on Cash Effective Tax Rates (CETR$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		11.59***				12.10***
FIRM$_i$			2.54***			2.54***
IND$_i$				2.98***		----------
LOC$_l$					2.22***	1.95***
(MSA)						
N	29,293	29,293	29,293	29,293	29,293	29,293
NYEARS		24				24
NFIRMS			5,197			5,197
NINDS				367		----------
NLOCS					218	218
RSQ	0.075	0.083	0.403	0.109	0.090	0.416
Estimated Coefficients (t-tests):						
Intercept	0.328***	0.314***	0.120	0.156	0.523***	−0.984***
	(39.09)	(27.58)	(1.18)	(1.02)	(10.64)	(−3.34)
SIZE$_{it}$	0.004***	0.005***	0.016***	0.004***	0.004***	0.033***
	(3.97)	(4.99)	(5.46)	(3.78)	(3.86)	(8.99)
ROA$_{it}$	−0.066***	−0.072***	−0.141***	−0.078***	−0.072***	−0.152***
	(−4.61)	(−4.99)	(−7.36)	(−5.28)	(−4.92)	(−7.96)
NOL$_{it}$	−0.037***	−0.033***	−0.032***	−0.036***	−0.037***	−0.026***
	(−12.70)	(−10.86)	(−8.02)	(−11.93)	(−12.34)	(−6.34)
Δ NOL$_{it}$	−0.055***	−0.052***	−0.036***	−0.054***	−0.057***	−0.023***
	(−14.63)	(−13.81)	(−5.62)	(−14.23)	(−15.04)	(−3.56)
LEV$_{it}$	−0.086***	−0.096***	0.001	−0.073***	−0.085***	−0.025*
	(−10.97)	(−12.24)	(0.09)	(−8.79)	(−10.71)	(−1.87)
FI$_{it}$	−0.123***	−0.122***	−0.531***	−0.077*	−0.119***	−0.507***
	(−3.23)	(−3.20)	(−8.50)	(1.88)	(−3.07)	(−8.03)
GPPE$_{it}$	−0.065***	−0.062***	−0.028**	−0.039***	−0.061***	0.003

	(−14.77)	(−14.11)	(−2.40)	(−6.54)	(−13.39)	(0.21)
$INTANG_{it}$	−0.031***	−0.015	−0.051***	−0.022**	−0.032***	−0.016
	(−3.44)	(−1.64)	(−2.68)	(−2.12)	(−3.53)	(−0.84)
$EQINC_{it}$	−1.036***	−0.989***	−1.233***	−0.839***	−0.949***	−1.131**
	(−3.49)	(−3.34)	(−2.79)	(−2.68)	(−3.16)	(−2.55)
MTB_{it}	−0.001***	−0.001***	−0.001***	−0.002***	−0.001***	−0.001**
	(−3.22)	(−2.99)	(−2.77)	(−3.61)	(−3.18)	(−2.10)
$R\&D_{it}$	−0.469***	−0.483***	−0.045	−0.348***	−0.445***	−0.048
	(−15.88)	(−16.38)	(−0.53)	(−9.43)	(−14.26)	(−0.56)
$CASH_{it}$	−0.062***	−0.042***	−0.071***	−0.039***	−0.055***	−0.030*
	(−6.07)	(−4.10)	(−4.22)	(−3.52)	(−5.32)	(−1.74)
$CAPEX_{it}$	0.051***	0.015	0.133***	−0.088***	0.060***	0.077***
	(3.44)	(1.00)	(7.06)	(5.66)	(4.01)	(4.03)
ADV_{it}	0.046	0.073	−0.083	−0.024	0.035	−0.066
	(0.85)	(1.37)	(−0.65)	(−0.39)	(0.63)	(−0.52)
$SG\&A_{it}$	0.072***	0.076***	0.153***	0.076***	0.073***	0.164***
	(6.84)	(7.18)	(5.99)	(6.25)	(6.78)	(6.42)
$\triangle SALES_{it}$	−0.096***	−0.097***	−0.079***	−0.086***	−0.091***	−0.084***
	(−19.20)	(−19.12)	(−13.60)	(−16.98)	(−18.08)	(−14.14)
$INSTPERC_{it}$	0.033***	0.039***	0.002	0.033***	0.031***	0.007
	(6.92)	(7.92)	(0.38)	(6.65)	(6.52)	(1.08)
$MKTPRES_{it}$	−0.000	0.000	−0.000	−0.000	−0.000	−0.000
	(−0.11)	(0.33)	(−0.57)	(−0.99)	(−0.12)	(−1.05)
$ANALYST_{it}$	−0.009***	−0.008***	−0.000	−0.009***	−0.008***	−0.000
	(−5.82)	(−5.70)	(−0.18)	(−6.09)	(−5.52)	(−0.19)
$ALOCAL_{it}$	0.005*	0.003	0.007*	0.006**	0.005*	0.007*
	(1.95)	(1.16)	(1.85)	(2.44)	(1.96)	(1.90)
STR_{it}	0.001**	0.000	0.001	0.000	0.001	−0.001
	(2.24)	(0.92)	(1.29)	(0.87)	(0.82)	(−0.56)

Panel C: MSA Fixed Effects on FIN 48 Tax Reserve (UTB_{it})

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
$YEAR_t$		10.65***				4.37***
$FIRM_i$			16.70***			15.12***
IND_i				5.85***		----------
LOC_l (MSA)					12.68***	3.22***
N	18,925	18,925	18,925	18,925	18,925	18,925
NYEARS		11				11
NFIRMS			3,322			3,322
NINDS				326		----------
NLOCS					158	158
RSQ	0.094	0.099	0.801	0.178	0.181	0.806

Estimated Coefficients (t-tests):

Intercept	−0.001	−0.003***	0.124***	−0.007**	0.001	0.112***
	(−0.97)	(−2.58)	(17.68)	(−2.08)	(0.18)	(11.55)
$SIZE_{it}$	0.000***	0.000***	−0.006***	0.001***	0.000***	−0.006***
	(3.67)	(3.71)	(−22.24)	(7.36)	(4.01)	(−21.36)
ROA_{it}	0.003***	0.003***	0.001**	0.003***	0.003***	0.001**
	(6.85)	(6.86)	(2.22)	(6.09)	(6.81)	(2.54)
NOL_{it}	0.002***	0.003***	0.000	0.002***	0.001***	0.000
	(5.25)	(6.86)	(0.22)	(4.75)	(3.31)	(0.23)
ΔNOL_{it}	0.001***	0.001***	0.001***	0.001***	0.001***	0.000***
	(15.03)	(15.44)	(9.55)	(14.74)	(14.04)	(8.75)
LEV_{it}	−0.001	0.000	0.001*	0.001	0.000	0.001*
	(−0.86)	(−0.68)	(1.83)	(1.01)	(−0.02)	(1.72)
FI_{it}	0.026***	0.025***	−0.003	0.013***	0.023***	−0.003
	(6.20)	(5.99)	(−0.71)	(3.13)	(5.61)	(−0.74)
$GPPE_{it}$	0.000	0.001	0.004***	0.003***	0.001***	0.003***
	(0.92)	(1.15)	(4.98)	(4.08)	(2.86)	(4.30)
$INTANG_{it}$	0.002	0.002**	0.001	−0.003**	0.002*	0.001
	(1.59)	(1.98)	(0.62)	(−2.28)	(1.77)	(0.45)
$EQINC_{it}$	0.051	0.050	0.027	0.095**	0.084*	0.032
	(1.14)	(1.11)	(0.67)	(2.05)	(1.92)	(0.80)
MTB_{it}	0.000	0.000**	0.000	0.000***	0.000	0.000
	(1.64)	(2.31)	(1.24)	(2.59)	(0.71)	(1.21)
$R\&D_{it}$	−0.000**	−0.000**	0.000	0.000	0.000	0.000
	(−2.56)	(−2.45)	(0.59)	(0.47)	(0.25)	(1.15)
$CASH_{it}$	0.022***	0.022***	−0.001	0.013***	0.013***	−0.001
	(21.84)	(21.96)	(−0.36)	(11.62)	(13.20)	(−0.86)
$CAPEX_{it}$	−0.016***	−0.016***	−0.005***	−0.017***	−0.019***	−0.004***
	(−8.95)	(−8.99)	(−3.49)	(−9.21)	(−10.95)	(−2.75)
ADV_{it}	0.002	0.003	0.009	0.009	0.011**	0.016**
	(0.31)	(0.50)	(1.23)	(1.51)	(2.12)	(2.16)
$SG\&A_{it}$	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(4.94)	(4.95)	(3.77)	(4.69)	(4.56)	(3.16)
$\Delta SALES_{it}$	−0.002***	−0.002***	−0.001***	−0.001***	−0.001***	−0.001***
	(−5.08)	(−4.95)	(−2.78)	(−3.57)	(−4.46)	(−2.69)
$INSTPERC_{it}$	−0.001**	−0.002**	0.000	−0.001	0.001	−0.000
	(−2.10)	(−2.52)	(0.20)	(−0.91)	(0.90)	(−0.09)
$MKTPRES_{it}$	−0.000***	−0.000***	−0.000**	−0.000***	−0.000***	−0.000**
	(−5.91)	(−5.44)	(−2.52)	(−4.62)	(−4.85)	(−2.30)
$ANALYST_{it}$	−0.008*	−0.000	−0.000	−0.001***	−0.001***	−0.000
	(−1.94)	(−1.02)	(−0.46)	(−3.76)	(−4.09)	(−0.35)
$ALOCAL_{it}$	0.003***	0.003***	−0.000	0.003***	0.002***	0.000
	(9.19)	(8.15)	(−0.43)	(8.00)	(6.29)	(0.30)
STR_{it}	0.001***	0.001***	−0.000***	0.000***	0.000	0.000
	(12.44)	(11.72)	(−2.70)	(8.41)	(0.61)	(1.57)

Panel D: MSA Fixed Effects on 5-Year Cash ETR (CETR5$_{it-4\sim t}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		26.56***				32.10***
FIRM$_i$			10.01***			10.08***
IND$_i$				9.46***		----------
LOC$_l$ (MSA)					5.69***	4.85***
N	20,707	20,707	20,707	20,707	20,707	20,707
NYEARS		24				24
NFIRMS			3,248			3,248
NINDS				355		----------
NLOCS					164	164
RSQ	0.169	0.192	0.710	0.287	0.205	0.728
Estimated Coefficients (t-tests):						
Intercept	0.315***	0.297***	0.240***	0.211***	0.298***	−0.043
	(57.28)	(43.86)	(6.33)	(12.99)	(26.03)	(−0.80)
SIZE$_{it}$	0.001**	0.003***	−0.001	0.002**	0.001*	0.016***
	(2.04)	(4.85)	(−0.79)	(2.33)	(1.65)	(8.80)
ROA$_{it}$	0.128***	0.125***	0.013	0.116***	0.126***	0.003
	(12.98)	(12.80)	(1.43)	(11.93)	(12.74)	(0.34)
NOL$_{it}$	−0.019***	−0.015***	−0.016***	−0.018***	−0.018***	−0.013***
	(−10.48)	(−7.99)	(−8.63)	(−9.90)	(−9.90)	(−6.79)
Δ NOL$_{it}$	−0.184***	−0.177***	−0.113***	−0.178***	−0.189***	−0.096***
	(−22.78)	(−22.18)	(−12.84)	(−22.88)	(−23.48)	(−11.08)
LEV$_{it}$	−0.063***	−0.079***	0.020***	−0.048***	−0.064***	−0.006
	(−12.78)	(−15.83)	(3.33)	(−9.35)	(−12.80)	(−0.97)
FI$_{it}$	−0.164***	−0.160***	−0.264***	−0.137***	−0.170***	−0.241***
	(−7.15)	(−7.06)	(−9.41)	(−5.76)	(−7.33)	(−8.73)
GPPE$_{it}$	−0.056***	−0.052***	−0.009	−0.025***	−0.052***	0.017***
	(−20.14)	(−18.69)	(−1.38)	(−6.55)	(−18.20)	(2.66)
INTANG$_{it}$	−0.034***	−0.012**	−0.047***	−0.022***	−0.036***	−0.015*
	(−6.42)	(−2.19)	(−5.32)	(−3.62)	(−6.85)	(−1.73)
EQINC$_{it}$	−0.981***	−0.899***	−1.208***	−0.595***	−0.893***	−1.035***
	(−5.33)	(−4.95)	(−5.67)	(−3.15)	(−4.83)	(−4.96)
MTB$_{it}$	−0.001***	−0.001***	−0.001***	−0.002***	−0.001***	−0.000
	(−4.79)	(−4.54)	(−3.57)	(−6.74)	(−5.06)	(−1.51)
R&D$_{it}$	−0.431***	−0.451***	−0.133***	−0.283***	−0.392***	−0.105**
	(−22.49)	(−23.80)	(−3.00)	(−11.87)	(−19.39)	(−2.40)
CASH$_{it}$	−0.070***	−0.046***	−0.056***	−0.038***	−0.065***	−0.019**
	(−10.74)	(−6.92)	(−6.92)	(−5.50)	(−9.75)	(−2.33)
CAPEX$_{it}$	−0.085***	−0.110***	0.017*	−0.041***	−0.073***	−0.004
	(−8.29)	(−10.69)	(1.76)	(−4.00)	(−7.10)	(−0.47)
ADV$_{it}$	0.071**	0.099***	−0.084	0.046	0.068**	−0.021

	(2.23)	(3.13)	(−1.44)	(1.30)	(2.08)	(−0.37)
SG&A$_{it}$	0.077***	0.078***	0.028*	0.056***	0.074***	0.038***
	(11.21)	(11.45)	(1.95)	(6.92)	(10.40)	(2.77)
△ SALES$_{it}$	−0.065***	−0.065***	−0.026***	−0.051***	−0.061***	−0.025***
	(−14.64)	(−14.36)	(−7.49)	(−11.83)	(−13.80)	(−7.17)
INSTPERC$_{it}$	0.016***	0.030***	−0.002	0.014***	0.014***	0.013***
	(5.36)	(9.54)	(0.83)	(4.57)	(4.75)	(4.18)
MKTPRES$_{it}$	0.001***	0.001***	0.000	0.000**	0.001***	0.000
	(3.98)	(4.44)	(1.57)	(2.46)	(4.09)	(0.88)
ANALYST$_{it}$	−0.008***	−0.008***	−0.001	−0.009***	−0.007***	−0.003***
	(−8.77)	(−9.51)	(−1.23)	(−10.44)	(−8.34)	(−3.84)
ALOCAL$_{it}$	0.003**	0.002	−0.001	0.006***	0.003**	0.001
	(2.34)	(1.01)	(−0.34)	(3.93)	(2.06)	(0.58)
STR$_{it}$	0.002***	0.001***	0.001	0.001***	0.000	0.000
	(5.89)	(4.00)	(1.53)	(4.05)	(0.63)	(0.46)

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA), and R-squared for fixed effect models. Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable.

Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-4\sim t}) = \alpha_0 + \Sigma_l\alpha_l LOC_l + \Sigma_t\alpha_t YEAR_t + \Sigma_i\alpha_i FIRM_i + \alpha_{str}STR_{it} + \Sigma_k\alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, or LOC (MSA), but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). Model 6 includes all fixed effects except for industry. All variables are defined in Panel A of Table 7.

Table 4: Significance Levels of MSA Fixed Effects

Level	ETR_{it} N	%	$CETR_{it}$ N	%	UTB_{it} N	%	$CETR5_{it-4\sim t}$ N	%
1 percent	23	16.2	122	85.9	31	29.8	42	45.7
5 percent	47	33.1	11	7.8	19	18.3	15	16.3
10 percent	21	14.8	3	2.1	15	14.4	7	7.6
Not significant	51	35.9	6	4.2	39	37.5	28	30.4
Total	142	100	142	100	104	100	92	100

This Table presents the number and percentage of individual MSAs with statistically significant MSA fixed effects from Model 6 in Table 3, Panels A, B, C and D (for ETR, CETR, UTB, and CETR5 respectively). The calculations are performed at the 1%, 5% and 10% significance level, respectively.

Table 5: MSA Fixed Effects Variation: Length of Localisation and Geographical Diversification

Panel A: Length of Localisation and Location Fixed Effects

	ETR_{it}		CETR_{it}		UTB_{it}		$\text{CETR5}_{it-4\sim t}$	
	Long	Short	Long	Short	Long	Short	Long	Short
Joint Significance (F-statistics)								
YEAR_t	7.61***	1.69**	11.25***	2.37***	4.23***	0.56	31.59***	1.58**
FIRM_i	3.26***	2.40***	2.71***	2.03***	17.28***	11.29***	11.12***	13.88***
LOC_l (MSA)	2.63***	1.44**	2.68***	1.72***	5.00***	1.45*	6.62***	3.29***
Controls	YES	YES	YES	YES	YES	YES	YES	YES
N	26,480	2,813	26,480	2,813	15,617	1,180	19,447	1,260
NYEARS	24	24	24	24	11	11	24	24
NFIRMS	3,858	1,562	3,858	1,562	2,823	665	2,683	668
NLOCS	212	165	212	165	158	100	162	102
RSQ	0.410	0.798	0.378	0.770	0.806	0.951	0.717	0.962

Panel B: Geographical Diversification and Location Fixed Effects

	ETR_{it}		CETR_{it}		UTB_{it}		$\text{CETR5}_{it-4\sim t}$	
	Yes	No	Yes	No	Yes	No	Yes	No
Joint Significance (F-statistics)								
YEAR_t	4.40***	1.24	8.58***	3.79***	2.57***	4.63***	30.15***	5.10***
FIRM_i	3.11***	2.72***	2.65***	1.81***	12.63***	11.78***	9.51***	7.45***
LOC_l (MSA)	2.08***	3.08***	1.87***	2.54***	3.63***	0.74	4.76***	2.68***
Controls	YES	YES	YES	YES	YES	YES	YES	YES
N	16,572	9,404	16,572	9,404	9,183	3,555	9,037	5,434
NYEARS	20	20	20	20	8	8	20	20
NFIRMS	3,402	3,011	3,402	3,011	2,104	1,381	2,301	1,605

NLOCS	198	198	198	198	147	130	156	146
RSQ	0.490	0.621	0.457	0.529	0.827	0.888	0.750	0.822

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents for each subset of the sample F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA); and R-squared for each regression. Panel A presents the results for whether the length of localisation affects location fixed effects. The length of localisation is deemed to be *long* if the firm has been located in the same MSA for more than five years (or three years for UTB sample). Panel B presents the results for whether the geographical diversification of the firm affects location fixed effects. The geographical diversification is deemed to be *yes* if the firm has at least one material subsidiary in another state/country in a given year.

Table 6: MSA Fixed Effects and MSA Characteristics

Panel A: Descriptive Statistics

	N	Mean	Std.Dev.	25th Pctl	Median	75th Pctl
Dependent Variables						
$\hat{\alpha}_l^{ETR}$	120	0.271	0.228	0.211	0.285	0.348
$\hat{\alpha}_l^{CETR}$	120	0.767	0.265	0.684	0.807	0.892
$\hat{\alpha}_l^{UTB}$	86	0.021	0.014	0.012	0.022	0.027
$\hat{\alpha}_l^{CETR5}$	77	0.159	0.107	0.092	0.172	0.224
Independent Variables						
$LPOP_l$	120	12.791	1.205	11.910	12.685	13.707
$LWAGES_l$	120	10.623	0.183	10.488	10.609	10.729
$LGDP_l$	120	10.718	0.270	10.551	10.723	10.872
EDU_l	120	7.510	0.362	7.264	7.475	7.784
$CRIMES_l$	120	3.436	1.080	2.728	3.445	4.024
$RELIGION_l$	120	0.653	0.082	0.607	0.650	0.705
$LAUDITOR_l$	120	0.656	0.767	0.000	0.347	1.409
$LDISTANCEIRS_l$	120	3.711	1.954	3.483	4.283	4.840
$LWEATHER_l$	120	9.696	0.110	9.595	9.678	9.797
$LOSTFIRMPCT_l$	120	0.067	0.082	0.014	0.035	0.082

Panel B: Correlation Matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	$\hat{\alpha}_l^{ETR}$	1													
2	$\hat{\alpha}_l^{CETR}$	**0.332**	1												
3	$\hat{\alpha}_l^{UTB}$	**0.089**	-0.012	1											
4	$\hat{\alpha}_l^{CETR5}$	**0.336**	**0.338**	-0.013	1										
5	$LPOP_l$	**0.119**	**0.135**	**0.128**	-0.017	1									
6	$LWAGES_l$	0.0353	**0.180**	**0.166**	0.051	**0.696**	1								
7	$LGDP_l$	**-0.071**	**0.127**	**0.208**	-0.014	**0.523**	**0.760**	1							
8	EDU_l	0.052	**0.214**	-0.015	**0.123**	**0.440**	**0.692**	**0.484**	1						
9	$CRIMES_l$	**-0.084**	**-0.125**	-0.008	**-0.103**	**-0.204**	**-0.361**	**-0.248**	**-0.267**	1					
10	$RELIGION_l$	0.017	-0.033	**-0.101**	**-0.127**	-0.075	**-0.238**	-0.068	**-0.243**	**0.385**	1				
11	$LAUDITOR_l$	-0.056	**0.126**	**0.145**	**0.115**	**0.331**	**0.215**	**0.233**	**0.259**	**-0.172**	**-0.320**	1			
12	$LDISTANCEIRS_l$	**-0.094**	0.001	-0.072	-0.033	**-0.528**	**-0.408**	**-0.239**	**-0.220**	**0.243**	**0.107**	**-0.194**	1		
13	$LWEATHER_l$	**0.145**	0.050	**-0.190**	-0.041	**0.177**	0.0241	-0.050	**-0.298**	**0.253**	**0.240**	**-0.245**	-0.057	1	
14	$LOSTFIRMPCT_l$	-0.049	**-0.130**	**-0.134**	**0.122**	**-0.608**	**-0.477**	**-0.445**	**-0.272**	0.0585	0.0116	**-0.247**	**0.210**	0.010	1

Panel C: MSA Fixed Effects on MSA Characteristics

Variables	ETR Fixed Effects	CETR Fixed Effects	UTB Fixed Effects	CETR5 Fixed Effects
Intercept	−1.282	−4.774**	0.230	−0.193
	(−0.52)	(−2.14)	(1.53)	(−0.16)
$LPOP_l$	0.022	−0.017	0.002	−0.003
	(0.71)	(−0.56)	(0.92)	(−0.16)
$LWAGES_l$	−0.170	−0.013	0.018	0.021
	(−0.60)	(−0.05)	(1.01)	(0.15)
$LGDP_l$	−0.145	−0.031	0.007	−0.049
	(−0.90)	(−0.25)	(1.00)	(−0.69)
EDU_l	0.120	0.193***	−0.015**	0.053
	(1.06)	(2.70)	(−2.18)	(1.10)
$CRIMES_l$	−0.033	−0.037	0.002	−0.005
	(−1.24)	(−1.50)	(1.09)	(−0.31)
$RELIGION_l$	0.069	0.205	−0.029	−0.092
	(0.28)	(0.52)	(−1.36)	(−0.47)
$LAUDITOR_l$	−0.021	0.044	0.001	0.020
	(−0.51)	(1.43)	(0.57)	(1.18)
$LDISTANCEIRS_l$	−0.005	0.013	0.000	−0.001
	(−0.45)	(0.81)	(0.06)	(−0.09)
$LWEATHER_l$	0.397**	0.486**	−0.038**	0.036
	(2.03)	(2.57)	(−2.22)	(0.31)
$LOSTFIRMPCT_l$	−0.198	−0.341	0.012	0.403
	(−0.42)	(−0.62)	(0.37)	(1.58)
N	120	120	86	77

RSQ	0.084	0.098	0.168	0.076
F-test	1.17	1.65	2.43**	1.00

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A reports descriptive statistics for regression of MSA fixed effects and MSA characteristics. Panel B reports Pearson correlation coefficients for the variables used in Equation (2). All variables are defined in Panel B of Table 7. **Bolded** coefficients denote significance at the 5% level or less using a two-sided test. Panel C reports the results from testing Equation (2) with robust standard errors:

$$\hat{a}_l^{ETR}(\hat{a}_l^{CETR}/\hat{a}_l^{UTB}/\hat{a}_l^{CETR5})$$
$$= \beta_0 + \beta_1 LPOP_l + \beta_2 LWAGES_l + \beta_3 LGDP_l + \beta_4 EDUC_l + \beta_5 CRIMES_l + \beta_6 RELIGION_l + \beta_7 LAUDITOR_l + \beta_8 LDISTANCEIRS_l$$
$$+ \beta_9 LWEATHER_l + \beta_{10} LOSTFIRMPCT_l + \epsilon_l$$

The dependent variables are coefficients estimated for MSA l's fixed effect when the dependent variables in Equation (1) are ETR, CETR, UTB, and CETR5 respectively. The independent variables include a number of MSA characteristics.

Table 7: Variable Definitions

Panel A: Variable Definitions for Equation (1)

Variable	Definition
Dependent variables:	
ETR_{it}	The financial accounting (i.e. GAAP) effective tax rate, defined as total income tax expense (TXT) divided by pre-tax book income (PI) before special items (SPI)
$CETR_{it}$	The cash effective tax rate, defined as cash tax paid (TXPD) divided by pre-tax book income (PI) before special items (SPI)
UTB_{it}	The FIN 48 tax reserve, measured as the end of year unrecognised tax benefits (TXTUBEND) scaled by total assets (AT)
$CETR5_{it-4\sim t}$	The long-run average cash effective tax rate, defined as the sum of cash taxes paid (TXPD) in years t, t-1, t-2, t-3, and t-4, divided by pre-tax book income (PI) before special items (SPI) in years t, t-1, t-2, t-3, and t-4
Fixed effects:	
LOC_l (MSA fixed effects)	A set of indicator variables indicating the Metropolitan Statistical Area (MSA) of the firm's headquarters
$FIRM_i$ (firm fixed effects)	A set of indicator variables for each firm (GVKEY)
$YEAR_t$ (year fixed effects)	A set of indicator variables indicating the financial year (FYEAR) of the observation
IND_i (industry fixed effects)	A set of indicator variables indicating the industry membership (four-digit SIC code) of the firm
Control variables:	
$SIZE_{it}$	Firm size, measured as the natural log of total assets (AT)
ROA_{it}	Return on assets, measured as pre-tax book income (PI) divided by lagged total assets (AT)
NOL_{it}	A dummy variable coded as one if the firm reports a positive tax loss carry forward (TLCF) and zero otherwise
ΔNOL_{it}	Change in tax loss carry forward (ΔTLCF), scaled by lagged total assets (AT); when missing, reset to 0
LEV_{it}	Leverage, measured as the sum of long-term debt (DLTT) and long-term debt in current liabilities (DLC) divided by total assets (AT)

|	
FI_{it}	Pre-tax foreign income (PIFO), scaled by lagged total assets (AT); when missing, reset to 0
$GPPE_{it}$	Gross property, plant, and equipment (PPEGT), scaled by total assets (AT)
$INTANG_{it}$	Intangible assets (INTAN), scaled by total assets (AT)
$EQINC_{it}$	Equity income in earnings (ESUB), scaled by lagged assets (AT)
MTB_{it}	Market-to-book ratio, measured as market value of equity (PRCC_F*CSHO), scaled by book value of equity (CEQ)
$R\&D_{it}$	Research and development expense (XRD), scaled by net sales (SALE); when missing, reset to 0
$CASH_{it}$	Cash and cash equivalents (CHE), scaled by total assets (AT)
$CAPEX_{it}$	Capital expenditures (CAPX), scaled by gross property, plant, and equipment (PPEGT)
ADV_{it}	Advertising expense (XAD), scaled by net sales (SALE); when missing, reset to 0
$SG\&A_{it}$	Selling, general, and administrative expense (XSGA), scaled by net sales (SALE); when missing, reset to 0
$\Delta SALES_{it}$	The annual percentage change in net sales (($SALE_t$ / $SALE_{t-1}$) − 1)
$INSTPERC_{it}$	The percentage of nontransient institutional investors, following Bushee (1998); when missing, reset to 0
$MKTPRES_{it}$	Count of the number of consecutive nonnegative changes in split-adjusted quarterly earnings per share relative to the same quarter from the prior year, following Myers, Myers and Skinner (2007)
$ANALYST_{it}$	The natural logarithm of the number of analyst estimates reported before the end of the fiscal year; when missing, reset to 0
$ALOCAL_{it}$	The average number of firms in the fiscal year followed by each analyst in the same MSA; when missing, reset to 0
$NUMDIRS_{it}$	The natural logarithm of the number of total directors sitting on the Board
$PCTINDEP_{it}$	The percentage of independent directors to total directors sitting on the Board
$GENDER_{it}$	The proportion of male directors sitting on the Board
$CFOBOD_{it}$	An indicator variable equals 1 if the CFO is on the Board of Directors and 0 otherwise
$CEOCHAIR_{it}$	An indicator variable that equals 1 if the CEO is also Chair of the Board and 0 otherwise
$CEOCOMP_{it}$	The natural logarithm of CEO total compensation
STR_{it}	The highest marginal rate as reported in the state corporate income tax schedule in a given year

Panel B: Variable Definitions for Equation (2)

| Variable	Definition
Dependent variables:	
$\hat{\alpha}_l^{ETR}$	The coefficients estimated when ETR is the dependent variable in Equation (1)
$\hat{\alpha}_l^{CETR}$	The coefficients estimated when CETR is the dependent variable in Equation (1)

$\hat{\alpha}_l^{UTB}$	The coefficients estimated when UTB is the dependent variable in Equation (1)
$\hat{\alpha}_l^{CETR5}$	The coefficients estimated when CETR5 is the dependent variable in Equation (1)
Independent variables:	
$LPOP_l$	Natural logarithm of the estimated size of the average workforce population for the MSA
$LWAGES_l$	Natural logarithm of the weighted-average personal income for the employed workforce in the MSA, calculated using personal income (INCWAGE) weighted by sample weights (PERWT) from the IPUMS
$LGDP_l$	Natural logarithm of the average GDP per capita in the MSA, calculated using the average total GDP index divided by the average total population in the MSA
EDU_l	The weighted-average education level of the workforce population in the MSA, calculated using education levels (EDUC) weighted by sample weights from the IPUMS
$CRIMES_l$	The average total crime rate in the MSA, calculated by dividing the number of reported crimes by the total population and multiplying the result by 100
$RELIGION_l$	The proportion of Gallup poll respondents in each state, matched to each MSA, who indicate that religion is an important part of their daily life
$LAUDITOR_l$	The presence of BIG4 audit firms' local offices in the MSA, measured by the average of the natural logarithm of one plus the number of all BIG4 firms' local offices
$LDISTANCEIRS_l$	Natural logarithm of the geodesic distance, reported in miles, between the firm's headquarters and the closest IRS territory manager's office
$LWEATHER_l$	Natural logarithm of the state-level average daily sunlight (insolation or solar radiation) matched to each MSA, reported in kilojoules per square meter (KJ/m2)
$LOSTFIRMPCT_l$	The percentage of firms that report a negative pre-tax book income out of all firms in each MSA

Fig. 1: Spatial Distribution of MSA Fixed Effect Coefficients
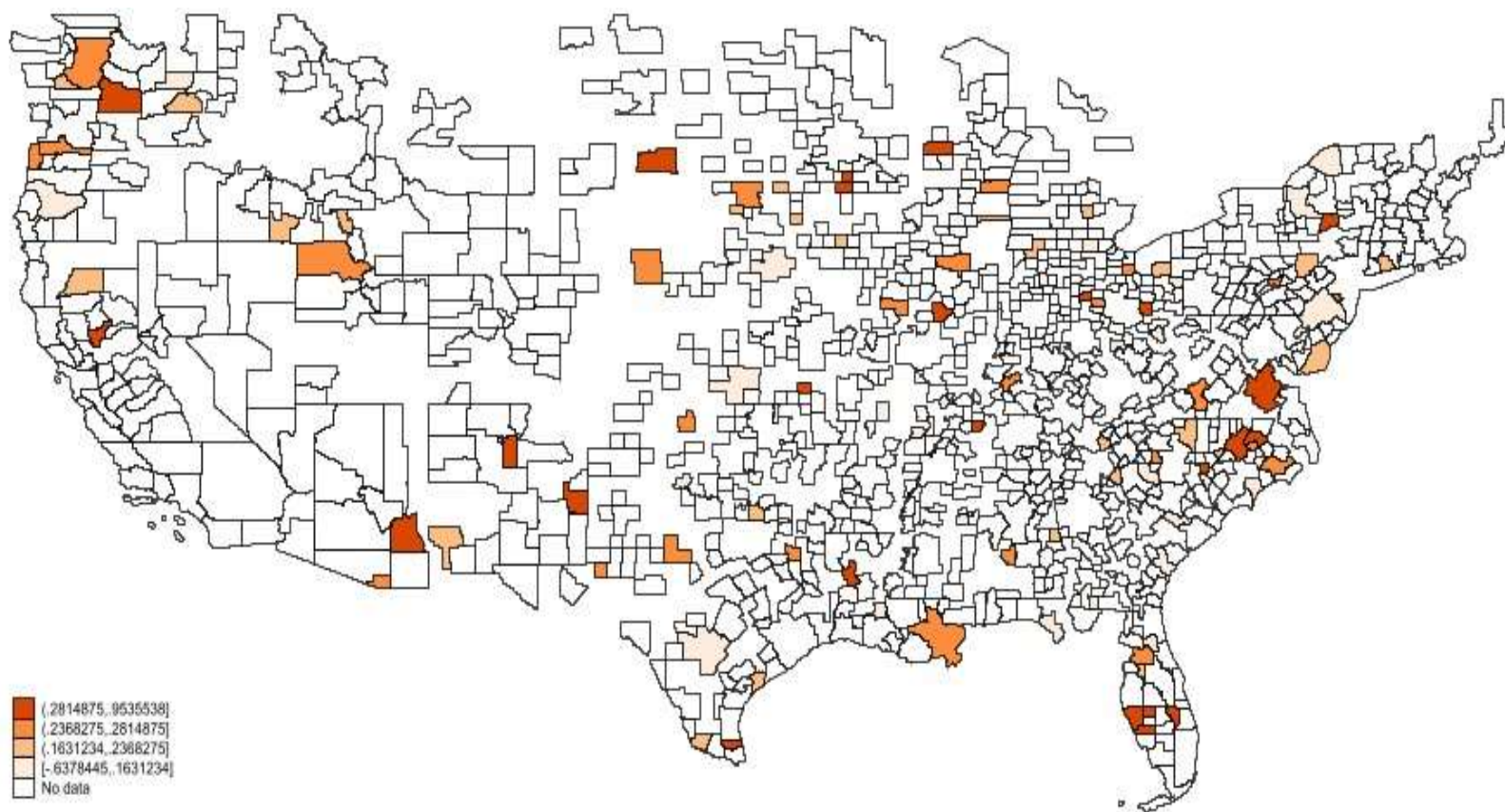
Fig. 1.1 – spatial distribution of the inverted location fixed effect coefficients estimated in Table 3, Panel A (for ETR). A darker shade indicates greater corporate tax avoidance.
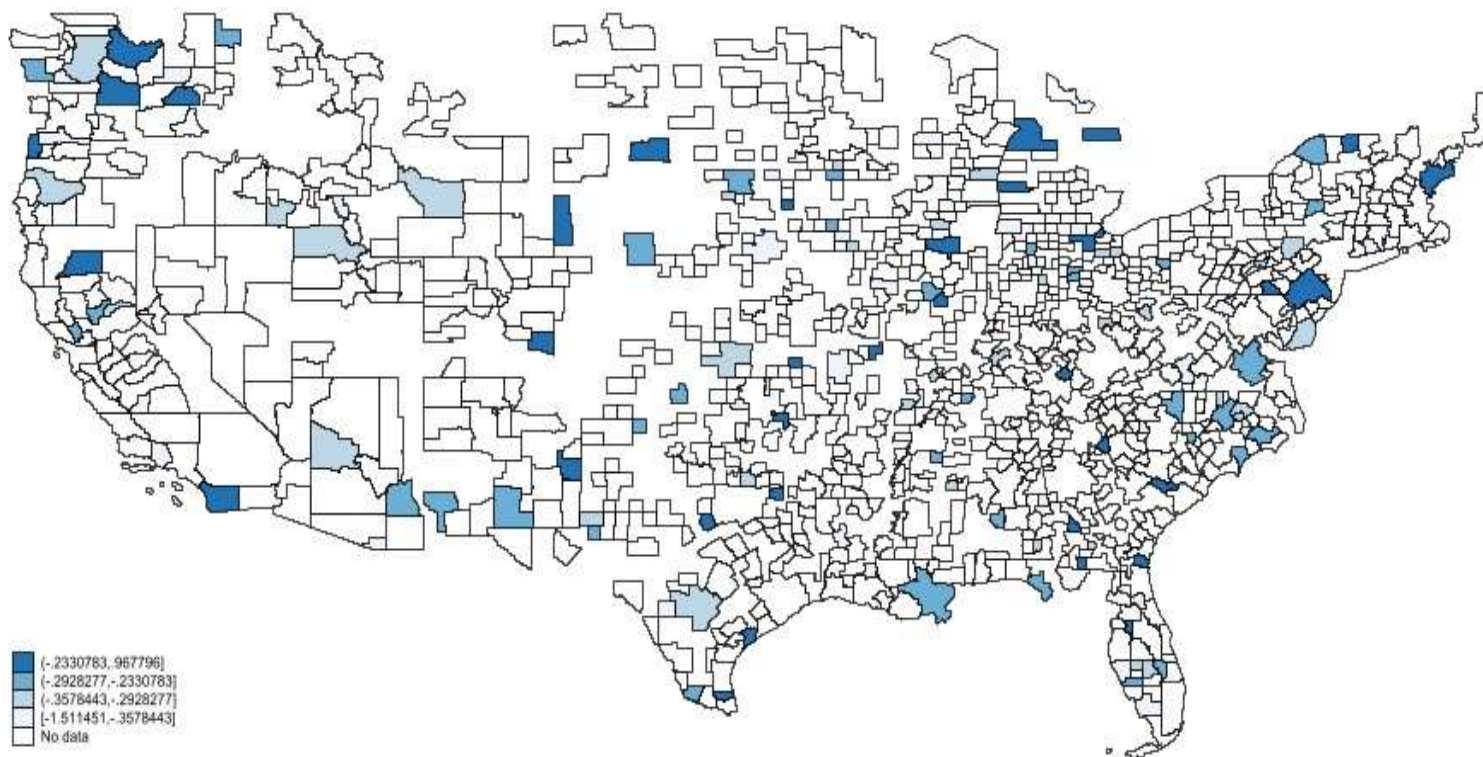
Fig. 1.2 – spatial distribution of the inverted location fixed effect coefficients estimated in Table 3, Panel B (for CETR). A darker shade indicates greater corporate tax avoidance.
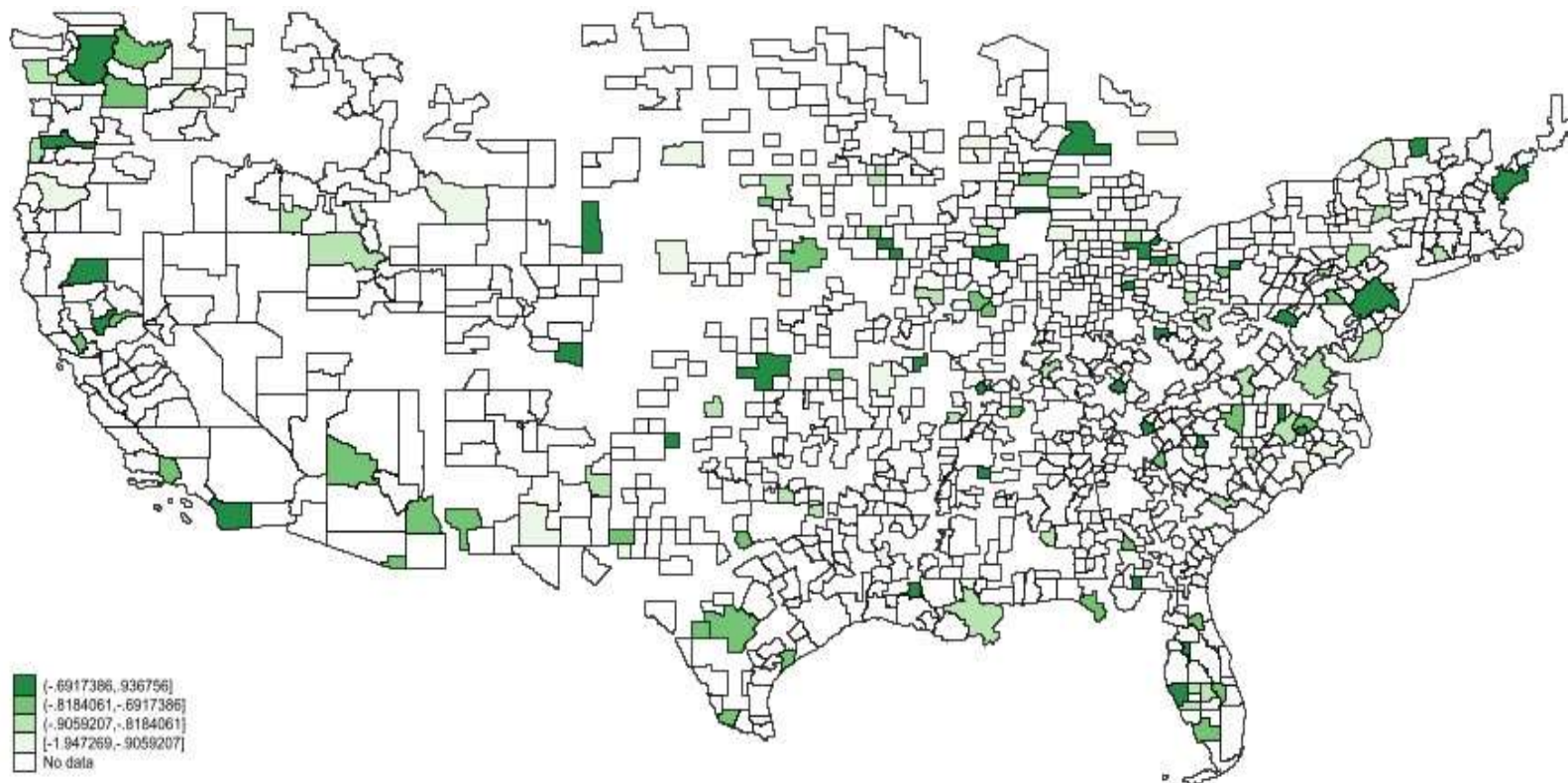
Fig. 1.3 – spatial distribution of the location fixed effect coefficients estimated in Table 3, Panel C (for UTB). A darker shade indicates more uncertain tax positions.

(.2814875,.9535538]
(.2368275,.2814875]
(.1631234,.2368275]
[-.6378445,.1631234]
No data

Fig. 1.4 – spatial distribution of the inverted location fixed effect coefficients estimated in Table 3, Panel D (for CETR5). A darker shade indicates greater long-run tax avoidance.
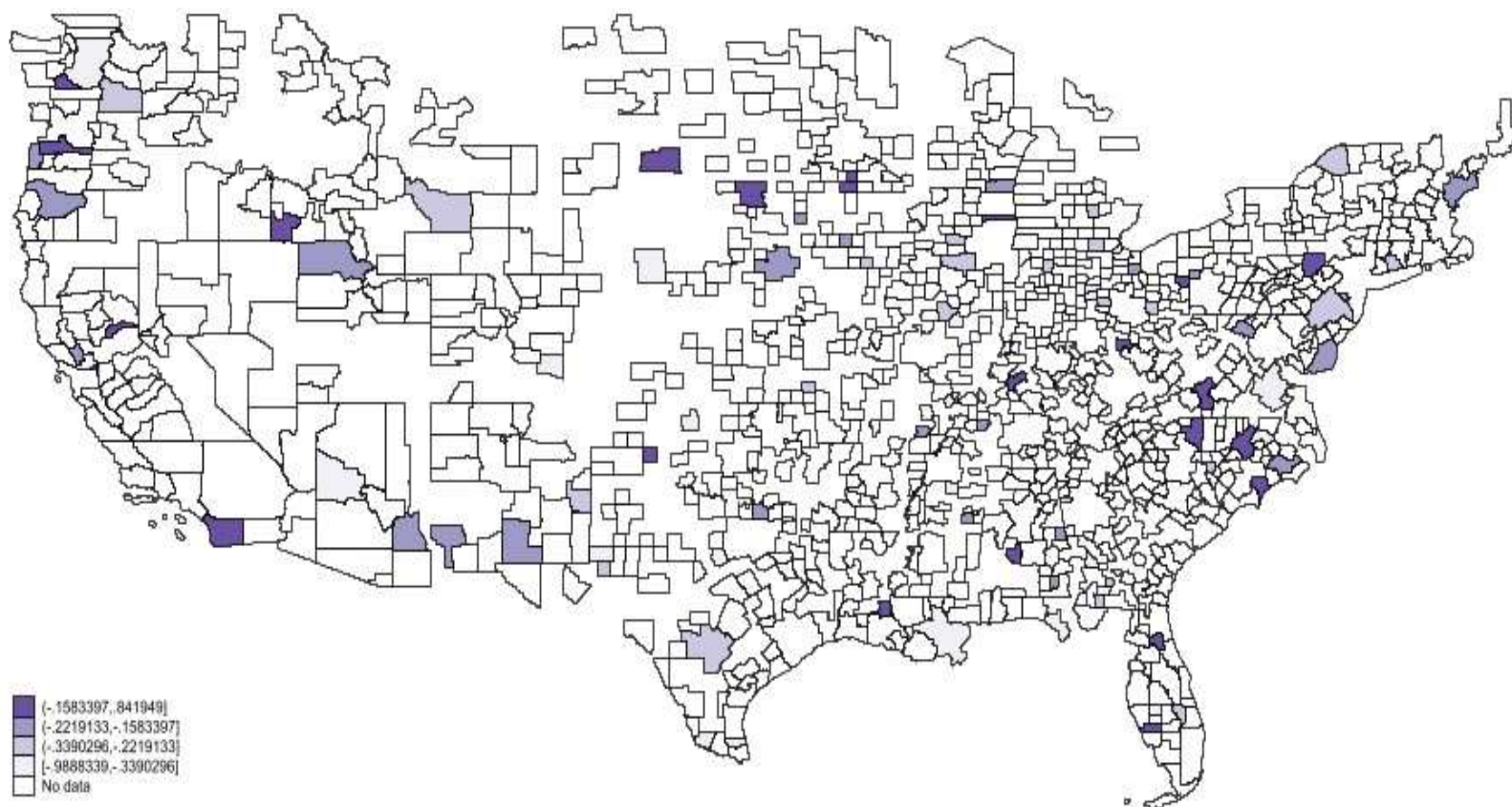
Supplementary Appendix: Robustness Tests

1.   Including loss observations

In our main sample, we exclude firm-year observations with negative pre-tax income following prior studies (Dyreng et al., 2010; Kubick et al., 2017), which results in a significant reduction in the sample size. This section tests the sensitivity of our results to including those loss observations. Specifically, we employ a measure of corporate tax avoidance that uses the market value of assets in place of pre-tax income in its denominator. Our measure, ΔCETR, is calculated as the difference between cash taxes paid and the product of pre-tax income and the corporate statutory tax rate, scaled by market value of assets (Henry and Sansing, 2018). ΔETR uses GAAP tax expense instead of cash taxes paid. ΔCETR5 is ΔCETR measured in the long-run with both the numerator and the denominator summed over a five-year period. Including loss firms increases the sample size to between 42,796 to 55,226 firm-year observations. The results presented in Table SA1 show that MSA fixed effects are jointly significant in explaining ΔETR and ΔCETR and ΔCETR5 (F-statistic = 2.81, 2.47, and 8.25, respectively).[9] These effects are still significant when other fixed effects are controlled in the model (F-statistic = 2.26, 2.16 and 3.37, respectively). This is consistent with our main findings and it suggests that locations fixed effects are present in both profitable and loss firms.

Table SA1: Location Fixed Effects on Tax Avoidance: Including Loss Observations

Panel A: MSA Fixed Effects on ΔETR (ΔETR$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		50.07***				43.03***
FIRM$_i$			3.24***			3.23***
IND$_i$				2.89***		----------
LOC$_l$ (MSA)					2.47***	2.16***

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[9] Note that we did not exclude loss firms for the UTB sample in our main analysis. Therefore, the location fixed effects on the UTB of both profitable and loss firms have already been estimated and the results are presented in Table 3 (see the main results).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
N	55,226	55,226	55,226	55,226	55,226	55,226
NYEARS		24				24
NFIRMS			7,559			7,559
NINDS				371		----------
NLOCS					330	330
RSQ	0.274	0.289	0.521	0.288	0.285	0.535

Panel B: MSA Fixed Effects on ΔCETR (ΔCETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		56.02***				51.81***
FIRM$_i$			3.55***			3.54***
IND$_i$				3.24***		----------
LOC$_l$ (MSA)					2.81***	2.26***
N	55,226	55,226	55,226	55,226	55,226	55,226
NYEARS		24				24
NFIRMS			7,559			7,559
NINDS				371		----------
NLOCS					330	330
RSQ	0.303	0.318	0.554	0.318	0.314	0.569

Panel C: MSA Fixed Effects on ΔCETR5 (ΔCETR5$_{it-4\sim t}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		37.99***				95.73***
FIRM$_i$			10.87***			10.92***
IND$_i$				16.61***		----------
LOC$_l$ (MSA)					8.25***	3.37***

N	42,796	42,796	42,796	42,796	42,796	42,796
NYEARS		24				24
NFIRMS			5,606			5,606
NINDS				365		----------
NLOCS					314	314
RSQ	0.211	0.226	0.701	0.310	0.257	0.722

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA), and R-squared for fixed effect models. Panel A presents the results with the modified effective tax rate measure ΔETR as the dependent variable, Panel B with the Henry and Sansing (2018) measure ΔCETR as the dependent variable, and Panel C with the modified ΔCETR5 as the dependent variable. ΔCETR is the difference between cash taxes paid, adjusted for the change in tax refunds receivable, and the product of pretax income and the statutory tax rate, scaled by market value of assets, i.e. (TXPD-(TXR_t-TXR_{t-1})-0.35*PI)/(AT+PRCC_Q*CSHO-SEQ). ΔETR uses GAAP tax expense instead of cash taxes paid, i.e. (TXT-0.35*PI)/(AT+PRCC_Q*CSHO-SEQ). ΔCETR5 is ΔCETR with both the numerator and the denominator measured over a five-year period (t-4 to t).

Each column represents a regression nested within the first-stage model:

$$\Delta ETR_{it}(\Delta CETR_{it} / \Delta CETR5_{it}) = \alpha_0 + \Sigma_l \alpha_l LOC_l + \Sigma_t \alpha_t YEAR_t + \Sigma_i \alpha_i FIRM_i + \alpha_{str} STR_{it} + \Sigma_k \alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, or LOC (MSA), but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). Model 6 includes all fixed effects except for industry.

2.   Alternative measures for geographic units

Our main findings of the location fixed effect on corporate tax avoidance are based on the basic geographic unit, MSAs. We also consider alternative measures of geographic unit, including states, counties, and the zip codes of the firms' headquarters. These three additional geographic units tested here reflect different ways of grouping geographical areas for administrative and political reasons. As reported in Table SA2, models 5, 6 and 7 replace the MSAs in Equation (1) with the new measures for geographical unit, i.e. states, counties, and the zip codes, respectively. Similarly, models 8, 9 and 10 include year, firm and location fixed effects with those new geographical unit proxies substituting MSAs. We consistently find that firm locations have jointly significant effects on corporate tax avoidance, regardless of the specific unit of measurement we use in the analysis. The F-statistics are usually the largest for state fixed effects and smaller for county and zip code fixed effects, both in the full models and when each location fixed effect is tested individually. This is because both county and zip code are smaller geographic units that contain the least number of firms and therefore the location fixed effects overlap more with the firm fixed effects. The R-squared is the largest for the zip code fixed effects, which is unsurprising given that R-squared increases as more predictors are included. Overall, the results from estimating Equation (1) are robust to using different geographic units as the main source of variation.

Table SA2: Location Fixed Effects on Tax Avoidance: Alternative Geographical Units

Panel A: Geographical Fixed Effects on Effective Tax Rates (ETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
YEAR$_t$		7.23***						7.67***	7.51***	6.86***
FIRM$_i$			3.01***					3.02***	3.08***	3.13***
IND$_i$				3.20***				----------	----------	----------
LOC$_l$ (state)					2.29***			2.26***		
LOC$_l$ (county)						1.68***			2.23***	
LOC$_l$ (zipcode)							2.20***			2.21***
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293
NYEARS		24						24	24	24
NFIRMS			5,197					5,197	5,197	5,197
NINDS				367				----------	----------	----------
NLOCS					50	557	2,769	50	557	2,769
RSQ	0.071	0.076	0.437	0.107	0.074	0.093	0.244	0.443	0.453	0.502

Panel B: Geographical Fixed Effects on Cash Effective Tax Rates (CETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
YEAR$_t$		11.59***						12.21***	12.06***	10.76***
FIRM$_i$			2.54***					2.54***	2.51***	2.52***
IND$_i$				2.98***				----------	----------	----------
LOC$_l$ (state)					2.67***			1.55**		
LOC$_l$ (county)						2.17***			1.61***	
LOC$_l$ (zipcode)							2.05***			1.84***
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293	29,293
NYEARS		24						24	24	24
NFIRMS			5,197					5,197	5,197	5,197
NINDS				367				----------	----------	----------
NLOCS					50	557	2,769	50	557	2,769
RSQ	0.075	0.083	0.403	0.109	0.079	0.104	0.238	0.411	0.419	0.464

Panel C: Geographical Fixed Effects on FIN 48 Tax Reserve (UTB$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
YEAR$_t$		10.65***						4.25***	4.39***	4.34***
FIRM$_i$			16.70***					15.85***	15.26***	17.34***
IND$_i$				5.85***				----------	----------	----------
LOC$_l$ (state)					20.65***			4.23***		
LOC$_l$ (county)						7.60***			2.73***	
LOC$_l$ (zipcode)							4.57***			3.62***
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	18,925	18,925	18,925	18,925	18,925	18,925	18,925	18,925	18,925	18,925
NYEARS		11						11	11	11
NFIRMS			3,322					3,322	3,322	3,322
NINDS				326				----------	----------	----------
NLOCS					44	375	1,814	44	375	1,814
RSQ	0.094	0.099	0.801	0.178	0.134	0.197	0.390	0.804	0.807	0.831

Panel D: Geographical Fixed Effects on 5-year Cash Effective Tax Rates (CETR5$_{it-4\sim t}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
YEAR$_t$		26.56***						32.34***	32.11***	30.32***
FIRM$_i$			10.01***					10.10***	10.11***	9.45***
IND$_i$				9.46***				----------	----------	----------
LOC$_l$ (state)					7.93***			5.20***		
LOC$_l$ (county)						4.59***			4.20***	
LOC$_l$ (zipcode)							5.36***			3.58***
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	20,707	20,707	20,707	20,707	20,707	20,707	20,707	20,707	20,707	20,707
NYEARS		24						24	24	24
NFIRMS			3,248					3,248	3,248	3,248
NINDS				355				----------	----------	----------
NLOCS					47	419	2,046	47	419	2,046
RSQ	0.169	0.192	0.710	0.287	0.184	0.228	0.477	0.725	0.732	0.761

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, or IND, and alternative measures of LOC (state, county or zip code); and R-squared for fixed effect models. The estimated coefficients for control variables are omitted for brevity. Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable. Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-4\sim t}) = \alpha_0 + \Sigma_l \alpha_l LOC_l + \Sigma_t \alpha_t YEAR_t + \Sigma_i \alpha_i FIRM_i + \alpha_{str} STR_{it} + \Sigma_k \alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of effects (indicator variables) – YEAR, FIRM, IND, or LOC (state, county or zip code), but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). The final three models, Models 8, 9 and 10, are tests of each of the geographical effects in the presence of the firm and year effects.

3.   Selection bias test: location decision

In our main specification, we control for firm fixed effects. That leads to a limitation that our results rely on firms that have changed MSA locations. There is a concern that firms' change of location can be endogenously decided and correlated with geographic factors and tax-related incentives. To address this concern, we split the sample into (1) firms that have changed headquarter locations from one MSA to another at least once during the sample period; and (2) firms that have not changed headquarter locations during the sample period. In sample one (two), there are 5,008 (24,285) observations in 164 (212) MSAs for the ETR and CETR regressions, 2,447 (16,478) observations in 114 (156) MSAs for UTB, and 3,154 (17,553) observations in 118 (162) MSAs for CETR5. Table SA3 reports results using the location-change sample. We find that MSA fixed effects are significant when included on their own across all regressions, and collectively with firm and year fixed effects, which is consistent with our main results. The F-statistics for the MSA fixed effects are generally smaller than those reported in Table 3 (see the main results), which is understandable given that the reduced sample has much fewer degrees of freedom and fewer numbers of MSAs. In Table SA4, we present results using the second sample of no-change firms. In this sample, we cannot control for firm fixed effects because they will subsume location fixed effects. In the full specification, we control for industry fixed effects instead. We continue to find location fixed effects to be jointly significant in explaining variations in tax avoidance measures. In summary, our findings suggest that location fixed effects are less likely to be affected by firms' decision on changing or not changing their headquarter locations.

Table SA3: MSA Fixed Effects for Firms that Changed Location

Panel A: MSA Fixed Effects on Effective Tax Rates (ETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		1.12				1.11
FIRM$_i$			2.46***			2.51***
IND$_i$				2.27***		----------
LOC$_l$ (MSA)					1.57***	1.83***
Controls	YES	YES	YES	YES	YES	YES
N	5,008	5,008	5,008	5,008	5,008	5,008
NYEARS		24				24
NFIRMS			944			944

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
NINDS				254		----------
NLOCS					164	164
RSQ	0.072	0.076	0.410	0.172	0.118	0.450

Panel B: MSA Fixed Effects on Cash Effective Tax Rates (CETR$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		1.61**				2.01***
FIRM$_i$			2.12***			2.11***
IND$_i$				2.26***		----------
LOC$_l$ (MSA)					1.61***	1.54***
Controls	YES	YES	YES	YES	YES	YES
N	5,008	5,008	5,008	5,008	5,008	5,008
NYEARS		24				24
NFIRMS			944			944
NINDS				254		----------
NLOCS					164	164
RSQ	0.081	0.087	0.385	0.180	0.128	0.424

Panel C: MSA Fixed Effects on FIN 48 Tax Reserve (UTB$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		3.11***				1.09
FIRM$_i$			12.10***			10.81***
IND$_i$				4.55***		----------
LOC$_l$ (MSA)					3.93***	2.41***
Controls	YES	YES	YES	YES	YES	YES
N	2,447	2,447	2,447	2,447	2,447	2,447
NYEARS		11				11
NFIRMS			485			485

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
NINDS				168		----------
NLOCS					114	114
RSQ	0.093	0.104	0.774	0.321	0.239	0.802

Panel D: MSA Fixed Effects on 5-Year Cash ETR (CETR5$_{it-4\sim t}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		3.22***				3.48***
FIRM$_i$			9.13***			9.59***
IND$_i$				7.41***		----------
LOC$_l$ (MSA)					4.42***	5.31***
Controls	YES	YES	YES	YES	YES	YES
N	3,154	3,154	3,154	3,154	3,154	3,154
NYEARS		24				24
NFIRMS			507			507
NINDS				215		----------
NLOCS					118	118
RSQ	0.200	0.217	0.710	0.481	0.317	0.763

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA); and R-squared for fixed effect models. The sample only includes firms that have changed location during the sample period. Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable. Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-4\sim t}) = \alpha_0 + \Sigma_l \alpha_l LOC_l + \Sigma_t \alpha_t YEAR_t + \Sigma_i \alpha_i FIRM_i + \alpha_{str} STR_{it} + \Sigma_k \alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, or LOC (MSA), but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). Model 6 includes all fixed effects except for industry.

Table SA4: MSA Fixed Effects for Firms that Have Not Changed Location

Panel A: MSA Fixed Effects on Effective Tax Rates (ETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		6.94***				6.48***
FIRM$_i$			3.17***			----------
IND$_i$				3.04***		2.96***
LOC$_l$ (MSA)					1.86***	1.71***
Controls	YES	YES	YES	YES	YES	YES
N	24,285	24,285	24,285	24,285	24,285	24,285
NYEARS		24				24
NFIRMS			4,253			----------
NINDS				363		363
NLOCS					212	212
RSQ	0.073	0.079	0.446	0.114	0.088	0.132

Panel B: MSA Fixed Effects on Cash Effective Tax Rates (CETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
YEAR$_t$		10.84***				10.39***
FIRM$_i$			2.65***			----------
IND$_i$				2.88***		2.77***
LOC$_l$ (MSA)					2.23***	2.01***
Controls	YES	YES	YES	YES	YES	YES
N	24,285	24,285	24,285	24,285	24,285	24,285
NYEARS		24				24
NFIRMS			4,253			----------
NINDS				363		363

NLOCS					212	212
RSQ	0.077	0.086	0.409	0.115	0.094	0.139

Panel C: MSA Fixed Effects on FIN 48 Tax Reserve (UTB$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		8.35***				7.90***
FIRM$_i$			17.75***			----------
IND$_i$				6.16***		4.31***
LOC$_l$ (MSA)					14.16***	10.35***
Controls	YES	YES	YES	YES	YES	YES
N	16,478	16,478	16,478	16,478	16,478	16,478
NYEARS		11				11
NFIRMS			2,837			----------
NINDS				318		318
NLOCS					156	156
RSQ	0.101	0.105	0.808	0.198	0.207	0.274

Panel D: MSA Fixed Effects on 5-year Cash Effective Tax Rates (CETR5$_{it-4\sim t}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		24.35***				23.77***
FIRM$_i$			10.15***			----------
IND$_i$				9.09***		8.97***
LOC$_l$ (MSA)					5.47***	5.05***
Controls	YES	YES	YES	YES	YES	YES
N	17,553	17,553	17,553	17,553	17,553	17,553
NYEARS		24				24
NFIRMS			2,741			----------
NINDS				347		347

NLOCS					162	162
RSQ	0.168	0.193	0.711	0.297	0.208	0.349

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA), and R-squared for fixed effect models. Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable. Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-4\sim t}) = \alpha_0 + \Sigma_l\alpha_lLOC_l + \Sigma_t\alpha_tYEAR_t + \Sigma_i\alpha_iIND_i + \alpha_{str}STR_{it} + \Sigma_k\alpha_kCONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, or LOC (MSA), but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). Model 6 includes all fixed effects except for firm.

4. Validity tests

Since we posit that the level of tax avoidance activities undertaken by a given firm is related to where the firm is located due to the influences from their geographical factors, it is expected that neighbouring MSAs should be relatively similar in their characteristics, and they should have similar impact on the firms' tax behaviour. We then test the relation between the distance from one MSA to another (i.e., a pair) and the absolute difference of each pair of the estimated MSA fixed effect coefficients found in Table 3 (see the main results). We define the geographical distance, $Distance_l$, as an indicator variable that equals to one if distance between a pair of MSA is greater than 125 kilometres; and zero if it is less or equal to 125 kilometres. $DIFF_{lETR}$, $DIFF_{lCETR}$ $DIFF_{lUTB}$ and $DIFF_{lCETR5}$ are the absolute differences of each pair of location fixed effects for ETR, CETR, UTB and CETR5, respectively. We regress $DIFF_l$ on $Distance_l$ with an intercept and robust standard errors. Among those MSAs that we use to estimate the effects of MSA fixed effects on MSA characteristics, 120 (or 86 or 77) MSAs yield 14,280 (or 7,310 or 5,852) pairs, excluding those pairs that have the same MSA in it. Table SA5 presents the results. It shows that the relationships between differences in location fixed effects and distances between MSAs are positively related for CETR, UTB and CETR5, indicating that the size of location fixed effects are more similar among MSAs that are geographically located closer. This finding affirms that the identified location fixed effects indeed show the geographical feature.

If our estimation on the location fixed effects is valid, we should also be able to observe location fixed effects being stable over time. We therefore, perform a sensitivity test that split the sample period into two using the mid-point of our sampling year. We use the year 2006 as the splitting point for the ETR, CETR and CETR5 samples and 2012 for the UTB samples. Reported in Table SA6, we find that in general, the location effects are significant in both sub-periods. There is no clear pattern indicating which period consistently dominates the results. Thus, consistent with our conjecture, the location-fixed effects appear to be stable over time.

Table SA5: Differences in MSA Location Fixed Effects and Distances between MSAs

	$DIFF_l^{ETR}$	$DIFF_l^{CETR}$	$DIFF_l^{UTB}$	$DIFF_l^{CETR5}$
Intercept	0.194***	0.213***	0.010***	0.090***
	(10.89)	(11.75)	(9.43)	(8.26)
$Distance_l$	0.004	0.040**	0.004***	0.025**
	(0.24)	(2.17)	(4.03)	(2.31)
N	14,280	14,280	7,310	5,852
RSQ	0.0000	0.0002	0.0013	0.0009
F-test	0.06	4.70**	16.24***	5.32**

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents the results from testing the relation between the distance from one MSA to another (i.e. a pair) and the absolute difference of each pair of estimated MSA fixed effect coefficients with robust standard errors:

$$DIFF_l^{ETR}(DIFF_l^{CETR}/DIFF_l^{UTB}/DIFF_l^{CETR5}) = \gamma_0 + \gamma_1 Distance_l$$

$DIFF_l$ is the absolute difference of each pair of location fixed effects for ETR, CETR, UTB and CETR5, respectively. $Distance_l$ is an indicator variable that equals to one if distance between a pair of MSAs is greater than 125 kilometres; and zero if it is less or equal to 125 kilometres.

Table SA6: Location Fixed Effects Over Time

	ETR_{it}		$CETR_{it}$		UTB_{it}		$CETR5_{it-4 \sim t}$	
	Pre 2006	Post 2006	Pre 2006	Post 2006	Pre 2012	Post 2012	Pre 2006	Post 2006
Joint Significance (F-statistics)								
$YEAR_t$	2.79***	10.73***	9.48***	6.60***	3.83***	7.31***	20.36***	10.69***
$FIRM_i$	2.88***	2.87***	2.04***	2.89***	15.34***	15.86***	11.01***	12.73***
LOC_l (MSA)	1.71***	1.87***	1.58***	1.18	3.73***	2.24***	4.01***	4.63***
Controls	YES	YES	YES	YES	YES	YES	YES	YES
N	14,881	14,412	14,881	14,412	7,738	11,187	9,491	7,932
NYEARS	12	12	12	12	5	6	12	12
NFIRMS	4,037	3,030	4,037	3,030	2,289	2,788	2,348	2,067
NLOCS	201	165	201	165	139	151	148	132
RSQ	0.571	0.479	0.491	0.490	0.887	0.872	0.832	0.797

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.
This Table presents the results for the first half, i.e. pre 2006 (2012), and second half, i.e. post and include 2006 (2012) of the sample period. F-statistics test the joint significance of the effects listed in the first column – YEAR, FIRM, IND, or LOC (MSA); and R-squared for each regression.

5.   Omitted variables tests

Prior studies find that governance factors such as board independence and CEO compensations are correlated with corporate tax avoidance (Armstrong et al., 2015; Gaertner, 2014). Thus, we additionally control for governance factors and CEO compensation to examine whether the geographic effects may work through the governance mechanisms. Specifically, we include measures of board size, percentage of independent directors, gender diversity on the board, CEO and Chair duality, and CFOs' board membership and CEO total compensation. These data are collected from Boardex and Execucomp. Including these variables severely reduces our sample size to a range between 11,369 (119) and 9,568 (107) firm-year (MSA) observations. Table SA7 reports the results. We find that controlling the above corporate governance and compensation factors in the reduced sample does not materially change our finding of significant location effects. As for these additional controls, we find that board independence exhibits a positive relationship with corporate tax avoidance.

Dyreng et al. (2010) find that executive fixed effects explain corporate tax avoidance. There is also evidence that CEOs prefer certain locations (Yonker, 2017). Therefore, we include CEO fixed effects in our models to test the robustness of our findings. We identify CEOs through the unique identifier of CEO from the ExecuComp database for the period from 1994 to 2017. Following Dyreng et al. (2010), each CEO in our sample is required to be employed by at least two different firms, for at least three years at each firm. This additional requirement significantly reduces our sample size. Table SA8 shows that CEO effect explains significant amount of variations in corporate tax avoidance, however, location fixed effects remain jointly significant in explaining tax avoidance across all full models after controlling for the CEO fixed effects. Overall, our findings suggest that the geographic effects are distinct from the executive effects.

Table SA7: MSA Fixed Effects: Controlling for Corporate Governance and CEO Compensation

Panel A: MSA Fixed Effects on Effective Tax Rates (ETR_{it})

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
$YEAR_t$		7.57***				9.76***
$FIRM_i$			2.80***			2.90***
IND_i				3.35***		----------
LOC_l (MSA)					1.87***	2.74***
N	11,369	11,369	11,369	11,369	11,369	11,369

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
NYEARS		19				19
NFIRMS			1,623			1,623
NINDS				300		----------
NLOCS					119	119
RSQ	0.109	0.119	0.393	0.183	0.126	0.413
Estimated Coefficients (t-tests):						
$NUMDIRS_{it}$	−0.000	−0.001	0.003	0.007*	−0.000	0.004
	(−0.10)	(−0.18)	(0.31)	(1.77)	(−0.10)	(0.50)
$PCTINDEP_{it}$	−0.035***	−0.024**	−0.052***	−0.033***	−0.039***	−0.012
	(−3.50)	(−2.25)	(−3.64)	(−3.11)	(−3.73)	(−0.77)
$GENDER_{it}$	−0.012	−0.005	−0.010	−0.023*	−0.012	0.005
	(−0.97)	(−0.36)	(−0.51)	(−1.68)	(−0.90)	(0.23)
$CFOBOD_{it}$	−0.000	0.003	−0.003	−0.001	−0.000	0.003
	(−0.13)	(0.84)	(−0.79)	(−0.37)	(−0.13)	(0.74)
$CEOCHAIR_{it}$	0.000	0.005	−0.006*	−0.001	−0.000	−0.001
	(0.04)	(1.53)	(−1.79)	(−0.40)	(−0.07)	(−0.27)
$CEOCOMP_{it}$	0.000	−0.000	0.003	0.002	0.001	0.003
	(0.15)	(−0.01)	(1.43)	(1.04)	(0.38)	(1.39)
Other Controls	YES	YES	YES	YES	YES	YES

Panel B: MSA Fixed Effects on Cash Effective Tax Rates ($CETR_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
$YEAR_t$		5.16***				9.44***
$FIRM_i$			3.25***			3.32***
IND_i				3.13***		----------
LOC_l (MSA)					2.33***	2.12***
N	11,369	11,369	11,369	11,369	11,369	11,369

NYEARS		19				19
NFIRMS			1,623			1,623
NINDS				300		----------
NLOCS					119	119
RSQ	0.112	0.120	0.424	0.182	0.134	0.441
Estimated Coefficients (t-tests):						
NUMDIRS$_{it}$	−0.002	−0.002	0.009	−0.001	−0.001	0.013
	(−0.53)	(−0.40)	(0.88)	(−0.21)	(−0.27)	(1.29)
PCTINDEP$_{it}$	−0.033***	−0.041***	−0.027	−0.031**	−0.038***	−0.018
	(−2.71)	(−3.15)	(−1.59)	(−2.38)	(−3.05)	(−0.91)
GENDER$_{it}$	−0.037**	−0.039**	0.006	−0.007	−0.034**	−0.044*
	(−2.43)	(−2.52)	(0.24)	(−0.40)	(−2.16)	(−1.72)
CFOBOD$_{it}$	0.009**	0.004	0.002	0.009**	0.010***	−0.003
	(2.43)	(1.09)	(0.43)	(2.54)	(2.85)	(−0.57)
CEOCHAIR$_{it}$	−0.001	0.003	−0.007*	0.000	−0.002	0.006
	(−0.20)	(0.64)	(−1.81)	(0.09)	(−0.59)	(1.31)
CEOCOMP$_{it}$	−0.005**	−0.005**	−0.005*	−0.007***	−0.006***	−0.002
	(−2.49)	(−2.39)	(−1.95)	(−3.53)	(−2.84)	(−0.72)
Other Controls	YES	YES	YES	YES	YES	YES

Panel C: MSA Fixed Effects on FIN 48 Tax Reserve (UTB$_{it}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Joint Significance (F-statistics)						
YEAR$_t$		11.23***				8.14***
FIRM$_i$			15.35***			14.23***
IND$_i$				5.49***		----------
LOC$_l$ (MSA)					9.21***	4.52***
N	9,568	9,568	9,568	9,568	9,568	9,568

NYEARS		11				11
NFIRMS			1,395			1,395
NINDS				283		----------
NLOCS					112	112
RSQ	0.223	0.232	0.786	0.334	0.299	0.794
Estimated Coefficients (t-tests):						
$NUMDIRS_{it}$	0.001	0.000	0.001*	0.001**	0.001*	0.001
	(1.47)	(0.89)	(1.85)	(2.31)	(1.71)	(1.36)
$PCTINDEP_{it}$	0.008***	0.007***	0.002	0.008***	0.010***	0.002
	(4.93)	(4.18)	(1.37)	(4.71)	(6.38)	(1.25)
$GENDER_{it}$	0.008***	0.005***	0.006***	0.009***	0.008***	0.003*
	(5.07)	(3.26)	(3.34)	(5.23)	(5.33)	(1.78)
$CFOBOD_{it}$	0.001**	0.001**	0.000	0.000	0.000	0.000
	(2.52)	(2.05)	(1.02)	(1.10)	(0.61)	(1.03)
$CEOCHAIR_{it}$	−0.002***	−0.002***	−0.001*	−0.002***	−0.002***	−0.000
	(−6.80)	(−5.46)	(−1.90)	(−5.77)	(−6.10)	(−1.54)
$CEOCOMP_{it}$	−0.000	0.000	0.000	0.000	−0.000	0.000
	(−0.38)	(0.28)	(0.28)	(0.00)	(−0.54)	(1.35)
Other Controls	YES	YES	YES	YES	YES	YES

Panel D: MSA Fixed Effects on 5-Year Cash ETR ($CETR5_{it-4\sim t}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Joint Significance (F-statistics)						
$YEAR_t$		6.72***				13.31***
$FIRM_i$			11.02***			11.35***
IND_i				7.63***		----------
LOC_l (MSA)					4.87***	5.77***
N	10,022	10,022	10,022	10,022	10,022	10,022

NYEARS		19				19
NFIRMS			1,385			1,385
NINDS				290		----------
NLOCS					107	107
RSQ	0.198	0.207	0.710	0.346	0.237	0.727
Estimated Coefficients (t-tests):						
$NUMDIRS_{it}$	0.004	0.004	0.005	0.006*	0.004	0.008*
	(1.40)	(1.25)	(1.06)	(1.92)	(1.42)	(1.67)
$PCTINDEP_{it}$	−0.040***	−0.018**	−0.044***	−0.041***	−0.043***	0.009
	(−4.71)	(−1.98)	(−5.06)	(−4.87)	(−5.06)	(0.89)
$GENDER_{it}$	−0.043***	−0.038***	0.036***	−0.001	−0.035***	0.015
	(−4.13)	(−3.65)	(2.85)	(−0.07)	(−3.34)	(1.17)
$CFOBOD_{it}$	0.004	0.001	0.002	0.004*	0.007***	−0.000
	(1.58)	(0.55)	(1.00)	(1.82)	(2.79)	(−0.03)
$CEOCHAIR_{it}$	0.005**	−0.001	0.002	0.007***	0.004	0.001
	(2.15)	(−0.28)	(1.08)	(3.03)	(1.54)	(0.36)
$CEOCOMP_{it}$	−0.002	−0.002	−0.003**	−0.004***	−0.002*	−0.001
	(−1.08)	(−1.37)	(−2.02)	(3.21)	(−1.74)	(−1.13)
Other Controls	YES	YES	YES	YES	YES	YES

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents results after controlling for corporate governance factors and CEO compensation.

Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable.

Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-4\sim t}) = \alpha_0 + \Sigma_l\alpha_l LOC_l + \Sigma_t\alpha_t YEAR_t + \Sigma_i\alpha_i FIRM_i + \alpha_{str}STR_{it} + \Sigma_k\alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4 and 5 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, or LOC (MSA), but include no controls for the other effects (except the effects of the time-varying firm-level

controls, which are included in all models). The final model, Model 6, is a test of each set of effects in the presence of the other effects, except for industry.

Table SA8: MSA Fixed Effects: Controlling for Executive Fixed Effects

Panel A: MSA Fixed Effects on Effective Tax Rates (ETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Joint Significance (F-statistics)							
YEAR$_t$		6.17***					5.04***
FIRM$_i$			2.52***				----------
IND$_i$				2.94***			3.55***
LOC$_l$ (MSA)					1.79***		2.44***
CEO$_i$						2.45***	2.35***
Controls	YES	YES	YES	YES	YES	YES	YES
N	12,289	12,289	12,289	12,289	12,289	12,289	12,289
NYEARS		24					24
NFIRMS			1,676				----------
NINDS				306			306
NLOCS					172		172
NCEO						2,807	2,807
RSQ	0.087	0.097	0.348	0.151	0.110	0.471	0.490

Panel B: MSA Fixed Effects on Cash Effective Tax Rates (CETR$_{it}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Joint Significance (F-statistics)							
YEAR$_t$		4.99***					5.86***
FIRM$_i$			2.60***				----------

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
IND_i				2.65***			1.92**
LOC_l (MSA)					1.95***		2.30***
CEO_i						2.49***	2.40***
Controls	YES	YES	YES	YES	YES	YES	YES
N	12,289	12,289	12,289	12,289	12,289	12,289	12,289
NYEARS		24					24
NFIRMS			1,676				----------
NINDS				306			306
NLOCS					172		172
NCEO						2,807	2,807
RSQ	0.088	0.096	0.354	0.145	0.112	0.475	0.493

Panel C: MSA Fixed Effects on FIN 48 Tax Reserve (UTB_{it})

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Joint Significance (F-statistics)							
$YEAR_t$		9.03***					4.34***
$FIRM_i$			16.34***				----------
IND_i				5.57***			7.01***
LOC_l (MSA)					5.71***		3.95***
CEO_i						14.92***	14.04***
Controls	YES	YES	YES	YES	YES	YES	YES
N	7,399	7,399	7,399	7,399	7,399	7,399	7,399
NYEARS		11					11
NFIRMS			1,144				----------
NINDS				269			269
NLOCS					137		137
NCEO						1,539	1,539
RSQ	0.181	0.191	0.795	0.301	0.260	0.834	0.841

Panel D: MSA Fixed Effects on 5-year Cash Effective Tax Rates (CETR5$_{it-4\sim t}$)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Joint Significance (F-statistics)							
YEAR$_t$		16.26***					20.86***
FIRM$_i$			9.89***				----------
IND$_i$				7.26***			8.51***
LOC$_l$ (MSA)					5.42***		5.15***
CEO$_i$						10.74***	9.45***
Controls	YES	YES	YES	YES	YES	YES	YES
N	10,593	10,593	10,593	10,593	10,593	10,593	10,593
NYEARS		24					24
NFIRMS			1,444				----------
NINDS				295			295
NLOCS					141		141
NCEO						2,329	2,329
RSQ	0.203	0.229	0.689	0.340	0.257	0.802	0.821

*, **, *** represent statistical significance at the 10%, 5%, and 1% levels, respectively.

This Table presents F-statistics testing the joint significance of the effects listed in the first column – YEAR, FIRM, IND, LOC (MSA), or CEO; and R-squared for fixed effect models. Panel A presents the results with ETR as the dependent variable, Panel B with CETR as the dependent variable, Panel C with UTB as the dependent variable, and Panel D with CETR5 as the dependent variable. Each column represents a regression nested within the first-stage model:

$$ETR_{it}(CETR_{it}/UTB_{it}/CETR5_{it-1\sim t}) = \alpha_0 + \Sigma_l \alpha_l LOC_l + \Sigma_t \alpha_t YEAR_t + \Sigma_i \alpha_i FIRM_i + \Sigma_m \alpha_m CEO_m + \alpha_{str} STR_{it} + \Sigma_k \alpha_k CONTROL_{it}^k + \varepsilon_{it}$$

Model 1 includes only an intercept and the vector of time-varying firm-level controls. Models 2, 3, 4, 5, and 6 are regressions, which include only one set of fixed effects (indicator variables) – YEAR, FIRM, IND, LOC (MSA), or CEO, but include no controls for the other effects (except the effects of the time-varying firm-level controls, which are included in all models). The final model, Model 7, is a test of each set of effects in the presence of the other effects, except for industry.

A diagnostic tool for assessing the corporate income tax compliance burden: pilot study findings

Rodney Brown* and Kerrie Sadiq**

Abstract

The purpose of this article is to provide further and deeper insights on the size, nature, and drivers of the corporate income tax (CIT) compliance burden. The study, conducted during 2020-2021 across 10 jurisdictions with diverse economic characteristics, is built upon the premise that this information can be gained from developing a suitable CIT compliance burden diagnostic tool. The article details the methodology, analysis, and recommendations of the CIT pilot study. This article, modelled on a prior similar VAT study, adopts both the structure of the earlier article and, more importantly, the methodology, analysis, and findings are undertaken analogously. The primary objective of the CIT diagnostic tool is to provide an indication of the likely scale of compliance burden of a jurisdiction's CIT burden expressed in terms of a compliance burden index, and the main drivers of that burden. The secondary objective is to identify those aspects of CIT policy and administration that contribute to such burden most frequently across a population of surveyed jurisdictions. Despite significant disparity within factors and indicators, the pilot study results from the 10 jurisdictions surveyed indicate little difference in terms of compliance burden index ranking with a medium or high compliance burden for all CIT taxpayers. The consolidated results indicate that all jurisdictions contain CIT compliance and administration measures that can be improved.

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1.   INTRODUCTION AND BACKGROUND

Interest in the issue of tax compliance costs has grown significantly over the last two decades, in large part due to the work of academics and government agencies concerned about their incidence and perverse impacts.[1] Tax compliance costs are defined as 'the costs borne by businesses and individuals for complying with tax regulation, excluding the costs of the taxes themselves'.[2] Over time, a variety of approaches have been used to gauge the size and nature of the tax compliance burden.[3] Two prominent examples noted in the earlier value added tax (VAT) project include the 'Standard Cost Model'[4] (which is widely used by and on behalf of the European Commission) and the World Bank's 'Doing Business (DB)'[5] series. Additionally, jurisdictional revenue authorities may publish very limited data.[6] While each of these methodologies have several useful features, they also have conceptual and practical limitations,[7] which in part led to the commencement of exploratory work at the Organisation for Economic Co-operation and Development (OECD) in 2012-13 to develop a superior methodology. However, due to competing priorities, in particular the Base Erosion and Profit Shifting (BEPS) project, the OECD ceased exploratory work on the alternative methodology.[8] Subsequently, in 2015, tax academics at UNSW agreed that further exploration on the development of a diagnostic tool was warranted and initially focused on VAT with the intention to extend the diagnostic tool concept to other business taxes in due course. This culminated in the VAT compliance burden pilot project,[9] and its subsequent roll-out.[10]

The pilot study involved 13 countries and was launched by UNSW Sydney in early 2017, to test the VAT diagnostic tool. The findings broadly aligned with expectations and participants were generally of the view that the tool displayed merit in assessing the likely relative VAT compliance burden and its main drivers.[11] The project was then

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[1] Phil Lignier, Chris Evans and Binh Tran-Nam, 'Tangled Up in Tape: The Continuing Tax Compliance Plight of the Small and Medium Enterprise Business Sector' (2014) 29(2) *Australian Tax Forum* 217; Chris Evans, Philip Lignier and Binh Tran-Nam, B 2016, 'The Tax Compliance Costs of Large Corporations: An Empirical Inquiry and Comparative Analysis' (2016) 64(4) *Canadian Tax Journal* 751.

[2] European Commission, *A Review and Evaluation of Methodologies to Calculate Tax Compliance Costs*, Working Paper N.40-2013, Taxation Papers, FWC TAXUD/2012/CC/116 (prepared by Ramboll Management Consulting, the Evaluation Partnership, and Europe Economic Research, 2013) 1.

[3] Richard Highfield, Chris Evans and Michael Walpole, 'The Development and Testing of a Diagnostic Tool for Assessing VAT Compliance Costs: Pilot Study Findings' (2019) 16(3) *eJournal of Tax Research* 620.

[4] European Commission, above n 2. The European Commission report reviews, assesses and compares twelve methodologies which can be used for measuring compliance costs of taxation.

[5] World Bank, *Doing Business 2018: Reforming to Create Jobs* (World Bank, 15th ed, 2018).

[6] For example, the Australian Taxation Office publishes annual data on the average time per form completion reported by taxpayers. See Australian Government, 'Taxation Statistics 2018-19: COC Table 1, Cost of Taxation Compliance Data, by Form Type, 1998–99 to 2019–20 Years', https://data.gov.au/data/dataset/taxation-statistics-2018-19/resource/c454ed6a-42c4-4b61-92ef-144ec13c7026?inner_span=True.

[7] For a detailed discussion of these limitations see Richard Highfield, Michael Walpole and Chris Evans, 'A Proposal for the Development and Testing of a Diagnostic Tool for Assessing VAT Compliance Costs' (2017) 28(3) *International VAT Monitor* 228.

[8] Highfield, Evans and Walpole, above n 3, 622.

[9] Highfield, Evans and Walpole, above n 3.

[10] Richard Highfield, Chris Evans, Binh Tran-Nam and Michael Walpole, 'Diagnosing the VAT Compliance Burden: A Cross-Country Assessment – Amended Final Report' (21 October 2019), https://www.business.unsw.edu.au/Our-People-Site/Documents/Joint%20Report%20on%20VAT%20compliance%20costs%20tool.pdf.

[11] Highfield, Evans and Walpole, above n 3.

expanded, in partnership with KPMG, to cover the 47 member countries of the OECD's Forum on Tax Administration (FTA) which have a VAT or GST in place.[12] A modified tool was used which incorporated feedback from pilot study participants. The academics leading this project concluded that the modified diagnostic tool is a robust instrument for measuring and evaluating the business VAT compliance burden *across* countries and for identifying the underlying *drivers* of that burden.[13]

This project builds on the successful work carried out in the VAT project by extending the diagnostic tool concept to corporate income tax (CIT). In line with the VAT project, this project operates from the premise that further and deeper insights on the size, nature, and drivers of the CIT tax compliance burden can be gained from developing a suitable CIT compliance burden diagnostic tool. Furthermore, a recent scandal involving the World Bank's DB Index[14] has led to the discontinuation of the DB Report creating additional impetus for the development of a robust alternative methodology.[15]

This article details the methodology, analysis, and recommendations of the CIT pilot study. The study was conducted during 2020-21 across 10 jurisdictions with diverse economic characteristics.[16] The assistance of academic researchers previously involved in the initial VAT project as well as new academic researchers to the project was sought.[17] The approach adopted was consistent with the final report of the VAT compliance burden project. As such, this article is modelled on that study and, to ensure consistency and build on the success of the earlier project, both the structure of the article and, more importantly, the methodology, analysis, and findings are undertaken analogously.

Following this introduction, section 2 outlines the methodology and details both the design of the diagnostic tool and administration of the survey. Section 3 discusses the survey responses, while section 4 provides an analysis of the key findings from the survey. Section 5 provides concluding comments. This article reflects the project position as at November 2021.

2. METHODOLOGY

2.1 Design of the diagnostic tool and process of analysis

The design and development of the CIT diagnostic tool was a multi-stage process that followed the VAT diagnostic tool developmental steps.[18] Prior to the development of the tool, CIT was defined to ensure participants approached the tool from the same level of understanding as to what taxes were the subject under investigation. This compliance

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[12] Highfield et al, above n 10.

[13] Ibid 34.

[14] See Fernanda G Nicola, 'Scandal Involving World Bank's "Doing Business" Index Exposes Problems in Using Sportslike Rankings to Guide Development Goals', *The Conversation* (15 October 2021), https://theconversation.com/scandal-involving-world-banks-doing-business-index-exposes-problems-in-using-sportslike-rankings-to-guide-development-goals-169691.

[15] See World Bank, 'World Bank Group to Discontinue Doing Business Report' (statement, 16 September 2021), https://www.worldbank.org/en/news/statement/2021/09/16/world-bank-group-to-discontinue-doing-business-report.

[16] Australia, China, Egypt, Germany, Hong Kong, Italy, Japan, New Zealand, South Africa and USA.

[17] Four of the 13 jurisdictions surveyed in the VAT project were included in the CIT compliance project. These were Australia, Egypt, New Zealand and South Africa.

[18] Highfield et al, above n 10.

burden diagnostic tool adopts the definition of CIT in the OECD's Revenue Statistics database.[19] Specifically, CIT refers to income tax that is levied on the profits of an entity, usually a company, not on the shareholders who own it.[20] However, given the adoption of the OECD definition, taxes paid on the profits of partnerships and the income of institutions, such as life insurance or pension funds, are also classified as CIT if they are charged on the partnership or institution as an entity.[21] In these cases, the term 'corporation' in this rating sheet includes these kinds of entities.

As a starting point, the framework for the diagnostic tool was established through the identification of four factors perceived to be the main drivers of aggregate CIT compliance costs at the individual jurisdiction level. Each of the four factors was then sub-categorised into indicators. Whilst much of the groundwork for the CIT diagnostic tool was laid by the VAT compliance burden project, the CIT tool also incorporates specific indicators relevant for CIT which were conceived by participants of the original project at previous workshops in Sydney and Exeter.

The Sydney workshop, hosted at the Sydney offices of KPMG on 3-4 April 2018, was attended by many of participants from the original VAT pilot study to review the VAT diagnostic tool and identify areas for refinement. In addition, one of the objectives of the workshop was to explore, at a high level, the possible features of diagnostic tools for other major taxes, including CIT. On day 2 of the workshop, participants split into four syndicate groups – two brainstorming ideas for the development of a CIT diagnostic tool and two considering the features of a tool for employment related taxes. All groups were asked to assess the merits of the four-factor framework adopted by the VAT project for both the CIT and employment taxes respectively. Each group made a brief presentation of its findings that included proposed indicators, followed by discussion.

Building on the discussion and ideas gathered at the Sydney 2018 workshop, work continued on the development of diagnostic tools for other business taxes at the Exeter workshop on 9-10 April 2019. The workshop was hosted by Exeter University and brought together a number of participants from the expanded VAT study. Development of the prototype tools continued in sessions with syndicate groups, and it was agreed that the four-factor framework underpinning the VAT diagnostic tool was generally applicable to the other business tax regimes. The prototype tool developed at the Sydney workshop and later refined at the Exeter workshop formed the basis of the CIT diagnostic tool used in this pilot study. The four factors in the framework are:

Factor A: Compliance burden from core elements of CIT policy;

Factor B: The number and frequency of administrative requirements to comply;

Factor C: Revenue body capabilities in meeting taxpayers' service and compliance needs; and

Factor D: Monetary costs/benefits associated with compliance.

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[19] OECD, *Revenue Statistics: Interpretative Guide* (2021), https://www.oecd.org/tax/tax-policy/oecd-classification-taxes-interpretative-guide.pdf.
[20] Ibid 11.
[21] Ibid.

As outlined above, Step 1 required the identification of a four-factor framework to provide the overall structure for the diagnostic tool. Step 2 involved the development of a comprehensive set of compliance burden indicators, 30 in total, which were categorised under Factors A – D. These indicators are largely objective and aim to maintain the consistency of the final weighted scores used for cross-jurisdictional comparisons. A brief explanation of each factor and the associated indicators is as follows:

Factor A, entitled 'compliance burden from core elements of CIT policy', aims to establish a jurisdiction's perceived degree of complexity and compliance burden by considering core aspects such as tax rates, exemptions and simplification regimes, and alignment of tax returns with financial statements. A total of 10 indicators were developed for this factor based on agreement of the experts participating in the project.

Factor B, entitled 'number and frequency of administrative requirements to comply', aims to establish a jurisdiction's perceived degree of complexity and compliance burden by considering core aspects such as registration, document completion, and information requirements. A total of 10 indicators were developed for this factor based on agreement of the experts participating in the project.

Factor C, entitled 'revenue body capabilities in meeting taxpayers' service and compliance costs', aims to establish a jurisdiction's perceived degree of complexity and compliance burden by considering core aspects such as online services and phone services of the revenue authority. A total of seven indicators were developed for this factor based on agreement of the experts participating in the project.

Factor D, entitled 'monetary costs/benefits associated with compliance', aims to establish a jurisdiction's perceived degree of complexity and compliance burden by considering core aspects such as time taken to process refunds, interest paid on delayed refunds, and charges for private rulings. A total of three associated indicators were developed for this factor based on agreement of the experts participating in the project.

Table 1 outlines the four factors, the compliance burden indicators associated with each factor, and the range of possible scores for each indicator. A higher (lower) score indicates a higher (lower) compliance burden. The range of scores varied across indicators depending on the scale being used and information required (see Appendix Table A for further details on the scale descriptions for each indicator).

Table 1: Summary of Compliance Burden Factors and Indicators

Factor A: Compliance Burden from Core Elements of CIT Policy	
Compliance Burden Indicators	**Range**
Number of tax rates for different types of entities	1-3
Percentage of taxpayers subject to more than one rate	1-3
Percentage of corporations eligible for exemptions from CIT	1-3
Approval requirements for exemptions	1-4
Number of special CIT regimes that simplify tax computation and compliance	1-4
Percentage of taxpayers using the special CIT regimes that simplify matters	1-5
Number of adjustments from financial accounts generally required in CIT returns	1-4

Number of special CIT regimes that complicate tax computation and compliance	1-4
Percentage of taxpayers using special CIT regimes that complicate matters	1-4
Frequency of legislative amendments of the CIT law during 2019 fiscal year	1-4
Total unweighted score range	**10-38**
Factor B: Number and Frequency of Administrative Requirements to Comply	
Compliance Burden Indicators	**Range**
Percentage of new CIT taxpayers that registered electronically	1-5
Frequency of CIT return filings	1-5
Frequency of CIT payments for a small/medium/large corporation	1-5
Percentage of taxpayers required to make estimated CIT payments	1-4
Information required for a CIT return of a small/medium/large corporation	1-4
Percentage of taxpayers required to submit additional documentation	1-4
Standard period for retaining records for CIT purposes	1-3
Percentage of taxpayers subject to verification actions each year	1-3
Percentage of verification actions that result in disputed CIT assessments	1-3
Whether cooperative compliance programs exist	1-2
Total unweighted score range	**10-38**
Factor C: Revenue Body Capabilities in Meeting Taxpayers' Service and Compliance Needs	
Compliance Burden Indicators	**Range**
Quality of revenue body's website for CIT	1-5
Percentage of CIT payments made through revenue body's online payment facilities	1-5
Percentage of taxpayers using revenue body's online filing facilities to file CIT returns	1-5
Quality of revenue body's online transaction services for additional services	1-5
Quality of revenue body's phone enquiry service	1-5
Quality of revenue body's support services for newly registered businesses subject to CIT	1-5
Time generally required for revenue body to provide private tax rulings	1-3
Total unweighted score range	**7-33**
Factor D: Monetary Costs/Benefits Associated with Compliance	
Compliance Burden Indicators	**Range**
Time generally required for revenue body to process CIT refunds	1-3
When is interest paid on delayed refunds	1-4
A charge for a private tax ruling	1-2
Total unweighted score range	**3-9**
Aggregate unweighted score range (all factors)	**30-118**

Step 3 required eliciting survey responses through the administration of the instrument across a group of appropriate jurisdictions. Each of the compliance burden indicators required a single rating on the project's 'Rating and Evaluation Form'. There was

provision for any qualifying comments to be made by researchers if deemed necessary and helpful for research purposes. The relevant fiscal year for rating purposes in this pilot study was 2019. While some of the indicators could be determined independently by country researchers using published materials, a number required data and insights that were held only by government agencies, in particular the tax administration body and/or ministry of finance, and/or representatives of business and the tax/accounting profession. Where this was the case, project researchers were encouraged to seek clarification from experts. The lack of objective data at times was a limitation of the study which this clarification sought to address.

The 'Rating Sheet' also sought to gather a limited amount of information pertaining to the degree of government and institutional recognition and attention being given to address the tax compliance burden/costs of the CIT and other taxes. There were two statements (Indicators B10 and D3) that required an indication of whether certain policies and activities are in place, with just a simple 'Yes/No' response required. Information required to respond to these two statements was likely to be found in official government, Ministry of Finance (MOF) and/or revenue body documents (eg, annual budget statements, revenue body plans and performance reports). A copy of the Rating Sheet sent to participants is provided at Appendix Table A.

Step 4 involved the normalisation of the ratings along with their weighting and aggregation. Where indicators provided for multiple scores, such as Factor B, indicators 3 and 5 with small medium and large businesses, these scores were converted to the arithmetic mean of the three ratings (rounded up to a whole number). Following the VAT project, it was also recognised that the four factors would impact unevenly in a compliance burden context. Consequently, the same empirical methodology as that adopted in the earlier VAT project was used for the purposes of scoring and weighting the responses to the diagnostic tool.

The aggregation subsequently allowed systems to be classified by the likely compliance burden in Step 5. Finally, in Step 6, the major drivers of the CIT compliance burden were identified.

Figure 1 (Summary of Process, Appendix) provides a summary of the process of design, implementation and analysis described above.

2.2   Survey participants

Ten jurisdictions were targeted for engagement with the pilot study. The sample of jurisdictions was selected partly on convenience, generally based upon academic contacts known to researchers who were part of the VAT project and/or the current CIT project. In addition, the researchers aimed to ensure there was a mix of developed and developing jurisdictions as well as broad geographic representation and varying degrees of tax system maturity. While the sample size was relatively small, a diverse set of jurisdictions was selected that included Australia, China, Egypt, Germany, Hong Kong SAR, Italy, Japan, New Zealand, South Africa, and United States of America. Consistent with the VAT pilot study, academics only were consulted during the current CIT pilot study. The obvious limitation of this approach was that experts within the profession were not generally consulted unless informally approached by individual academics to assist with their survey responses. The rollout of the VAT pilot study to a larger project took this limitation into account and with the assistance of a 'Big 4' international accounting firm was able to garner the expertise of individuals with greater

practical experience. A consistent approach will also be adopted in any further rollout of the CIT study.

2.3 Administration of the survey

The diagnostic tool contained in Appendix Table A and distributed to participants identifies the main factors perceived to drive overall CIT compliance costs at the jurisdiction level and, for each factor, sets out a series of compliance burden indicators relating to the design and administration of CIT systems.

Participants were advised that other information sources should be utilised where practicable in the event that some ministries of finance and/or revenue bodies were not prepared to engage on this project or would do so only on a partial basis. Participants were then provided with a summary of those indicators where such sources of information may need to be accessed as indicated in Appendix Table B. Participants were asked to provide an indication of their use of these information sources in the 'comments' section of the ratings form.

Finally, as CIT regimes are often complex and quite different among countries, it is impossible for this diagnostic tool to cover all possible features of the regimes that affect compliance costs. As such, participants were provided with the opportunity to provide additional information in comment sections in the rating sheet to highlight any specific rules or features of a jurisdiction's CIT regime that are not covered in the indicators but have significant implications on the compliance burden.

The academics approached were generally enthusiastic about participating in the project and were overall compliant with the timeframe provided. Where participants were unclear as to particular questions, clarity was generally sought. The quality of the responses was generally high with the biggest limitation being missing indicators. Where this was the case, as described in section 3 below, the main researchers attempted to locate the data and, where this was not possible, consistent with the VAT project, default indicators were used.

2.4 The development of weightings for each burden factor

The VAT compliance burden project acknowledged that the four factors would have an uneven impact on the compliance burden and that, as a result, some form of scoring and weighting would be needed for the diagnostic tool. The process adopted in the earlier VAT project was applied to the CIT compliance burden survey results. Specifically, the academics representing the 10 jurisdictions participating in the survey were given an opportunity to provide a judgment on the relative weighting of each of the four factors. Participants were advised that this part of the project was voluntary. Nine responses were received. Table 2 summarises those responses.

Table 2: Suggested Factor Weighting Provided by Participants

Country	Suggested Weightings			
	Factor A Tax law/policy complexity	Factor B Administrative requirements	Factor C Revenue body capabilities	Factor D Monetary costs/benefits
Australia	0.45	0.30	0.20	0.05
China	0.60	0.10	0.20	0.10
Egypt	0.25	0.30	0.30	0.15
Hong Kong	0.25	0.25	0.25	0.25
Italy	0.20	0.50	0.20	0.10
Japan	0.50	0.15	0.05	0.30
New Zealand	0.30	0.20	0.30	0.20
South Africa	0.30	0.20	0.30	0.20
USA	0.40	0.40	0.15	0.05
Range	0.20-0.60	0.10-0.50	0.05-0.30	0.05-0.30
Median	0.30	0.25	0.20	0.15
Arithmetic Mean	0.361	0.267	0.217	0.156
Geometric Mean	0.340	0.241	0.195	0.131
Normalised Geometric Mean	0.375	0.265	0.215	0.144

Analysis of the weightings in the VAT pilot study suggested a reasonable degree of consistency. However, this was not the case in the CIT pilot study and was of concern to the main researchers in the current investigation. Analysis of the weightings provided by the nine participants revealed significant variation in the perceptions of factor relevance across the jurisdictions. The most variation in suggested weightings was found for Factors A and B which varied from 0.20 to 0.60 and 0.10 to 0.50, respectively. Again, consistent with the VAT project, a geometric mean computation of weightings was made for each factor and applied for determining the final weighted score for each factor. Given the significant variation in perceptions of factor relevance, the normalised geometric mean was calculated with all jurisdiction responses included and then again removing the highest and lowest scores for each factor. The results, as set out in Table 3b below, suggest that difference was not significant. The participants were not asked to provide further details as to their judgment of the weightings and consequently the main researchers were unable to determine the cause of the variations. Weightings were also normalised. Weighted scores were then aggregated for each jurisdiction to derive an overall weighted score. These figures are provided in Table 3a.

Table 3a: Theoretical Scores (Weighted and Unweighted)

Factor	Minimum unweighted score	Maximum unweighted score	Normalised weightings	Minimum normalised weighted score	Maximum normalised weighted score
A	10	38	0.375	3.752	14.256
B	10	38	0.265	2.655	10.087
C	7	33	0.215	1.505	7.095
D	3	9	0.144	0.433	1.299
Totals	30	118	1.000	**8.344**	**32.738**

Table 3b: Mean Scores for Factors A – D

	F A	F B	F C	F D
Normalised Geometric Mean with all jurisdictions included	0.375	0.265	0.215	0.144
Normalised Geometric Mean with highest and lowest scores removed	0.360	0.262	0.210	0.167

The final weightings also allowed the calculation of a minimum and maximum theoretical score reflecting the incidence of overall burden that was then converted into a Compliance Burden Index ranging from 1 to 10, with 1 being the lowest compliance burden and 10 being the highest compliance burden. In addition, the index permits the classification of the compliance burden into evenly spread groupings labelled 'very low', 'low', 'medium', 'high' and 'very high'. The categorisation of the Compliance Burden Index is contained in Table 4.

Table 4: Normalised Weighted Scores and Compliance Burden Index

	Proposed weighted score range	Compliance Burden Index	Classification
Range of total weighted scores: 8.344 to 32.738	8.344 – 10.783	1	Very Low
	10.784 – 13.223	2	
	13.224 – 15.662	3	Low
	15.663 – 18.102	4	
	18.103 – 20.541	5	Medium
	20.542 – 22.980	6	
	22.981 – 25.420	7	High
	25.421 – 27.859	8	
	27.860 – 30.299	9	Very High
	30.300 – 32.738	10	

3. SURVEY RESPONSES

Survey responses were received from researchers representing the 10 countries in the data set. Detail on each indicator within the four factors along with a summary and analysis of the survey responses were either fully or partially provided. While participants in the project largely completed the survey forms, there were instances where they were unable to locate the data or form a judgment as to the appropriate value for a specific indicator. Where this occurred, the main researchers attempted to locate additional sources of data by using databases such as the IBFD Country Tax Guides[22] and OECD Tax Administration Comparative Information.[23] Where data was not able to be obtained, consistent with the VAT project, a default value set at the mid-point of the indicator range value was used.[24] The results required seven default indicators for Hong Kong, four for Germany and Japan and one for Australia, China and New Zealand.[25] The original VAT study determined that jurisdictions with five or more default values should be removed from the final analysis. The researchers in the current study were cognisant of this approach and undertook an investigation as to the consequences of keeping jurisdictions above this threshold in the data sample. Given the high number of default indicators for Hong Kong, the main researchers undertook the statistical analysis discussed above and below including and excluding the jurisdiction and found no statistical difference. Consequently, Hong Kong remained in the survey.

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[22] The IBFD Country Tax Guides were accessed through the IBFD Tax Research Platform: https://research.ibfd.org

[23] OECD, *Tax Administration: Comparative Information on OECD and Other Advanced and Emerging Economies* (various years), https://www.oecd-ilibrary.org/taxation/tax-administration_23077727#:~:text=The%20OECD's%20Tax%20Administration%20Comparative,and%20examples%20of%20good%20practice.

[24] Highfield et al, above n 10, 10.

[25] Hong Kong was an outlier in this sense.

3.1   Factor A – compliance burden from core elements of CIT policy

Country ratings for Factor A are set out in Table 5 (Country Ratings – Tax Law/Policy Complexity (Factor A), Appendix), while comments for each of the 10 indicators are provided below.

3.1.1   *Indicators A1-A2: ease of computation*

Ease of computation comprised two indicators: number of tax rates for different types of entities and percentage of taxpayers subject to more than one rate.

Indicator A1 was derived by determining the number of tax rates for different types of entities such as base rate entities and small business entities as defined by the individual jurisdictions being surveyed. This indicator was included on the basis that the number of different tax rates increases complexity as taxpayers are required to ascertain the applicable rate.[26] Indicator A2 was derived from determining what percentage of taxpayers were subject to more than one rate of CIT on the basis that complexity is increased where the same taxpayer is dealing with more than one rate of tax.

Of the 10 jurisdictions surveyed, seven had more than one rate of corporate tax; however only two jurisdictions, Hong Kong and Italy, indicated that more than 50 per cent of taxpayers where subject to more than one corporate tax rate. This suggests that while there are different corporate tax rates within jurisdictions, once a taxpayer determines which rate applies to them, in most jurisdictions there is only one rate within the relevant category of taxpayer.

3.1.2   *Indicators A3-A6: CIT policies that simplify tax computation and compliance*

Indicators pointing to CIT policies that simplify tax computation and compliance involved four gauges: percentage of corporations eligible for exemptions form CIT (for example charities), whether approval is required for exemption, the number of special CIT regimes, and percentage of taxpayers that use special regimes that may simplify tax computation and compliance.

Indicator A3 was derived by taking account of the percentage of taxpayers that were exempt from CIT as an exemption potentially simplifies compliance.[27] The need to gain formal approval for any such exemption was represented in indicator A4, with a lower number of taxpayers needing approval indicating a simpler process. Indicator A5 reflected the number of special CIT regimes that were in place that were designed to simplify tax computation and compliance, such as small business or group tax regimes, with a higher number of potential regimes applying indicating more complexity in compliance. Participants were also asked to list the relevant regimes. As a follow up question, indicator A6 asked about the percentage of taxpayers using the special CIT regimes identified on indicator A5, where a higher score indicated less taxpayers being able to avail themselves of a simplification regime.

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[26] Tracy Oliver and Scott Bartley, 'Tax System Complexity and Compliance Costs – Some Theoretical Considerations' (2005, Winter) *Economic Roundup* 53, https://treasury.gov.au/publication/economic-roundup-winter-2005/tax-system-complexity-and-compliance-costs-some-theoretical-considerations.
[27] Tamer Budak and Simon James, 'The Level of Tax Complexity: A Comparative Analysis Between the UK and Turkey Based on the OTS Index' (2018) 44(1) *International Tax Journal* 23.

All jurisdictions, except two, indicated that less than 25 per cent of corporate taxpayers were eligible for exemptions from CIT. The United States indicated that more than 50 per cent were eligible, while Hong Kong indicated that between 25 and 49 per cent were eligible. Where taxpayers were eligible for exemptions, seven jurisdictions indicated that approval was required for 50 per cent or more of all exemptions. Only Italy and Japan indicated that no approval was required prior to applying the exemptions. Turning to the number of special CIT regimes that simplify tax computation and compliance, six jurisdictions indicated they had no such regimes with the consequential flow-on that most jurisdictions also indicated that taxpayers were not using any simplification regime. Only Italy indicated there were regimes that simplified computation and compliance that were being utilised by between 25 and 49 per cent of available taxpayers.

3.1.3 *Indicators A7-A10: CIT policies that complicate tax computation and compliance*

Following indicators that rate the simplification of computation and compliance, indicators A7 to A10 rate CIT policies that complicate computation and compliance. Indicator A7 investigates the alignment between financial accounts and tax returns and rates the number of adjustments from financial accounts generally required in CIT returns. Indicator A8 rates the number of special CIT regimes, such as transfer pricing, anti-hybrid, and controlled-foreign-company rules, while indicator A9 determines the percentage of taxpayers using any of the special regimes identified in indicator A8. Finally, indicator A10 rates the frequency of legislative amendments of the CIT during the 2019 financial year.

All jurisdictions indicated that there were significant numbers of adjustments required from financial accounts in CIT returns, with three indicating the number was between five and 20 and seven indicating the number was more than 20. In a similar vein, jurisdictions indicated that there were more than three special CIT regimes that complicated tax computation and compliance, although the majority of jurisdictions indicated that less than 25 per cent of taxpayers used any of the regimes identified. Finally, the majority of jurisdictions specified a limited number of legislative amendments in the 2019 financial year with six indicating that there were one to five amendments during the year.

3.2 Factor B – number and frequency of administrative requirements to comply

Country ratings for Factor B are set out in Table 6 (Country Ratings – Number and Frequency of Administrative Requirements to Comply (Factor B), Appendix), while comments for each of the 10 indicators are provided below.

3.2.1 *Indicator B1: ease of registration*

The first indicator of complexity in administration, B1, rates the percentage of new taxpayers that registered electronically with a five-point scale that considered compulsory electronic registration as a 1, and paper and or attendance at a tax office in person to register as a 5. Jurisdictional responses to this indicator were markedly different with Egypt, Germany, Italy, and South Africa all stating that electronic registration was required, while China indicated that paper/in person registration was required. Other jurisdictions generally noted that most taxpayers chose to register electronically.

3.2.2   *Indicators B2-B4: frequency of tax filing and payments*

Increased frequency of tax filing and payments arguably contributes to a higher level of compliance burden. Three indicators reflected the question of frequency. Indicator B2 rated the frequency of CIT return filings, while indicator B3 rated the frequency of CIT payments. Indicator B3 was separated into micro/small corporate taxpayers, medium taxpayers, and large taxpayers. Indicator B4 rated the percentage of taxpayers required to make estimated CIT payments.

All jurisdictions surveyed were consistent in indicating that CIT returns were filed once a year. However, frequency of payments varied significantly across jurisdictions and across different sized corporate taxpayers. For example, Australia reported one payment per year for small taxpayers and monthly payments for large taxpayers while China reported quarterly payments for small and medium taxpayers and one payment per year for large taxpayers. Other jurisdictions, such as Germany and Italy, reported the same frequency of payments no matter the size of the taxpayer. The percentage of taxpayers required to make estimated CIT payments was much more consistent across jurisdictions with eight reporting that 50 per cent or more taxpayers were required to do so.

3.2.3   *Indicators B5-B7: information requirements*

The greater the information requirements, the greater the burden on the taxpayer. As such, indicators B5 to B7 rated the information required to comply with the relevant reporting obligations. Indicator B5 examined the amount of information required for the completion of the CIT return in terms of boxes or fields that need to be completed. Indicator B5 was separated into micro/small corporate taxpayers, medium taxpayers, and large taxpayers. Indicator B6 rates the requirement for additional information, while indicator B7 rates the number of years that records for CIT purposes must be retained by taxpayers.

Responses to indicator B5 suggest a large variance across jurisdictions but, in most cases, very little variation within jurisdictions but across different sized taxpayers. Australia, New Zealand and Egypt were the exception to this where information requirements increased as the size of the taxpayer increased. Most respondents indicated that additional information was required by at least some taxpayers although taxpayers affected ranged from less than 25 per cent to more than 50 per cent. Indicator B7, relating to record keeping as relatively consistent across jurisdictions with eight indicating that the time frame was between four and eight years. China and Germany indicated that the time frame was more than eight years.

3.2.4   *Indicators B8-B10: level of verification actions and disputed assessments*

The final set of indicators rating administration of the CIT system related to the level of verification actions and disputed assessments. Indicator B8 rated the percentage of taxpayers subject to verification actions each year with verification actions defined as all types of actions taken by the revenue bodies to verify taxpayer's reported liabilities such as document verification requests, audits, investigations, and written and phone inquiries. Indicator B9 rated the percentage of verification actions that resulted in disputed CIT assessments, while Indicator B10 was a yes/no response as to whether cooperative compliance programs exist.

Half of the jurisdictions surveyed stated that more than 10 per cent of taxpayers were subject to verification actions each year, but this did not result in consistent ratings in terms of the percentage that resulted in disputed assessments. In some jurisdictions, such as China and the United States, more than 10 per cent of taxpayers were subject to verification actions but less than 5 per cent of those actions resulted in disputed assessments. The opposite was true of Hong Kong where less than 5 per cent were subject to verification actions but that resulted in more than 10 per cent disputed assessment. For indicator B10, six jurisdictions had cooperative compliance programs while four did not.

3.3   Factor C – revenue body capabilities in meeting taxpayers' service and compliance needs

Country ratings for Factor C are set out in Table 7 (Country Ratings – Revenue Body Capabilities in Meeting Taxpayers' Service and Compliance Needs (Factor C), Appendix), while comments for each of the seven indicators are provided below.

3.3.1   Indicators C1-C4: online services

Indicators C1 to C4 consider the revenue body's online services to aid taxpayers in meeting their obligations. Indicator C1 considers the quality of the revenue body's website for CIT generally with a qualitative five-point rating of 1 for excellent through to 5 for non-existent. Indicator C2 then rated the percentage of CIT payments made directly through the revenue body's online payment facilities rather than third party facilities. Indicator C3 rates the percentage of taxpayers using the revenue body's online filing facilities to file CIT returns. Finally, indicator C4 rated on a five-point scale, from excellent through to non-existent, the quality of the revenue body's online transaction services for additional services such as clarification requests, extension filing requests, and advanced ruling requests.

All jurisdictions considered the quality of the revenue body's website to be at least reasonable, with several rating the service as good and New Zealand rating the service as excellent. No jurisdiction rated the quality of the website as poor or non-existent. The percentage of payments made directly through the revenue body's online payment facilities varied significantly between jurisdictions. Half the jurisdictions stated that 75 per cent or more taxpayers used the direct facility, while Japan and New Zealand stated that less than 25 per cent did so. In terms of online filing facilities, Hong Kong was the only jurisdiction to not have an online system, while eight of the 10 jurisdictions stated that 75 per cent or more taxpayers used such a system.

3.3.2   Indicator C5: phone services

Indicator C5 specifically asked about the quality of the revenue body's phone enquiry service, including response times and the standard of advice. The indicator defined quality of the revenue body's phone service as the ease with which taxpayers are generally able to make phone contact with a relevant tax official and that official typically provides reliable and relevant advice in a courteous and timely manner.

Jurisdiction responses to the quality of phone services were mixed. Only Hong Kong and Japan rated the services as excellent, with New Zealand and South Africa rating the services as poor. Most jurisdictions rated phone services as adequate.

3.3.3   Indicators C6-C7: other services

Indicator C6 rates the quality of the revenue body's support services for newly registered businesses subject to CIT. It does so on a five-point scale of excellent through to non-existent. The indicator was broad in terms of support, including but not limited to: (1) proactive visits by revenue body officials to taxpayers' premises to explain CIT obligations; (2) proactive transmittal from the tax body of practical guidance on CIT obligations to taxpayers; (3) public seminars conducted by revenue body officials; (4) easy to understand guidance materials that are readily accessible; (5) a dedicated section of the revenue body's website devoted to educating and assisting new businesses; (6) regular use of business journals to explain CIT obligations; and (7) financial assistance/incentives for the use of tax accounting software packages. Indicator C7 rates the time generally required for a revenue body to provide private tax rulings after taxpayers submit applications.

As with the previous indicators in Factor C, ratings were highly variable across the 10 jurisdictions. For example, Japan rated the quality of support as excellent, while South Africa and United States rated it as poor. The remaining seven jurisdictions rated the quality of the support as good or reasonable. Similarly, the time taken for a revenue body to provide private tax rulings varied significantly from less than a month to longer than two months, with the majority of jurisdictions (six in total) in the survey sample falling within the longer period of time.

3.4   Factor D – monetary costs/benefits associated with compliance

Country ratings for Factor D are set out in Table 8 below, while comments for each of the three indicators are provided below.

3.4.1   Indicators D1-D3

Indicator D1 rates the time generally required for a revenue body to process CIT refunds after taxpayers submit applications while indicator D2 determines whether interest is payable on delayed refunds and, if so, the time at which that interest is payable. Indicator D3 is a yes/no response to whether the revenue body charges fees for private tax rulings.

In terms of time taken to process CIT refunds, Italy, South Africa, and the United States were the slowest, taking on average longer than two months. Australia, China, and Japan were the quickest taking on average less than one month. Generally, the jurisdictions that provided the quickest refunds were also those jurisdictions that paid interest on delayed refunds. Only Egypt has a regime where no interest is payable, yet refunds were generally processed within one to two months. The charging of fees for private tax rulings was mixed across jurisdictions with five charging and five not charging fees.

Table 8: Country Ratings - Monetary Costs/Benefits Associated with Compliance (Factor D)

| Country | Monetary costs/benefits indicators (* denotes use of default indicator) | | | Total score (min. score = 3, max. score = 9) | Normalised weighting | Normalised weighted score |
| | 1 | 2 | 3 | | | |
	Time required for revenue body to process CIT refunds	Payment of interest on delayed funds	Does revenue body charge fees for private tax rulings			
Australia	1	1	1	3	14.4%	0.433
China	1	1	1	3	14.4%	0.433
Egypt	2	4	1	7	14.4%	1.011
Germany	2	3	2	7	14.4%	1.011
Hong Kong	2*	2*	2	6	14.4%	0.866
Italy	3	2	1	6	14.4%	0.866
Japan	1	1	1	3	14.4%	0.433
New Zealand	2	4	2	8	14.4%	1.155
South Africa	3	1	2	6	14.4%	0.866
USA	3	2	2	7	14.4%	1.011
Mean Score				6		0.809

4.   ANALYSIS OF SURVEY FINDINGS

As with the VAT diagnostic tool, the primary objective of the CIT diagnostic tool is to provide an indication of the likely scale of compliance burden of a jurisdiction's CIT expressed in terms of a compliance burden index, and the main drivers of that burden. The secondary objective is to identify those aspects of CIT policy and administration that contribute to such burden most frequently across a population of surveyed jurisdictions. The tool is not intended, nor designed, to provide a definitive ranking of the compliance burden of individual participating jurisdictions, acknowledging the considerable difficulties of achieving this in a precise and defensible manner.

4.1   Jurisdiction ratings

Overall results from the 10 jurisdictions surveyed indicate little difference in terms of compliance burden index ranking. All jurisdictions fell within the range of 5 to 7 with the majority ranked at 6. Table 9 provides summary scores and then allocates the relevant compliance burden index to the 10 jurisdictions surveyed, while Table 10 categorises the jurisdictions into the relevant compliance burden index.

Table 9: Summary Scores and Compliance Burden Index

Country	Total normalised weighted score for each factor				Total normalised weighted score – ALL FACTORS	Compliance Burden Index	Compliance Burden Index (Rounded)
	Factor A	Factor B	Factor C	Factor D			
Australia	10.505	5.309	2.580	0.433	18.827	4.868	5
China	9.004	6.105	2.580	0.433	18.123	4.608	5
Egypt	10.505	6.636	3.440	1.011	21.592	5.888	6
Germany	10.505	6.105	3.655	1.011	21.276	5.771	6
Hong Kong	12.381	5.840	4.300	0.866	23.387	6.550	7
Italy	9.754	5.840	3.870	0.866	20.331	5.422	5
Japan	10.130	5.309	3.870	0.433	19.742	5.205	5
New Zealand	9.754	6.636	3.655	1.155	21.201	5.743	6
South Africa	10.130	6.636	4.300	0.866	21.932	6.013	6
USA	10.880	5.840	3.440	1.011	21.170	5.732	6
Mean Score	10.355	6.026	3.569	0.809	20.758	5.580	6

Table 10: CIT Compliance Burden Index for Surveyed Jurisdictions

Compliance Burden Index	Number of Jurisdictions	Jurisdictions
1	0	-
2	0	-
3	0	-
4	0	-
5	4	Australia, China, Italy, Japan
6	5	Egypt, Germany, New Zealand, South Africa, United States
7	1	Hong Kong
8	0	-
9	0	-
10	0	-

The ranking of the 10 jurisdictions surveyed indicates a medium or high compliance burden for all CIT taxpayers. Despite significant disparity within factors and indicators, the consolidated results indicate that all jurisdictions contain CIT compliance and administration measures that can be improved.

These two Tables also highlight that attempts to derive a definitive or precise quantification of the compliance burden may be problematic since reducing the compliance burden to a single figure index masks underlying heterogeneity in the scores. For example, China's compliance burden index of 4.608 rounds *up* to 5, while Italy's compliance burden index of 5.422 rounds *down* to 5. Despite both jurisdictions receiving an overall rounded compliance burden index of 5, the variation of 0.814 in the actual score represents a difference of 17.7 per cent. This demonstrates that care must be taken when interpreting the results.

4.2   Drivers of the CIT compliance burden

In addition to the development and testing of a diagnostic tool for assessing the CIT compliance burden, the responses to each of the indicators within Factors A – D provide some insight into the main drivers of CIT compliance costs. Responses to Factor A suggest that the compliance burden from the core elements of the CIT policy caused the highest compliance burden with total scores for Factor A ranging from a low of 24 (China) to a high of 33 (Hong Kong) out of a possible 38. Within the core elements of a jurisdiction's CIT policy, the main indicators driving compliance costs are the lack of comprehensive special simplification regimes with most jurisdictions indicating that either no regime existed or less than 25 per cent of taxpayers were able to avail themselves of a special tax regime where one or more did exist, and the number of CIT policies that complicate compliance with most jurisdictions indicating there were more than three special CIT regimes that complicated computation and compliance. In essence, and as would be expected, the complexity of the CIT regime increases the compliance burden. Administrative requirements to comply were found to increase the compliance burden in some jurisdictions and not others. Total scores for Factor B ranged from a low of 20 (Australia and Japan) to a high of 25 (Egypt, New Zealand and South Africa) out of a possible score of 38 however it was within the 10 indicators that there was a deal of variation. While it is difficult to detect a discernible trend, information required for both the tax return as well as additional documentation are two areas that researchers consistently indicated contribute to the compliance burden. Despite the potential trend, the mean of the scores does not suggest this is the case. Taxpayer experience with the revenue authority, represented in Factor C, affected the compliance burden both negatively and positively. Total scores for Factor C ranged from a low of 12 (Australia and China) to a high of 20 (Hong Kong and South Africa) out of a possible score of 33. Again, there was a deal of inconsistency within the indicators; however this was not reflected in the overall score or means of jurisdictional responses to individual indicators. Consistent with a strong move towards technology-based tax administration systems, where a revenue authority had a user-friendly web presence and online payment system, the compliance burden decreased. However, the compliance burden was increased where the revenue authority provided poor quality phone services. Finally, monetary costs and benefits associated with compliance which were dealt with in Factor D, seem to have little effect on the CIT compliance burden. Total scores for Factor D ranged from a low of 3 (Australia, China and Japan) to a high of 8 (New Zealand) from a possible score of 9.

4.3   Post-survey validation

Similar to the VAT pilot study, the ratings and findings above are considered as preliminary and not final and further refinement of the tool is expected (see section 4.4 below). Furthermore, the findings were subjected to an external validation exercise in the months after the survey was conducted. Specifically, the findings were benchmarked

against comparative data to ascertain the reliability of the compliance burden classifications. The best available data for this exercise is the PwC *Paying Taxes 2020* report which formed part of the World Bank's *Doing Business* study.[28] This report ranks the ease of paying taxes across 190 jurisdictions and includes data up to and including 2018.[29] The Paying Taxes indicator consists of several components, the most relevant of which for our validation purposes, is the 'total time to comply' which is expressed in hours.[30] This is disaggregated into the time to comply for the three major tax types being CIT, labour tax and consumption tax.

A comparison of the findings of the pilot study and the 'time to comply' data is provided in Table 11. For comparison purposes, the PwC data has been categorised into quintiles as follows: 0-23 hours = 'very low'; 24-37 hours = 'low'; 38-49 hours = 'medium'; 50-79 hours = 'high'; and 80+ hours = 'very high'.

Table 11: Comparison of CIT Compliance Burden Diagnostic Tool and PwC/WB *Paying Taxes* 'Time to Comply' (2018 fiscal year)

Jurisdiction	Prototype Diagnostic Tool			*Paying Taxes* – Time to comply (CIT)		
	CBI	Classification	Rank	Estimated hours to comply in 2018	Classification	Rank
Australia	5 (4.868)	Medium	2	37	Low	3
China	5 (4.608)	Medium	1	40	Medium	6
Egypt	6 (5.888)	Medium	8	56	High	8
Germany	6 (5.771)	Medium	7	41	Medium	7
Hong Kong	7 (6.550)	High	10	20	Very Low	1
Italy	5 (5.422)	Medium	4	39	Medium	5
Japan	5 (5.205)	Medium	3	38	Medium	4
New Zealand	6 (5.743)	Medium	5	34	Low	2
South Africa	6 (6.013)	Medium	9	96	Very High	10
USA	6 (5.732)	Medium	6	87	Very High	9

In terms of classification, the comparative data in Table 11 reveals an 'exact' match for four jurisdictions (China, Germany, Italy and Japan) and a 'close' match for three

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[28] As mentioned in the Introduction, above n 15, in September 2021, the World Bank announced that it has discontinued the *Doing Business* study. It was published annually from 2006 to 2019.

[29] The data is available at PricewaterhouseCoopers, 'Paying Taxes 2020: Overall Ranking and Data Tables', https://www.pwc.com/gx/en/services/tax/publications/paying-taxes-2020/overall-ranking-and-data-tables.html.

[30] We note that the Paying Taxes Indicator is based upon a hypothetical case study company that may or may not be representative of the population of CIT payers in the jurisdictions surveyed.

jurisdictions (Australia, Egypt and New Zealand).[31] There are three 'outlier' jurisdictions (Hong Kong, South Africa and USA) with Hong Kong having vastly divergent results. A possible reason for the latter is that the results for Hong Kong included seven 'default indicators' compared to four for Germany and Japan and one for Australia, China and New Zealand. This may have unduly influenced the results for this jurisdiction.

Overall, the results of the benchmarking exercise suggest the prototype CIT diagnostic tool produces credible outcomes rendering the tool worthy of further exploration and refinement.

5.   CONCLUDING COMMENTS

This current study expands the original VAT compliance burden project (the pilot study and extended study) by applying similar principles and methodology to develop and test a diagnostic tool for assessing the corporate income tax (CIT) compliance burden. Consistent with the VAT project, this pilot study was able to evaluate the merits of a prototype diagnostic tool for gauging the nature and likely overall incidence of CIT compliance burden at the jurisdictional level, and to evaluate its use in comparative cross-jurisdiction assessments to promote reform. The pilot was conducted across 10 countries, representing a mix of advanced and developing economies. Unlike the VAT diagnostic tool that found significant variations between jurisdictions, this was not the case with CIT, at least in the sample of 10 jurisdictions used for the purposes of testing the survey.

Consistent with the rollout of the VAT diagnostic tool on a far more extensive basis, future research in this area is highly desirable. This would include asking survey participants to provide written feedback on the prototype CIT diagnostic tool and the preliminary findings of the pilot study. Subsequently, a workshop involving survey participants and other members of the wider compliance burden project could be conducted to discuss the results and potential areas for refinement to the tool. The tool could then be rolled out to more countries such as the 53 members of the OECD's Forum on Tax Administration. The rollout would require significant investment of time and resources and industry partners are currently being sought for this purpose.

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[31] A 'close' match is defined when there is only a one step difference in classification, eg, medium versus high.

6.   APPENDIX

Appendix Table A: Survey Form (As Used in the Prototype Pilot)

CORPORATE INCOME TAX
Compliance Burden Indicators – Rating Sheet
(Record a single rating for each indicator as it relates to the country's CIT for the <u>2019</u> fiscal year (pre-COVID-19))

General Note

1. Definition of Corporate Income Tax ("CIT")

This compliance burden diagnostic tool adopts the definition of CIT in the OECD's Revenue Statistics database. In particular, CIT refers to income tax that is levied on the entity, not on the individuals who own it. For instance, taxes paid on the profits of partnerships and the income of institutions, such as life insurance or pension funds, are classified as CIT if they are charged on the partnership or institution as an entity. In these cases, the term "corporation" in this rating sheet includes these kinds of entities.

2. Comment sections

As CIT regimes are often complex and quite different among countries, it is impossible for this diagnostic tool to cover all possible features of the regimes that affect compliance costs. Please use the comment sections in this rating sheet to highlight any specific rules or features of your country's CIT regime that are not covered in the indicators, but have significant implications on the compliance burden.

Country	
Organisation	
Completed by	
Email contact	
Phone number	
Other organisations who assisted with completion	1) Ministry of Finance: Name and email address
	2) Revenue body: Name and email address
	3)
	4)
	5)

A. Compliance Burden from Core Elements of CIT Policy

Compliance burden indicators	Relevant rating
Ease of tax computation	
A1. Number of tax rates for different types of entities (e.g. base rate entities, small business entities, etc.) : *(Note)* 1. One rate 2. Two rates 3. More than two rates Note: Some countries may impose different tax rates for different types of income or highly specialised entities including mining companies, life companies, credit unions, retirement sovereign accounts and not-for-profits. Tax rates for different types of income or highly specialised entities are **excluded** for the purposes of this indicator. You may wish to provide further information in the comments section below about the specific tax rates included in your answer to A1 (e.g. Two rates being the standard CIT rate and the CIT rate for small business entities).	☐ 1 ☐ 2 ☐ 3
A2. Percentage of taxpayers subject to more than one rate: 1. Less than 25% 2. 25%-49% 3. 50% or more	☐ 1 ☐ 2 ☐ 3
CIT policies that simplify tax computation and compliance	
A3. Percentage of corporations eligible for exemptions from CIT (e.g. charities): 1. 50% or more 2. 25%-49% 3. Less than 25%	☐ 1 ☐ 2 ☐ 3

A4. Is approval required for exemptions?
     1. No approval required for all exemptions
     2. Approval required for less than 25% of all exemptions
     3. Approval required for 25% to 49% of all exemptions
     4. Approval required for 50% or more of all exemptions
	☐ 1
	 ☐ 2
	
	 ☐ 3
	
	 ☐ 4

Compliance burden indicators	Relevant rating

A5. The CIT regime has the following special CIT regimes which <u>simplify</u> tax computation and compliance:
    1. One regime (e.g. small business or group tax regimes)
    2. Two to three regimes
    3. More than three regimes
    4. No simplified regimes exist
Please list the regimes: _____
	☐ 1
	☐ 2
	☐ 3
	☐ 4

A6. Percentage of taxpayers using the special CIT regimes identified in Question A5, which simplify tax computation and compliance:
    1. 75% or more
    2. 50%-74%
    3. 25%-49%
    4. Less than 25%
    5. No such regime
	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5

CIT policies that complicate tax computation and compliance	
A7. Alignment between financial accounts and tax returns: number of adjustments from financial accounts generally required in CIT returns: 1. No adjustment required 2. Fewer than 5 adjustments 3. 5 to 20 adjustments 4. More than 20 adjustments	☐ 1 ☐ 2 ☐ 3 ☐ 4

A8. The CIT regime has the following special CIT regimes which <u>complicate</u> tax computation and compliance:
    1. One regime (e.g. CFC, transfer pricing, anti-hybrid rules)
    2. Two to three regimes
    3. More than three regimes
    4. No simplified regimes exist
Please list the regimes: _____
	☐ 1
	☐ 2
	☐ 3
	☐ 4

A9. Percentage of taxpayers using any of the special CIT regimes identified in Question A8, which complicate tax computation and compliance: 1. No such regime 2. Less than 25% 3. 25%-49% 4. 50% or more	☐ 1 ☐ 2 ☐ 3 ☐ 4

A10. Frequency of legislative amendments of the CIT law during 2019 fiscal year:
    1. No amendments
    2. 1 to 5 a year
    3. 6 to 10 a year
    4. More than 10 a year
	☐ 1
	☐ 2
	☐ 3
	☐ 4

Compliance burden indicators	Relevant rating
COMMENTS (If you wish to elaborate on any ratings in this section, please do so here. For instance, please highlight any rules or features in your country's CIT regime that are not covered in the above indicators, but have significant impact on compliance burden)	

B. Number and frequency of administrative requirements to comply

Compliance burden indicators	Relevant rating
Ease of registration	
B1. Percentage of new CIT taxpayers that registered electronically: 1. Business must file registration electronically 2. 50% or more 3. 25%-49% 4. Less than 25% 5. Businesses must file registration on paper and/or attend a tax office in person	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Frequency of tax filing and payments	
B2. Frequency of CIT return filings: 1. Once a year 2. Twice a year 3. Quarterly 4. Monthly 5. Other (please specify: _____)	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

B3. Frequency of CIT payments (including estimated CIT payments): *(Note)*	Micro/ Small	Med-ium	Large
Once a year	☐ 1	☐ 1	☐ 1
Twice a year	☐ 2	☐ 2	☐ 2
Quarterly	☐ 3	☐ 3	☐ 3
Monthly	☐ 4	☐ 4	☐ 4
Other (please specify: _____)	☐ 5	☐ 5	☐ 5
Note: Some countries may impose different CIT payment requirements depending on the size of the corporation. If so, please tick the relevant boxes in each of the relevant categories of corporations.			

Compliance burden indicators	Relevant rating
B4. Percentage of taxpayers required to make estimated CIT payments: 1. No such requirement 2. Less than 25% 3. 25%-49% 4. 50% or more	☐ 1 ☐ 2 ☐ 3 ☐ 4

Compliance burden indicators			Relevant rating
Information requirements			
B5. Information required for a CIT return of a small/medium/large corporation:	Micro/ Small	Med-ium	Large
1. Less than 50 boxes or fields 2. 50-100 boxes or fields 3. 101-200 boxes or fields 4. Over 200 boxes or fields	☐ 1 ☐ 2 ☐ 3 ☐ 4	☐ 1 ☐ 2 ☐ 3 ☐ 4	☐ 1 ☐ 2 ☐ 3 ☐ 4
B6. Percentage of taxpayers required to submit additional documentation: 1. No such requirement for all taxpayers 2. Less than 25% 3. 25%-49% 4. 50% or more			☐ 1 ☐ 2 ☐ 3 ☐ 4
B7. Records for CIT purposes must be retained by taxpayers for a standard period of: 1. Up to 4 years 2. Between 4 and 8 years 3. More than 8 years			☐ 1 ☐ 2 ☐ 3
Level of verification actions and disputed assessments			
B8. Percentage of taxpayers subject to verification actions each year: (*Note*) 1. Less than 5% 2. 5%-10% 3. More than 10% Note: "Verification actions" include all types of actions taken by revenue bodies to verify taxpayers' reported liabilities (e.g. document verification requests, audits, investigations, and written and phone inquiries).			☐ 1 ☐ 2 ☐ 3
B9. Percentage of verification actions that result in disputed CIT assessments: 1. Less than 5% 2. 5%-10% 3. More than 10%			☐ 1 ☐ 2 ☐ 3
B10. Cooperative compliance programs exist? *(Note)* 1. Yes 2. No Note: Cooperative compliance programs refer to arrangements developed by revenue bodies, under which the extent of reviews and audits of the CIT returns submitted by a taxpayer to a revenue body can be reduced significantly, typically when the revenue body is satisfied that the taxpayer has an effective internal tax control framework and provides complete disclosures of relevant information and tax risks to the revenue body.			☐ 1 ☐ 2

Compliance burden indicators	Relevant rating
COMMENTS (If you wish to elaborate on any ratings in this section, please do so here. For instance, please highlight any rules or features in your country's CIT regime that are not covered in the above indicators, but have significant impact on compliance burden)	

C. Revenue body capabilities in meeting taxpayers' service and compliance needs

Compliance Burden Indicators	Relevant rating
Online Services	

C1. Quality of revenue body's website for CIT (e.g. comprehensiveness and ease of navigation) is generally:
   1. Excellent
   2. Good
   3. Reasonable
   4. Poor
   5. Non-existent
	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5

C2. Percentage of CIT payments made directly through revenue body's online payment facilities rather than third party facilities (e.g. banks):
   1. 75% or more
   2. Between 50%-74%
   3. Between 25%-49%
   4. Less than 25%
   5. No online payment facility
	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5

C3. Percentage of taxpayers using revenue body's online filing facilities to file CIT returns:
   1. 75% or more
   2. Between 50%-74%
   3. Between 25%-49%
   4. Less than 25%
   5. No online filing facility
	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5

C4. Quality of revenue body's online transaction services for additional services (e.g. clarification requests, extension filing requests, advance ruling requests, etc.): *(Note)* 1. Excellent 2. Good 3. Reasonable 4. Poor	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Compliance Burden Indicators	Relevant rating
5. Non-existent Note: Relevant factors for this indicator include but not limited to: (1) the online transaction services are relatively easy to access and to use; (2) the services are sufficiently personalised and attractive to use; (3) registration and security requirements are relatively simple and low cost to use; and (4) there are readily accessible "Help" services available when problems arise.	
Phone Services	

C5. Quality of revenue body's phone enquiry service (including response times and the standard of advice) is generally: *(Note)*
   1.   Excellent
   2.   Good
   3.   Reasonable
   4.   Poor
   5.   Non-existent
Note: The quality of revenue body's phone service refers to the ease with which taxpayers are generally able to make phone contact with a relevant tax official and that official typically provides reliable and relevant advice in a courteous and timely manner.
	☐ 1
	☐ 2
	☐ 3
	☐ 4
	☐ 5

Other Services	
C6. Quality of revenue body's support services for newly registered businesses subject to CIT is generally: *(Note)* 1. Excellent 2. Good 3. Reasonable 4. Poor 5. Non-existent Note: This support service can take a variety of forms, including but not limited to: (1) proactive visits by revenue body officials to taxpayers' premises to explain CIT obligations; (2) proactive transmittal from the tax body of practical guidance on CIT obligations to taxpayers; (3) public seminars conducted by revenue body officials; (4) easy to understand guidance materials that are readily accessible; (5) a dedicated section of the revenue body's website devoted to educating and assisting new businesses; (6) regular use of business journals to explain CIT obligations; and (7) financial assistance/incentives for the use of tax accounting software packages.	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
C7. Time generally required for revenue body to provide private tax rulings after taxpayers submit applications: 1. Within one month 2. One to two months 3. Longer than two months 4. Not available	☐ 1 ☐ 2 ☐ 3 ☐ 4

Compliance Burden Indicators	Relevant rating
COMMENTS (If you wish to elaborate on any ratings in this section, please do so here. For instance, please highlight any rules or features in your country's CIT regime that are not covered in the above indicators, but have significant impact on compliance burden)	

D. Monetary costs/benefits associated with compliance

| Compliance Burden Indicators	Relevant rating

D1. Time generally required for revenue body to process CIT refunds after taxpayers submit applications:
   1. Within one month
   2. One to two months
   3. Longer than two months
   4. Not available
	☐ 1
	☐ 2
	☐ 3
	☐ 4

D2. Payment of interest on delayed refunds: Interest is not payable to taxpayers unless CIT refund remains unpaid <u>after</u>:
   1. One month
   2. Two months
   3. Three months
   4. No interest is payable on CIT refund in any case
	☐ 1
	☐ 2
	☐ 3
	☐ 4

D3. Does revenue body charge fees for private tax rulings? 1. No 2. Yes	☐ 1 ☐ 2
COMMENTS (If you wish to elaborate on any ratings in this section or any features of your country's CIT regime not covered by the above indicators but with significant implications on compliance burden, please do so here)	

Appendix Table B: Sources of Additional Information

No.	Compliance burden indicator	Comments and suggested additional sources of information
A-6	Percentage of taxpayers using the special CIT regimes identified in Question A5, which simplify tax computation and compliance	We appreciate that there might not be any statistical sources for the '% volume' aspects of these indicators. Their completion requires a judgment call from experienced in-country tax/ accounting professionals on the likely incidence in practice of the specific design features to which the indicators relate.
A-9	Percentage of taxpayers using any of the special CIT regimes	

	identified in Question A8, which complicate tax computation and compliance:	
B-1	Percentage of new CIT taxpayers that registered electronically	We appreciate that there might not be any statistical sources for the '% volume' aspect of this. Although *Tax Administration 2019*, OECD (page 231 of Annex A)[32] details the registration channels as a percentage of total registrations, this data is not specific to tax type. This indicator's completion likely requires a judgment call from experienced in-country tax/ accounting professionals on the likely incidence in practice of the specific design features to which the indicator relates.
B-2	Frequency of CIT return filings	See *Tax Administration 2019*, OECD referenced below (page 244 of Annex A) which details the return filing frequency per year for CIT. Although the latest data reported is for 2017, they should be adequate for UNSW purposes.
B-3	Frequency of CIT payments (including estimated CIT payments)	See *Tax Administration 2019*, OECD referenced below (page 285 of Annex A) which details payment obligations per year for CIT. Although the latest data reported is for 2017, they should be adequate for UNSW purposes.
B-4	Percentage of taxpayers required to make estimated CIT payments	We appreciate that there might not be any statistical sources for the '% volume' aspect of this indicator. Its completion requires a judgment call from experienced in-country tax/ accounting professionals on the likely incidence in practice of the specific design features to which the indicator relates.
B-8	Percentage of taxpayers subject to verification actions each year	We appreciate that there might not be any statistical sources for the '% volume' aspect of this indicator. However, page 448 of Annex A (*Tax Administration 2019*, OECD) which details CIT verification/audit activity for CIT may provide some guidance. Page 67 of Annex A also details the audit hit rate for CIT. Nonetheless, this indicator may require judgment call from experienced in-country tax/ accounting professionals.

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[32] This report provides internationally comparative data on aspects of tax systems and their administration in 58 advanced and emerging economies. See n 23 above.

B-9	Percentage of verification actions that result in disputed CIT assessments	We appreciate that there might not be any statistical sources for the '% volume' aspect of this indicator. However, page 448 of Annex A (*Tax Administration 2019*, OECD) which details CIT verification/audit activity for CIT may provide some guidance. Page 67 of Annex A also details the audit hit rate for CIT. Nonetheless, this indicator may require judgment call from experienced in-country tax/ accounting professionals.
C-2	Percentage of CIT payments made directly through revenue body's online payment facilities rather than third party facilities (e.g. banks) **Note:** This does not include payments made through third parties but rather focuses on the revenue body's capabilities.	See *Tax Administration 2019*, OECD referenced below (page 289 of Annex A) which details whether electronic payment is mandatory for CIT. Page 308 also reports payment channels for all tax types (for 2016 and 2017). Unfortunately, many countries have not provided data to the OECD and this source may be of limited use. If required, a judgment call will need to be made drawing on general knowledge of business practices.
C-3	Percentage of taxpayers using revenue body's online filing facilities to file CIT returns	See *Tax Administration 2019*, OECD referenced below (page 39 of Annex A) which provides data on CIT e-filing rates. Although the latest data reported is for 2017, they should be adequate for UNSW purposes
C-4	Quality of revenue body's online transaction services for additional services (e.g. clarification requests, extension filing requests, advance ruling requests, etc.)	This indicator is meant to be determined based on the perspectives of users, not the revenue body. The guidance provided with the rating form gives some general criterion to guide the formulation of a judgment on the 'quality of transaction services' which would largely be for making CIT payments and filing returns
C-5	Quality of revenue body's phone enquiry service (including response times and the standard of advice)	This indicator is meant to be determined based on the perspectives of users, not the revenue body. This indicator may require judgment call from experienced in-country tax/ accounting professionals.
D-1	Time generally required for revenue body to process CIT refunds after taxpayers submit applications	There is no known statistical source for this indicator outside the revenue body. However, it is possible that experienced in-country representatives of business and/or tax/ accounting professionals can make a judgment call on the likely incidence in practice of the specific design features to which the indicator relates.

Fig. 1: Summary of Process
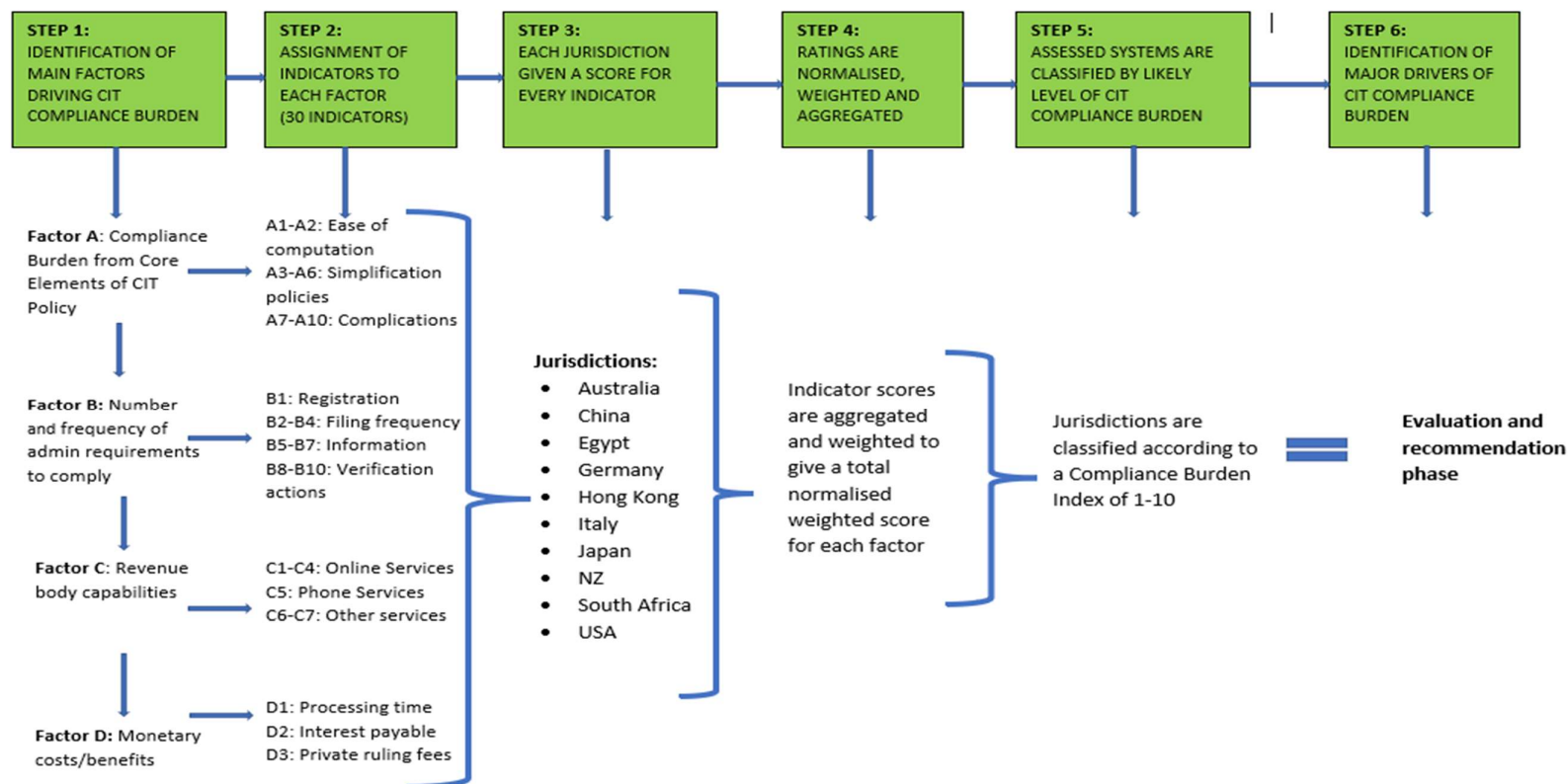
Table 5: Country Ratings - Tax Law/Policy Complexity (Factor A)

Country	Tax law/policy complexity indicators (* denotes use of default indicator)										Total score (min. score = 10, max. score = 38)	Normalised weighting	Normalised weighted score
	1	2	3	4	5	6	7	8	9	10			
	Number of tax rates for different entity types	% Taxp'rs subject to >1 rate	% Taxp'rs eligible for exempt'n from CIT	Approval required for exempt'n	Special regimes which simplify tax comput'n and compliance	% Taxp'rs using special CIT regimes identified in Indicator 5	Number of adjm'ts required between financial accounts and tax returns	Special regimes which complicate tax computation and compliance	% Taxpayers using special CIT regimes identified in Indicator 8	Frequency of legislative amendm'ts of CIT law			
Australia	2	1	3	3	4	5	3	3	2	2	28	37.5%	10.505
China	3	1	3	2	1	4	4	3	2	1	24	37.5%	9.004
Egypt	1	1	3	4	4	5	3	4	1	2	28	37.5%	10.505
Germany	1	1	3	4	1	4	4	2	4	4	28	37.5%	10.505
Hong Kong	3	3	2*	4	4	5	4	3	2*	3	33	37.5%	12.381
Italy	2	3	3	1	3	3	4	3	2	2	26	37.5%	9.754
Japan	2	1	3	1	4	5	4	3	2	2	27	37.5%	10.130
New Zealand	2	1	3	4	1	5	3	3	2	2	26	37.5%	9.754
South Africa	3	1	3	4	1	4	4	3	2	2	27	37.5%	10.130
USA	1	1	1	4	4	5	4	4	1	4	29	37.5%	10.880
Mean Score											28		10.355

Table 6: Country Ratings - Number and frequency of Administrative Requirements to Comply (Factor B)

Country	Administrative requirements indicators (* denotes use of default indicator)										Total score (min. score = 14, max. score = 38)	Normalised weighting	Normalised weighted score
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**			
	% New taxpayers reg'd electronic-ally	Freq'cy of CIT return filings	Freq'cy of CIT payments	% Taxp'rs required to make CIT payments	Inform'n required for a CIT return	% Taxp'rs required to submit addit'nal documen-tation	Records retained	% Taxp'rs subject to verific'n actions each year	% Verific'n actions that result in disputed CIT assessm'ts	Existence of cooperative compliance program			
Australia	2	1	3	3	2	2	2	2	2	1	20	26.5%	5.309
China	5	1	3	4	1	1	3	3	1	1	23	26.5%	6.105
Egypt	1	1	2	4	3	4	2	3	3	2	25	26.5%	6.636
Germany	1	1	3	4	2	4	3	1	2	2	23	26.5%	6.105
Hong Kong	3*	1	2	4	2	2*	2	1	3	2	22	26.5%	5.840
Italy	1	1	2	4	3	2	2	3	3	1	22	26.5%	5.840
Japan	3*	1	2*	3	2*	4	2	1	1	1	20	26.5%	5.309
New Zealand	2	1	5	4	3	4	2	1	2*	1	25	26.5%	6.636
South Africa	1	1	2	4	3	4	2	3	3	2	25	26.5%	6.636
USA	2	1	3	4	4	1	2	3	1	1	22	26.5%	5.840
Mean Score											23		6.026

Table 7: Country Ratings - Revenue Body Capabilities in Meeting Taxpayers' Service and Compliance Needs (Factor C)

| Country | Revenue body capabilities indicators (* denotes use of default indicator) | | | | | | | Total score (min. score = 7, max. score = 33) | Normalised weighting | Normalised weighted score |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | |
	Quality of revenue body's website	% CIT payments made directly through revenue body's online payment facilities	% Taxpayers using revenue body's online facilities to file CIT returns	Quality of revenue body's online transaction services for additional services	Quality of revenue body's phone inquiry service	Quality of revenue body's support services for newly registered businesses	Time required for revenue body to issue private tax rulings after submission			
Australia	2	1	1	3*	2	2	1	12	21.5%	2.580
China	2	1	1	2	3*	2	1	12	21.5%	2.580
Egypt	3	3	1	2	3	3	1	16	21.5%	3.440
Germany	3*	1	1	3*	3*	3*	3	17	21.5%	3.655
Hong Kong	2	2	5	5	1	3*	2	20	21.5%	4.300
Italy	2	1	4	3	3	2	3	18	21.5%	3.870
Japan	3*	4	1	5	1	1	3	18	21.5%	3.870
New Zealand	1	4	1	2	4	2	3	17	21.5%	3.655
South Africa	3	1	1	4	4	4	3	20	21.5%	4.300
USA	2	1	1	2	3	4	3	16	21.5%	3.440
Mean Score								17		3.569

How tax gap can inform tax policy and administration: a case study of Australia's individual income tax

Richard Highfield[*] and Neil Warren[**]

Abstract

An increasing number of revenue agencies are deploying 'tax gap' analysis to assess their overall performance. Tax gap – the difference between the estimated amount of tax legally payable for each tax and what is actually collected in practice – is of interest as it focuses attention on tax gap estimation methodologies and their refinement and the associated prevalence and communication of tax non-compliance. For some agencies, tax gap findings may have implications for other areas of government administration (e.g., student loans).

Using the Australian Taxation Office (ATO) tax gap findings for the individual income tax, this article examines their implications for the main types of non-compliance, the perpetrators and their underlying behaviours along with possible responses. The analysis undertaken employs an innovative extrapolation of the ATO's individual income tax gap estimates for 2015-16 to its *2% individuals sample file* of taxpayers in 2016-17 and reviews the results by sources of tax gap across various socio-economic and demographic groupings. It also examines possible implications for the administration of student loans and transfers. Finally, the article outlines potential reforms to address key weaknesses in both policy design and revenue administration.

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1.   BRINGING INCREASED KNOWLEDGE AND TRANSPARENCY TO TAX NON-COMPLIANCE

Traditionally, revenue agencies have relied on trends in revenue collections along with reporting on compliance yields as the central element of their performance reporting, together with a few efficiency-related measures. Generally, a trend of increasing revenue collections (ahead of budgeted forecasts) and rising compliance program outputs have been seen as indicators of a successful revenue agency and a healthier tax system. But is this necessarily the case? Do such indicators properly and adequately reflect the health of the tax system? If not, what might be done to provide a more balanced, informative, and transparent view of tax system performance?

Pioneering work to develop richer perspectives on tax system performance can be traced back to the 1970s when the United States Internal Revenue Service (IRS) introduced its Taxpayer Compliance Measurement Program (TCMP). TCMP was intended to be the IRS's primary program for gathering data on taxpayer compliance to measure compliance levels, estimate the tax gap, identify compliance issues, select returns for audit, and allocate audit resources. At its centre was a large program of random audit inquiries covering most taxpayers. While the IRS has adapted TCMP in subsequent years to meet its evolving circumstances, it continues to be a strong advocate of tax gap research.

More recently, a small but growing number of influential revenue agencies – including Australia, Canada, Denmark, Sweden, and the United Kingdom – have also introduced comprehensive programs of 'tax gap' research and analysis to help them better understand the compliance risks and associated revenue implications of the taxes they administer and the potential for improving tax compliance. In addition, and of particular significance, many have chosen to publish their findings and committed to use them as measures of their long-term performance. For example:

Australian Taxation Office (ATO):

Estimating tax gaps forms part of our broader accountability and transparency as a leading administrator (….). The community expects us to manage all aspects of the system, including advising on the tax gaps and what we are doing about them. As such, we measure and publish tax gaps where they are credible and reliable, to inject our perspective into the community debate. Tax gap estimates are also important for us to better understand levels of compliance and risk in the tax and superannuation systems. Insights gained from this work can guide us in determining priority risks and developing strategies, including administrative design, help and education, and audit strategies, which aim to sustainably reduce the tax gap.[1]

HM Revenue and Customs (United Kingdom):

The tax gap provides a useful tool for understanding the relative size and nature of non-compliance. This understanding can be applied in many different ways: 1) it provides a foundation for HMRC's strategy – thinking about the tax gap helps the department to understand how non-compliance occurs and how HMRC can address the causes and improve the overall health

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[1] ATO, 'Why we measure the tax gap', https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Australian-tax-gaps-overview/ (accessed 25 January 2023).

of the tax system; 2) drawing on information on how other countries manage their tax gaps, our tax gap analysis provides insight into which strategies are most effective at reducing the tax gap; and 3) though the tax gap isn't sufficiently timely or precise enough to set performance targets, it provides important information which helps us understand our long-term performance (HM Revenue and Customs, 2019).

A particular challenge for any government in an environment of considerable change is how it can bring transparency and understanding to otherwise complex change issues. In relation to taxation, the challenge is significant as it impacts every aspect of economic, social, and political life. Developing a framework capable of providing an understanding of the effectiveness of taxes in terms of the revenue raised and their associated risks is a long sought after goal. In recent years, tax gap analysis has been heralded as a tool capable of providing insight into complex tax issues. As Warren (2019, p. 536) noted, the concept of tax gap 'asks fundamental questions about data and its integrity as reported by the revenue agencies, the official statistician, and business and individual taxpayers. What tax gap estimates can therefore do is bring transparency and understanding to otherwise complex issues arising from the digital era and therein facilitate an informed evidence-based response to its impact through changes to tax policy design, legislation and administration'.

In this article, recent developments in individual income tax gap analysis in Australia are examined to demonstrate how they can illuminate complex tax issues and what these insights might also mean for managing mutually interdependent government revenue and expenditure systems (e.g., the payment of transfers, the collection of student loans). The analysis clearly reveals that tax gap research not only forces tax administrators to think beyond the tax system, but also to adopt a taxpayer-centric approach to the tax system where not only taxes are considered but also how those same taxpayers interact with the expenditure (and in particular the transfer) side of the government's budget.

The article begins in section 2 with an overview of the ATO's 2015-16 tax gap estimates for the individual income tax in respect of two major taxpayer segments – individuals not in business (INIB) and individuals in small business (IISB). Section 3 then develops a methodology for allocating the ATO's estimates of the individual income tax gap across individual income taxpayers in 2016-17, based on the ATO's 2% individuals sample file.[2] Section 4 examines a number of the complex insights that individual income tax gap estimates applied to the 2016-17 sample file can reveal in relation to non-compliance across various socio-economic and demographic groupings. Section 5 builds on the findings in section 4 by deconstructing each group's tax gap estimate into

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[2] The ATO makes available each year a statistical file of anonymised individual income tax return records – the 2% individuals sample file – for external research purposes. The file approximates to 2% of individual income tax returns processed for each income year in the 16-month period after the end of the relevant income year. As described by the ATO in its publicly released documentation, the records in the sample are selected pseudo-randomly (i.e., in a way that can be replicated and reproduced). Identifiable information is removed, and some demographic information is kept for modelling purposes, namely gender, marital status (including de facto), age groupings (in five-year groups), occupation code – at the one-digit level, and region. ATO classified sensitive individuals are excluded from the possibility of selection in the sample and where a region has less than 20,000 individuals in the full population lodging an income tax return, that region is grouped into a different, but similar, region. The selected components of income, deductions, losses, and offsets are all randomly perturbed using a multivariate methodology.

its component parts to better understand its main sources and what issues it raises for revenue agency performance and the tax's interaction with other income-based taxes (and transfers).

Section 6 examines what broad lessons these findings have for policy reforms, both for approaches to revenue agencies and for tax and other policies which adopt income as their base. The article concludes in section 7 with the observation that tax gap analysis will ultimately force government agencies to adopt a more *holistic* approach to income-based systems, which could demand tax policy design be framed in such a way that different aspects of the same base are taxed in a way which is understood and responded to with appropriately broad, consistent, and targeted policy design responses.

However, a word of caution on tax gap estimation and analysis. The techniques and approaches that underpin tax gap research and analysis continue to evolve and the reader should not assume that they have matured to a point of providing absolute accuracy and certainty. This is because tax gap estimates involve numerous methodological assumptions and data sources which are subject to constant revision, so that tax gap estimates in any one year are subject to revision over time.

2.   INDIVIDUAL INCOME TAX GAP IN AUSTRALIA: 2015-16

The ATO introduced a comprehensive program of tax gap research in 2014 following the completion of a detailed feasibility study. From all accounts, its introduction was and has been a profound move by the ATO, a point emphasised by Second Commissioner Jeremy Hirschhorn (2019):

> The ATO had of course always recognised that a focus on audit liabilities was not consistent with longer term success, reflected in some internal rules of thumb 'prevention over correction' and 'you can't audit your way to success'. However, we did not have the measurement tools to support this thinking, and were perhaps held back by our success under traditional metrics (and noting that, in practice, quantitative metrics will often be taken much more seriously by staff than qualitative metrics). The step change was to move to concepts of 'tax gap' (and its flip side, 'tax performance'), with a target of sustainable reductions in the tax gap.

With tax gap measuring the difference between actual tax collected and the estimated tax legally payable (Figure 1) (see HM Revenue and Customs, 2019; Warren, 2019), a focus on tax gap forces revenue agencies to think not from the inside out (revenue agency to taxpayer) but from the outside in (broader economy/all entities to the revenue agency). This different perspective on the task of revenue agencies is a frontier challenge because it requires a perspective beyond the traditional purview of administrators. This change in approach is being forced on agencies, requiring them to raise more revenue in a way which is both more transparent and accountable. It also forces consideration of issues which impact 'performance' and which can be beyond the control of those agencies, but which are critical to the success of their operation. Here policy design, taxpayer behaviour, market (domestic and international) changes, and technological changes are just some of those factors which can impact revenue performance and be beyond the control and influence of revenue agencies.

The ATO's tax gap program is currently structured to produce gap estimates on a year-by-year basis for all taxes administered, and designed and executed to produce gap

estimates that are both credible and reliable and which can be used to inform the wider community on the health of the tax system.[3] Over cycles of such research, the ATO is aiming to be able to assess the trend of its gap estimates over time and, in particular, to ascertain whether policy reforms and/or its compliance improvement strategies are, in net overall terms, having an impact. The tax gap framework displayed in Figure 1 highlights the key components of the overall gap estimation approach of the ATO for each tax.

Fig. 1: Tax Gap Concepts
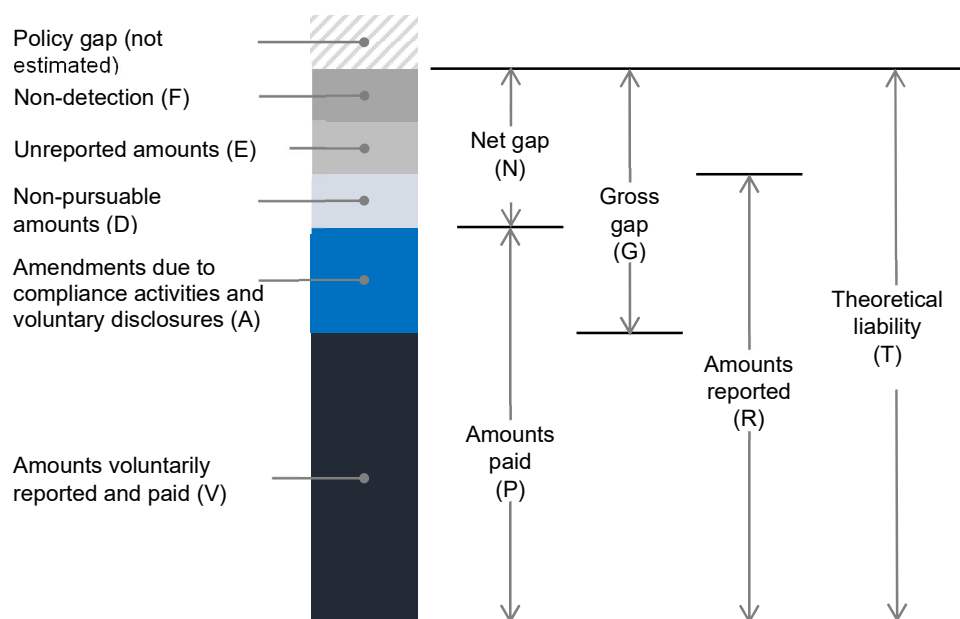
Source: ATO, 'How we measure tax gaps', https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Principles-and-approaches-to-measuring-gaps/?page=4#Tax_gap_framework (accessed 25 January 2023).

A key element of the ATO's gap research program is the individual income tax, recognising that revenue from this tax constituted 51.4% of all net tax revenue collected by the ATO in 2020-21 (Commissioner of Taxation, 2022, Table 3.1). For administrative reasons, the ATO disaggregates the population of individual income taxpayers into four segments: 1) individuals not in business (INIB); 2) individuals in small business (IISB); 3) individuals in medium businesses; and 4) high net wealth individuals. Table 1 sets out details of the taxpayer populations and net tax paid for each of these segments.

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[3] See ATO, 'Why we measure the tax gap', https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Australian-tax-gaps-overview/?page=3#Why_we_measure_the_tax_gap   (accessed   25 January 2023).

Table 1: Individual Income Tax: 2015-16

Taxpayer segment	Population		Net tax paid	
	No.	% of total	Amount (AUD million)	% of total
Individuals not in business	10,458,500	73.7	124,067	63.9
Individuals in small business	3,717,900	26.2	64,502	33.2
Individuals in medium business /1	6,700	0.04	1,178	0.6
High wealth individuals /1	9,500	0.06	4,424	2.3
Totals	14,192,600	100	194,171	100

/1. The data for these segments are described as indicative.

Source: https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Australian-tax-gaps-overview/?page=6#Overall_tax_performance (accessed 25 January 2023).

At the time of preparing the calculations in this article (January-March 2020), the ATO had released tax gap estimates in 2015-16 for only two segments of individuals (i.e., INIB and IISB). Together, these segments represent approximately 99.9% of all individual taxpayers and 97.1% of the net tax paid by individuals. Accordingly, the focus of this article will only be on the individual income tax gaps for INIB and IISB and therefore only include the income of individuals as an employee, a sole trader, a member of a partnership or a beneficiary of a trust. Excluded will be the tax gap of a small number of individuals classified as belonging to either a medium and emerging private groups or high wealth private groups.[4]

Table 2 details the individual income tax gap estimates released by the ATO for the financial year 2015-16 in respect of the INIB and IISB segments. The key observations are as follows:

- The estimated **gross** tax gap was AUD 19.1 billion, equivalent to 9.3% of the estimated tax base for these two segments of taxpayers.

- After taking account of compliance program outcomes and voluntary disclosures, the estimated **net** tax gap was AUD 17.8 billion, equivalent to 8.6% of the estimated tax base for these two segments of taxpayers.

- The estimated net tax gap was comprised of:

  o Understatements of liabilities in tax returns – AUD 16,332 million (92% of the gap).

  o Assessed taxes deemed uncollectible – AUD 640 million (3.6% of the gap).

  o Non-lodgement of returns – AUD 781 million (4.4% of the gap).

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[4] For a definition of these groups, see https://www.ato.gov.au/Business/Business-bulletins-newsroom/Tax-avoidance/Tax-Avoidance-Taskforce-extended-and-expanded/#:~:text=The%20Taskforce%20has%20been%20extended,amount%20of%20tax%20in%20Australia (accessed 25 January 2023).

- The substantially higher net tax gap for the IISB segment (i.e., 12.6%), compared with the tax gap of the INIB segment (i.e., 6.4%), is largely attributable to the fact that much of the income of these taxpayers is not subject to withholding at source and/or income reporting obligations.

Table 2: Tax Gap Estimation Steps (2015-16) – Individuals Not in Business and Small Business

Step	Description	Individuals not in business (INIB) (AUD m)	Individuals in small business (IISB) (AUD m)	INIB+IISB
1.1	Estimate unreported amounts for sample and extrapolate to population	7,208	5,047	12,255
1.2	Apply estimate for people outside the system	111	670	781
2.1	Apply estimate for non-detection (excluding hidden wages)	194	3,417	3,611
2.2	Apply estimate for hidden wages	1,362	484	1,846
3	*add* Non-pursuable debt	214	426	640
4	*equals* Gross gap	9,089	10,044	19,133
5.1	*subtract* Compliance outcomes and voluntary disclosures	645	735	1,380
5.2	*equals* Net gap	8,444	9,309	17,753
6.1	*add* Tax paid	124.067	64,502	188,569
6.2	*equals* Theoretical tax liability	132,511	73,811	206,322
6.3	**Gross gap %**	**6.9**	**13.6**	**9.3**
6.4	**Net gap %**	**6.4**	**12.6**	**8.6**

Source: https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Individuals-not-in-business-income-tax-gap/?anchor=Methodology#Updatesandrevisionstopreviousestimates (see Table 6); https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Small-business-income-tax-gap/?page=5 (see Table 3) (accessed 25 January 2023).

In the following section, the article outlines a novel methodology for allocating these 2015-16 gap estimates across various economic, demographic, and social groupings of individual taxpayers in 2016-17, with a view to better understanding their distribution and implications.

3. METHODOLOGY FOR ALLOCATING 2015-16 INDIVIDUAL INCOME TAX GAP TO 2016-17 INDIVIDUALS SAMPLE FILE

To examine the distribution of the income tax gap across the individual population requires a representative sample of taxpayers. At the time of drafting this article (March 2020) the most recent taxpayer sample available was the ATO's 2% Individuals sample file for 2016-17, which was drawn from the population of all returns processed by 31 October 2018, 16 months after the end of the 2016-17 financial year. Allocating the tax gap estimates for INIB and IISB set out in Table 2 across this *2% individuals sample file* in 2016-17 requires a three-step process (see Appendix 1, 'Methodology for allocating the individual income tax gap for 2016-17', for further details):

Step 1: Projecting the ATO's 2015-16 individual income tax gap estimates to the 2016-17 financial year.

Step 2: Adjusting the *2% individuals sample file* to reflect the overall number of taxpayers expected to ultimately lodge tax returns for the 2016-17 financial year.

Step 3: Allocating the 2016-17 tax gap estimates (in Step 1) across the adjusted 2% sample of taxpayers (derived in Step 2).

Applying the three-step process results in an *adjusted* 2% individuals sample file of taxpayers' return data which include, among other things, demographic characteristics, and their reported income sources and types of deductions and offsets, sufficient data in an overall context to be able to calculate their net tax (including Medicare Levy) liability, where applicable, student loan repayment along with sources of tax gap. Table 3 details the tax gap attributed by the ATO to the INIB and IISB segments and our projection of the aggregate tax gap estimate to 2016-17. Section 4 uses this sample file to examine the distribution of this gap across the INIB and IISB taxpayer segments, according to various social-economic and demographic groupings.

Table 2 outlines the ATO's 2015-16 tax gap estimates, and Table 3 presents these estimates disaggregated using information published on the ATO website. Most detail is available for the INIB segment with estimates of tax gap available for work-related expenses (WRE) (AUD 4.0 billion), rental properties (AUD 1.5 billion), and undeclared (mostly wage) income (AUD 1.4 billion).[5] With the estimate of unreported tax for the population being (AUD 7.2 billion), this implies a residual not explained by the ATO of AUD 0.3 billion. For IISB, the estimate of unreported tax for the population is AUD 5.0 billion in 2015-16 with the ATO finding that 'For the individuals in business component, the main driver of the gap relates to omission of income (76%). We also recognise the influence of people outside the system contributing to the overall gap'.[6] Other reported sources of the net tax gap are over-claimed deductions (14%), non-pursuable debt (4%) and 7% for people outside the tax system (POTS).

In the following section, the article examines insights that these individual gap estimates can reveal about non-compliance when viewed through the prism of certain socio-economic (e.g., vertical and horizontal equity) and demographic (e.g., age, gender, and region) groupings of individuals.

4.   DISTRIBUTION ISSUES ARISING FROM INCOME TAX GAP

The patterns of tax non-compliance across the population for individuals has not only important socio-economic, demographic, and political implications, but important ramifications for policy design and revenue agencies. Often, evidence of non-compliance from ongoing tax administration programs is either partial in scope or anecdotal. In contrast, tax gap analysis can provide a comprehensive and evidence-based perspective into non-compliance and its distribution across the total population, including those who should but do not lodge tax returns.

Table 4 details the aggregate results across all individual income taxpayers when applying the tax gap allocation methodology outlined in section 3 to the 1.902% sample file of all individuals expected to ultimately lodge returns for fiscal year 2016-17.

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[5]   https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Individuals-not-in-business-income-tax-gap/?page=4#Trends_and_latest_findings (accessed 25 January 2023).
[6] https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Small-business-income-tax-gap/?anchor=Trendsandlatestfindings2#Trendsandlatestfindings2 (accessed 25 January 2023).

Grossing up the resulting values to the projected full population reveals how the income tax gap estimate of AUD 17,413 million is equivalent to understatement of taxable income by AUD 47,666 million. This is equivalent to increasing taxable income by 5.5% and individual income tax revenue by 8.4%. Implied is an effective marginal tax rate (MTR) on tax gap-related income of 36.5% which should be contrasted with the average tax rate on reported taxable income of 24.1%. The impact of the progressive individual income tax's rate schedule (Table 5) clearly highlights the fiscal benefit from actions designed to improve income tax compliance.

Table 3: Individual Income Tax Gap Allocation: 2016-17

	TAX GAP ESTIMATION STEPS	VARIABLE USED IN ALLOCATION OF THE GAP	TAX GAP 2015-16 (ATO) (AUD M)	TAX GAP 2016-17 (PROJ'N) (AUD M)
STEP	**Individuals not in Business (INIB)**			
1.1	Estimate unreported amounts for sample and extrapolate to population	Work related expenses	4,000	3,997
		Rental Income: Loss	917	928
		Rental Income: Profit total)	583	608
		Non-Wage Market Income (unreported income)	1,400	1,435
		Total Ded'n (Residual estimate)	308	315
			7,208	7,283
2.1	Apply estimate for non-detection (excluding hidden wages)	Allocated based on (1.1)	194	199
2.2	Apply estimate for hidden wages	Wages	1,362	1,399
3	*add* Non-pursuable debt	All Taxes	214	219
4	*equals* Gross gap		8,978	9,100
5.1	*subtract* Compliance outcomes and voluntary disclosures	Allocated based on (4)	645	654
5.2	*equals* Net gap		8,333	8,447
	Apply estimate for people outside the system (POTS)		111	120
	Net Gap (incl POTS)		8,444	8,566
6.1	*add* Tax paid		124,067	133,688
6.2	*equals* Theoretical tax liability		132,511	142,255
	Net Tax Gap		6.4%	6.0%
	Individuals in Business (IISB)			
1.1	Estimate unreported amounts for sample and extrapolate to population			
	Projected based on INIB trend	Work related expenses	785	785
	Projected based on INIB trend	Rental Income: Loss	529	535
	Projected based on INIB trend	Rental Income: Profit	469	490
	Residual	Business Income (Residual estimate)	3,102	3,261
	Projected based on INIB trend	Total Deductions	161	165
			5,047	5,237
2.1	Apply estimate for non-detection (excluding hidden wages)	Allocated based on (1.1)	3,417	3,545
2.2	Apply estimate for hidden wages	Wages	484	497
3	*add* Non-pursuable debt	All Taxes	426	436

4	*equals* Gross gap			9,374	9,716
5.1	*subtract* Compliance outcomes and voluntary disclosures	Allocated based on (4)	735	753
5.2	*equals* Net gap		8,639	8,962
	Apply estimate for people outside the system		670	764
	Net Gap (incl POTS)		9,309	9,726
6.1	*add* Tax paid		64,502	73,511
6.2	*equals* Theoretical tax liability		73,811	83,237
	Net Tax Gap		12.6%	11.7%
	Summary: Net Gap (incl POTS)		17,753	18,292
	add Tax paid		188,569	207,199
	equals Theoretical tax liability		206,322	225,492
	Net Tax Gap		8.6%	8.1%

Source: See Table 2 and Taxation Statistics 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17,
(https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Taxation-statistics/ (accessed 25 January 2023)).

Table 4: Individual Income Tax Gap: 2016-17 (AUD)

Measure	Variable	Value
Average taxable income excluding TGI	TI	$59,088
Average tax	T	$14,219
Average income tax gap-related income	TGI	$3,271
Average income tax gap	TG	$1,195
Tax Gap Income as % Taxable Income (excl TGI)	TGI/TI	5.5%
Tax Gap as % Tax	TG/T	8.4%
Tax Gap as a % of Tax plus Tax Gap	TG/T' where T'=T+TG	7.8%
Average Tax Rate before Tax Gap	T/TI	24.1%
Average Tax Rate after Tax Gap	T'/TI' where TI'=TI+TGI	24.7%
Effective MTR on Tax Gap Income	TG/TGI	36.5%
Total Net Tax Gap (AUD b)		**17,413 million**
Tax Gap Equivalent Income (AUD b)		**47,666 million**

Source: Authors' calculations

Table 5: Individual Income Tax Schedule: Australian Residents 2016-17

Taxable income (AUD)	Tax on income (AUD)
0 – 18,200	Nil
18,201 – 37,000	19c for each 1 over 18,200
37,001 – 87,000	3,572 plus 32.5c for each 1 over 37,000
87,001 – 180,000	19,822 plus 37c for each 1 over 90,000
180,001 and over	54,232 plus 45c for each 1 over 180,000
Temporary Budget Levy	2c for each 1 over 180,000

The above rates do not include the Medicare levy of 2% or a Medicare levy surcharge (MLS) which, depending on the level of income for MLS purposes, has an MLS rate of 1%, 1.25% or 1.5%.
Source: https://data.gov.au/data/dataset/540e3eac-f2df-48d1-9bc0-fbe8dfec641f/resource/9f1ae0cb-ef43-4867-87f7-4955440afcab/download/ts17snapshot01historicalratesofpersonalincometax.xlsx;
https://data.gov.au/data/dataset/taxation-statistics-2019-20/resource/c618d6db-5578-4c13-845c-f2f482059837 (accessed 25 January 2023).

4.1   Vertical and horizontal equity and tax gap

While the results in Table 4 are interesting, they raise questions about the detail which underlies these aggregate statistics. The first and obvious question is how these aggregate results might vary across income groups. Figure 2 examines the results in Table 4 by dividing all taxpayers into 5 percentage point population groupings after ranking them by their taxable income.

Figure 2 indicates that individual income tax non-compliance measured by tax gap income (TGI) is more important in boosting taxable income (TI) for those on lower incomes than for those on higher incomes (shown by TGI/TI). However, because of the progressive nature of the personal income tax rate schedule (Table 5), the effective marginal tax rate on TGI increases with tax gap (TG) which means that the tax benefit from non-compliance is greatest for the highest income individuals (TG/TGI).

Fig. 2: Taxable Income and Income Tax Gap
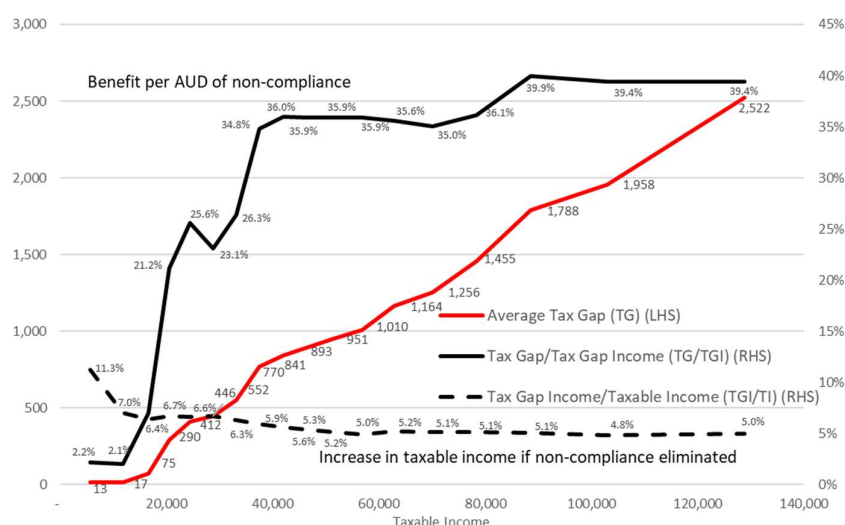
What is not immediately apparent from Figure 2 is the extent of any taxable income redistribution amongst taxpayers arising from the underreporting of taxable income evident in the tax gap estimates. This is important because typically, income inequality studies focus on income reported by respondents – not what they might have actually received whether cash, in-kind or imputed in some way (as with an accruals-based income measure). What tax gap estimates provide is an insight into the impact across individuals of that part of income which relates to non-compliance with the individuals' income tax law.

The traditional approach to examining income redistribution arising from income taxation is to contrast the Gini index of pre-and post-tax income. With individuals ranked by their level of taxable income, the Gini index of taxable income is measured as 2*A in Figure 3 where A measures the difference between the concentration curve of taxable income (SZX) and the line of perfect equality of taxable income distribution

(SRX). If we have perfect equality, then the area A would be zero and the Gini index zero. The greater the area of A, the greater the inequality. A concentration curve which maps out perfect inequality (XYS) would have A equal to 0.5 and a Gini index (or concentration index) of unity. Between the two extremes is the normal case (XZS) where the Gini index (or concentration index) of taxable income inequality is greater than zero but less than unity.

Fig. 3: Lorenz Curve and the Gini Index
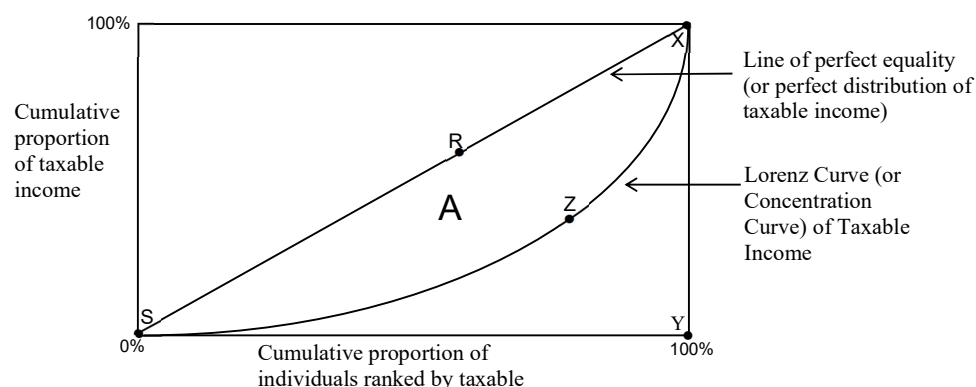
If the Gini index of pre-tax income is G and index of post-tax income is G*, we have an indicator of the impact a tax has on income distribution. If G*-G is negative then income inequality is being reduced by the tax and this is defined as an income inequality improving tax, sometimes loosely seen as a progressive tax. A situation where G*-G is positive is one where a tax worsens income inequality and is possibly regressive.

If tax progressivity is defined as where MTR/ATR>1 (a liability progression measure), a single number indicator of tax progressivity P can be defined as equal to twice the difference between the concentration index of tax (C) and the concentration index of pre-tax income (G) such that P=C-G. If P is positive, the tax is progressive since a tax which is more unequally distributed than income will improve income inequality. A value of P less than zero has the opposite effect, worsening income distribution, and is therefore regressive.

Table 6 presents measures of how G, G*, C and P are impacted by including consideration of tax gap and related non-compliance. Three key observations can be made. Firstly, failing to rank individuals using an income concept inclusive of the income-equivalent benefits from tax non-compliance (TGI) can result in a potentially misleading view of income distribution both pre and post tax. Rows 1 and 2 of Table 6 report G when individuals in the ATO sample file are ranked either by taxable income (as reported to the ATO) or taxable income plus tax gap equivalent income where it is assumed this income is not reported to the ATO as implied in the tax gap estimate (and underlying TGI in Table 4). What is apparent is that using TI+TGI rather than TI to rank individuals results in the apparent impact of TGI on taxable income distribution moving in a different direction. When ranking with TI, G falls from 0.4687 to 0.4658 while G for TI+TGI increases from 0.4671 to 0.4675. This is likely caused by the combination

of the distribution of TGI and the reranking of individuals when TGI is included in the ranking measure (an issue examined further below and in Figure 4). Tax non-compliance is therefore an important consideration in any income distribution study.

Secondly, not taxing TGI appears to impact significantly on post-tax income distribution measures. Using TI+TGI as the appropriate income ranking measure, not taxing TGI would result in a distribution measure pre-tax falling from 0.4675 (G') to 0.4072 (G*^). However, if TGI was taxed then the post-tax measure would have been 0.4022 (G*'), implying an improved post-tax income distribution.

Thirdly, and particularly important, is the observation from Table 6 that progressivity measures can provide a useful insight into how TGI and its taxing, impacts on G* estimates. A well known issue with comparing G* with G is that it is revealing the combined effects of two changes – the level of the tax and its progressivity. By measuring progressivity separately, we can better understand what change in post-tax income distribution is due to the level of the tax and what is due to changes in its progressivity. Table 6 presents these results and shows that while the post-tax income distribution improves when TGI is taxed (from 0.4072 to 0.4022), the progressivity of the individual income tax actually worsens (from 0.2044 to 0.1989). However, these results can be reconciled because the tax level has increased when TGI is taxed (from an average tax rate of 24.1% to 24.7% as shown in Table 4) and this combined with an overall less progressive income tax outcome, has resulted in an improved post-tax income distribution.

What the three observations above demonstrate is the important insights tax gap estimates can provide to our understanding of the distributional impact of non-compliance and the distributional benefits of improve tax compliance to the overall fairness of the tax system.

Table 6: Vertical Equity: Impact of Tax Gap on Concentration Indexes of Tax and Taxable Income

Measure		Definition	TI+TGI ranking of individuals	TI ranking of individuals
Concentration Index:				
1	Taxable Income excl TGI (G)	TI	0.4671	0.4687
2	Taxable Income incl TGI (G')	TI+TGI	0.4675	0.4658
3	Post-Tax Income excl TGI (G*)	TI-T	0.4021	0.4037
4	Post-Tax Income incl TGI (G*^)	TI+TGI-T	0.4072	0.4043
5	Post-Tax Income incl TGI (G*')	TI+TGI-T'	0.4022	0.4007
6	Tax when TGI untaxed (C)	T	0.6719	0.6738
7	Tax when TGI also taxed (C')	T'	0.6664	0.6641
Income Tax Progressivity				
8	- when excluding all TGI effects	P=C(T)-G	0.2048	0.2051
9	- when excluding TGI effects on tax but including its effects and on income	P^=C(T)-G'	0.2044	0.2080
10	- when including tax and income effects of TGI	P'=C(T')-G'	0.1989	0.1983

Note: TI is Taxable Income; TGI is tax gap equivalent income, T is tax on TI and T' is tax on TI+TGI

While the analysis in Table 6 outlines the vertical equity impact of tax gap-related income, it does not inform us on how TG impacts on individuals with seemingly equivalent income. This is the issue of horizontal equity or how the tax burden differs between individuals with *similar* incomes. Table 6 only illustrates how tax gap-related income impacts the pre- and post-tax distribution of income between individuals similarly ranked. However, since horizontal equity is about ensuring the tax system exhibit equal tax treatment of equals, an important question about non-compliance is whether it is broad-based and common across all taxpayers. If it was then we could expect no re-ranking of taxpayers to occur because of moving to include TGI in reported TI. If tax gap-related income is unevenly distributed then its inclusion will potentially result in individuals previously considered equal to no longer be equal, resulting in a re-ranking of them based on their taxable income pre- and post- inclusion of tax gap-related income. If re-ranking is significant, it means that the results in the first two columns of Table 6 are not comparable with those in the last column as there are two factors contributing to a change inequality, a re-ranking of the individuals and a change in the distribution of income.

Figure 4 presents evidence on the re-ranking of individuals by income when income either includes or excludes income not reported to the ATO in 2016-17. Here, individuals are first ranked by taxable income and then divided into 5% population groups and assigned a number (between 1 and 20) relating to the group in which they fall. The same process is then repeated but where income is defined as taxable income *plus* tax gap-related income. In the case of the middle-income group (10 and 11), 58% of taxpayers retain the same ranking they had before the addition of tax gap-related income into their original taxable income. Of those whose ranking changed, the majority experience a decline. When ranking increased, there was greater dispersion of individuals than when ranking declined. This is likely due to the impact of those whose non-compliance was substantial, and this appears to be the case in around 3% to 4% for the majority of the 5% individual groupings.

Fig. 4: Horizontal Equity: Tax Gap Income Induced Re-Ranking by Taxable Income
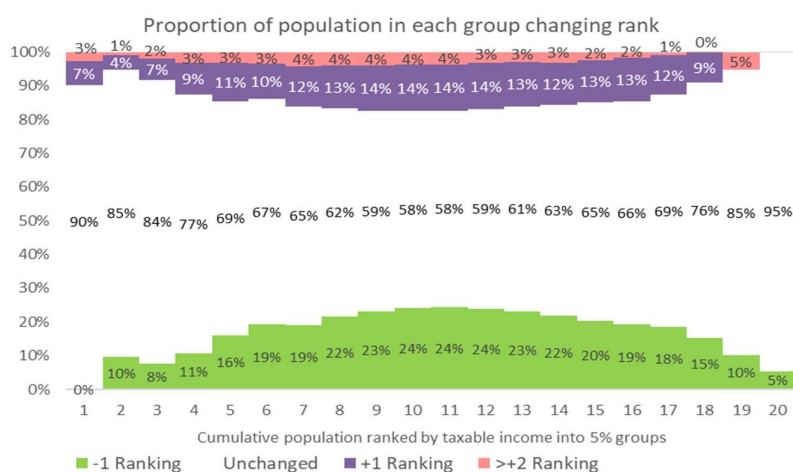
What Figure 4 starkly demonstrates is the substantial re-ranking of tax filers when taxable income not reported to the ATO in lodgements is taken into consideration. Horizontal equity of the individual income tax is therefore severely compromised by non-compliance with the law. Furthermore, this finding must ultimately bring into question the vertical equity observations in Table 6 where TI is used to rank individuals because it does not acknowledge the substantial re-ranking of the individual filers when tax gap-related income is taken into consideration. One approach to addressing this limitation is to rank individuals by TI+TGI and not TI. These results are presented in the final column of Table 6 and highlight how the inequality measure (G) is worsened for TI+TGI when individuals are ranked by TI+TGI instead of TI. Combined with the findings in Figure 2, while lower income groups might be engaged in non-compliance, it is far more significant for the higher income groups in terms of their share of TI+TGI. When the impact of tax paid (T) as against tax liable by law (T'=T+TG) is taken from TI+TGI, it is shown that post-tax income inequality improves, which is to be expected given the progressive rate schedule (Table 5) and the greater benefit to higher income groups from non-compliance. *Reducing the tax gap therefore not only improves vertical equity, it also significantly improves horizontal equity.*

However, in practice tax gaps have no single source and occur in many ways as shown in Table 3. Understanding how those sources differentially impact different income groups is an important consideration not only to understanding the cause of any resulting inequality, but to appreciate the likely distributional impact of any strategy designed to reduce a particular source of tax gap, such as work-related expenses. Figure 5 outlines the contribution to total tax gap by over-claimed work-related deductions, underreported business and rental income, and other forms of non-compliance.

In combination with Figure 2 (red section), Figure 5 illustrates how significantly the composition of non-compliance varies across taxable income groups. For those on lower incomes, work-related expenses are far less important than underreporting of wages income or over-claiming of rental expenses deductions. As income increases business income underreporting becomes more important as do work-related expenses. Targeting non-compliance on one source such as work-related expenses has obvious distributional implications as would targeting the underreporting of cash wages.[7]

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[7] It is important to note that the pattern of results in Figures 2 and 5 are in part influenced by the assumptions set out in section 3 relating to taxpayer non-compliance. However, it is not expected that the pattern of results would be fundamentally changed applying different assumptions.

Fig. 5: Composition to Tax Gap by Taxable Income Across Tax Filers
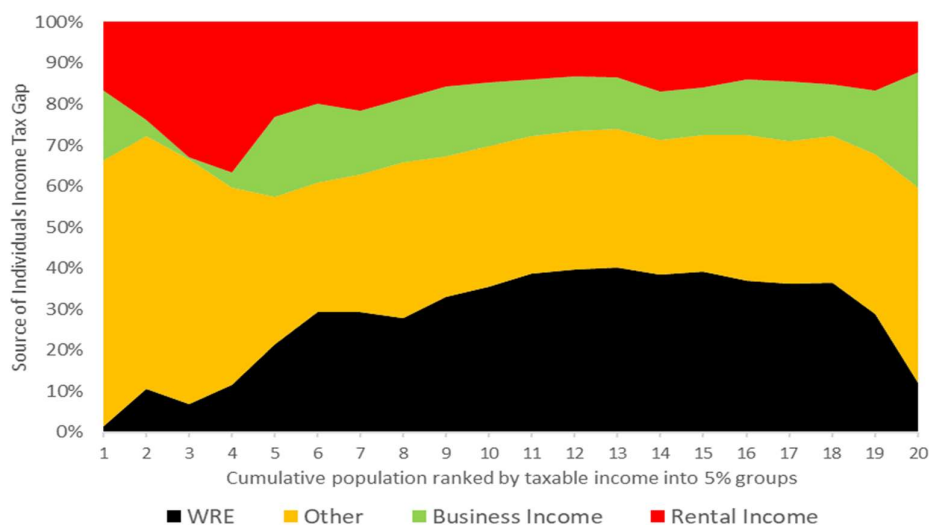
4.2   Impact of tax gap across different population groupings

Without the availability of tax gap data, revenue agencies have only limited, and more than likely unrepresentative, data on why and how individuals 'do not pay all tax liable' because it is obtained through compliance activities arising from risk-based models of non-compliance from a 'known'[8] population which are subject to infrequent review. The benefit of tax gap analysis is its *holistic* approach, forcing the estimation of non-compliance across both the 'known' (current taxpayers) and the unknown (or people outside the tax system (POTS)).

Explaining and understanding tax gap estimates therefore requires a broader view and understanding of the attributes and behaviour of both taxpayers and those outside the tax system. Here, tax gap studies can potentially benefit from strategies developed by marketers designed to better understand customer behaviour. In marketing studies of customer behaviour, a common approach is to segment the market according to a range of criteria including demographic, geographic, psychographic, and behaviour.

Demography is important because studying the population by characteristics such as age, gender, education, partner status, dependents, ethnicity, religion, and income enables use of readily observable statistical data to provide insights into the overall aggregate trends observed. Geographic data on locality, region, and national location can also complement demographic statistical data. However, demographic and geographic statistical 'hard' data cannot provide indicators into the 'soft' data such as that on psychographics which relates to individuals' activities, personalities, values, and attitudes; or behavioural data such as patterns of response or take-up rates.

Understanding tax gap therefore requires a study of both 'hard' and 'soft' data on all individuals in the total population, not just taxpayers and not just tax-related variables.

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[8] See discussion on this issue in Warren (2019, p. 546).

In the remainder of this section, a range of demographic and geographic statistics will be used to segment the population to better understand how tax gap varies across various population segments. Section 5 will investigate 'soft' data evidence for the behavioural response of taxpayers potentially underpinning those responses.

Figure 6 ('Tax Gap and Its Source Across Different Tax Filer Groupings (AUD pa, % Share by Gap Source)', Appendix 5) details the incidence of tax gap for 2016-17 across a range of demographic and geographic groupings including age, occupation, gender, partner status and geographical region, based on information derived from the ATO 2% sample file and enables the following observations to be made:[9]

> *Age:* The average tax gap rises consistently with age groupings up to 50-59 years and then declines, in line with the average incomes (and associated marginal rates of tax) of taxpayers in the respective age groupings.

> *Occupation:* The average tax gap varies significantly across occupational groupings, with significantly higher average gaps observed in the, on average, higher income 'white collar' groupings (i.e., managers and professionals) of taxpayers.

> *Gender:* The overall average tax gap for female taxpayers is around 60% of the average tax gap attributable to male taxpayers, which is consistent with their significantly lower average incomes and lower usage of tax agents.

> *Partner status:* The average tax gap for taxpayers with a spouse (i.e., married or de facto) is around 60% higher than the average tax gap attributable to single taxpayers, which is consistent with their substantially (i.e., over 40%) higher average income.

> *Geographical Region:* The overall average tax gap for taxpayers residing in major urban regions is roughly 10% higher than for their regional and rural counterparts, in line with their average incomes (and associated marginal rates of tax).

5.   ADMINISTRATION AND POLICY ISSUES REVEALED BY INCOME TAX GAP

While the 'hard' statistics on tax gap outlined in Table 2 and illustrated in Figures 2, 5 and 6 detail 'what is', they do not explain 'why' and it is here that insights into the behavioural responses underpinning these 'hard' statistics are important. This section investigates whether tax gap trends could be explained by whether an individual has chosen to use a tax agent or not (section 5.1) and what this might mean for deductions claimed (such as work-related expenses) or how income (rental and business) is received; or how interaction between shared bases (e.g., income as a base for both taxation and entitlement to transfers) might compromise one or more of those bases (section 5.2); or whether tax design and administration have encouraged some people to go outside the tax system and become non-lodgers (section 5.3).

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[9] The authors acknowledge that there is a degree of uncertainty associated with the underlying approach for this analysis and related observations that is explained more fully in Appendix 2, 'Demographic features and associated tax gap impacts of selected tax return items'.

5.1   Tax agent use impacts tax gap

Given the ATO offers a substantial level of support to individuals in the tax return preparation process (e.g., through its system of prefilled tax returns) and the fact most individuals are employee taxpayers who pay virtually all of their tax via employer withholdings, the fact that 71.6% of individual taxpayers in 2016-17 saw the need to engage a tax agent to assist with their relatively simple tax affairs raises a number of questions about what might be the main drivers and motivations for this usage and whether there are any specific tax compliance related implications.

Figure 7 highlights how the extensive use of tax agents strongly correlates with a higher average tax gap as incomes rise, when contrasted with taxpayers who prepare their own tax returns. The ATO tax gap research program has clearly revealed a fair level of income and deduction non-compliance amongst individuals and a disproportionally and seemingly (at first glance) contradictory result of higher non-compliance amongst those using a tax agent. To provide deeper insights into the incidence and likely sources of this non-compliance, Appendix 2 ('Demographic features and associated tax gap impacts of selected tax return items') details relevant tax gaps for 2016-17 across various demographic groupings of taxpayers (i.e., by age, gender, partner status, region, and occupation) for work-related expenses (WRE), rental income and business income, using the methodology outlined in section 3. The remainder of this section will provide an overview of these findings.

Fig. 7: Income, Average Tax Gap, and Use of Tax Agents by Tax Filers
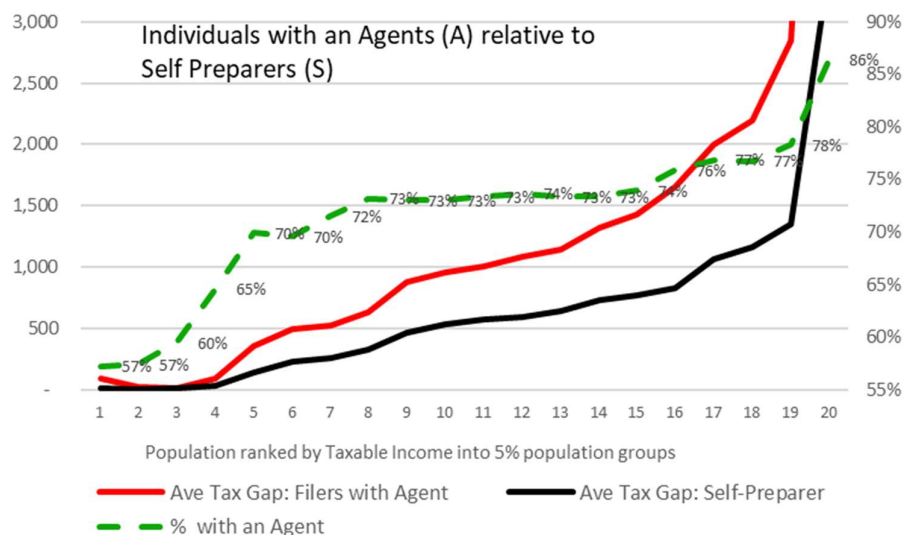
5.1.1   Work-related expenses

In the case of the 71.6% of individuals lodging a tax return who use an agent, they account for over 75.1% of WRE claims numbers, 79.8% of WRE claim value, 80.4% of WRE-related tax gap and 87.8% of all tax gap.

Deductions for WRE have been a problematic feature of Australia's income tax system for many decades. With the relevant tax law expressed in very broad terms, most employee taxpayers have, very often with the assistance of tax agents, identified opportunities for making WRE deduction claims in their tax returns. The average deduction claim in 2016-17 was AUD 2,495 with just under 50% of claims less than AUD 1,000. Spread over 9.3 million individuals these claims represent a significant cost to the revenue – WRE deductions for the 2016-17 financial year are projected to amount to around AUD 23 billion, at an estimated cost to the revenue of around AUD 8.3 billion. In its report, the Australia's Future Tax System Review Panel (2009) expressed concern for the complexities associated with WRE deduction claims and the resultant compliance burden on taxpayers, ATO administration costs, and the potential for significant revenue leakage from over-claimed deductions.

When the ATO released 2015-16 tax gap estimates for INIB and IISB in 2019, it indicated that the estimated value of tax forgone was AUD 4 billion (Table 3). While it did not quantify the tax forgone from over-claimed WRE deductions of taxpayers in the IISB market, based on an analysis of the deductions claimed in tax returns this amount is estimated to have been in the region of AUD 785 million, giving total revenue forgone of AUD 4,785 million from over-claimed WRE deductions for 2015-16 financial year (refer Table 3). Revenue leakage on this scale represents overall non-compliance for WRE deduction claims in the region of 50%, a level that in our view is entirely unacceptable and should be a priority for remedial action.

To better understand the incidence and sources of this non-compliance, Appendix 2 ('Demographic features and associated tax gap impacts of selected tax return items') sets out the results of analyses of WRE deductions in taxpayers' returns based on demographic and tax agent usage criteria, and related average tax gap projections derived from published findings of the ATO's tax gap research program. Key findings from these analyses are as follows:

- The incidence rate of WRE claims is highest for taxpayers aged 25-29, although the average value of claims is much higher for taxpayers aged 30-39 years; in line with their much higher on average incomes the average value of WRE claims and associated WRE tax gap projections are substantially higher for male taxpayers. There is also a distinct pattern of higher WRE claims and projected average WRE gaps among certain occupational groupings (e.g., managers, technicians, and machinery operators). On the other hand, both the 'regional location' and 'partner status' of taxpayers do not appear to be significant differentiating factors.

- Significantly, tax agent usage across all demographic factors is prominent, with a higher incidence of claims and average values across all age groupings, male taxpayers, and taxpayers located in major urban regions.

5.1.2   Net rental income

For the 71.6% of individuals lodging a tax return who use an agent, they account for over 89.5% of net rental income reported by numbers, 90.4% of net rental income by value, and 90.9% of net rental income related tax gap.

The favourable treatment of capital gains under Australia's income tax laws, coupled with the ability of taxpayers to offset any excess of expenditure over income from

income-producing assets against other categories of income has led to extensive use of the practice known as 'negative gearing'. For the financial year 2016-17, some 2.2 million individuals reported in their returns gross rental income of around AUD 45 billion and claimed deductions in respect of this income just over AUD 48 billion. More than 1.3 million of these taxpayers (i.e., around 60%) reported a rental income loss (Australian Taxation Office, 2019).

Over recent years, the ATO has reported its concern for the incidence of over-claimed rental income deductions and in its 2017-18 Budget the government announced it would amend the income tax laws to disallow travel expenses in relation to residential rental properties. Once implemented, these measures were expected to increase tax revenues by between AUD 160-200 million per year.

In reporting its most recent tax gap findings for the INIB taxpayer segment, the ATO indicated that understated net rental income (i.e., gross rental income less deductions) is estimated to have resulted in revenue leakage of AUD 1.5 billion in respect of returns for the 2015-16 financial year. While the ATO did not quantify the tax forgone in this area in respect of taxpayers in the IISB taxpayer segment, based on an analysis of net rental income reported in their tax returns this amount is estimated at AUD 998 million (Table 3), giving a total estimate of revenue forgone of AUD 2,498 million.

To better understand the incidence and sources of this non-compliance, Appendix 2 ('Demographic features and associated tax gap impacts of selected tax return items') sets out the results of analyses of reported net rental income in taxpayers' returns based on demographic and tax agent usage criteria, and related average tax gap projections derived from published findings of the ATO's tax gap research program. Key findings from these analyses are as follows:

- Across all taxpayers, both the incidence rate of net rental income and amount of average rental income reported all rise consistently in line with increasing age up to 50-59 years, with the latter measure falling significantly once taxpayers reach 60 years (i.e., in/approaching retirement); while the incidence rate for males and females is broadly similar, male taxpayers report amounts that are, on average, almost 20% higher than females, while their average projected tax gap is around 30% higher. There is also a higher concentration of taxpayers located in major urban centres, reporting substantially higher amounts of rental incomes.

- The data, unsurprisingly, indicates that taxpayers reporting rental incomes have a strong tendency to use tax agents, particularly for ages groups 30-39, 40-49, and 50-59 years, with substantially higher claims on average, and higher average projected tax gaps.

5.1.3 Net business income

Some 26.2% of individuals lodging a tax return are IISB and of them, 87.9% use an agent, and as a group account for 96.9% of business income reported by value, 97.2% of business income-related tax gap and 94.7% of total tax gap of all IISB.

The high use of tax agents by those individuals in business (IISB) shown in Figure 8 increases rapidly at first with taxable income but stabilises across higher income groups.

The average tax gap for IISB with tax agents is also consistently and substantially higher than taxpayers preparing their own returns across all income levels, due mainly to these persons having much lower average taxable income (AUD 46,537 in 2016-17 of which AUD 7,318 is business income) than those with tax agents (AUD 72,470 taxable income and AUD 31,455 business income).

Fig. 8: Income, Business Income, and Related Tax Gap by Tax Filers
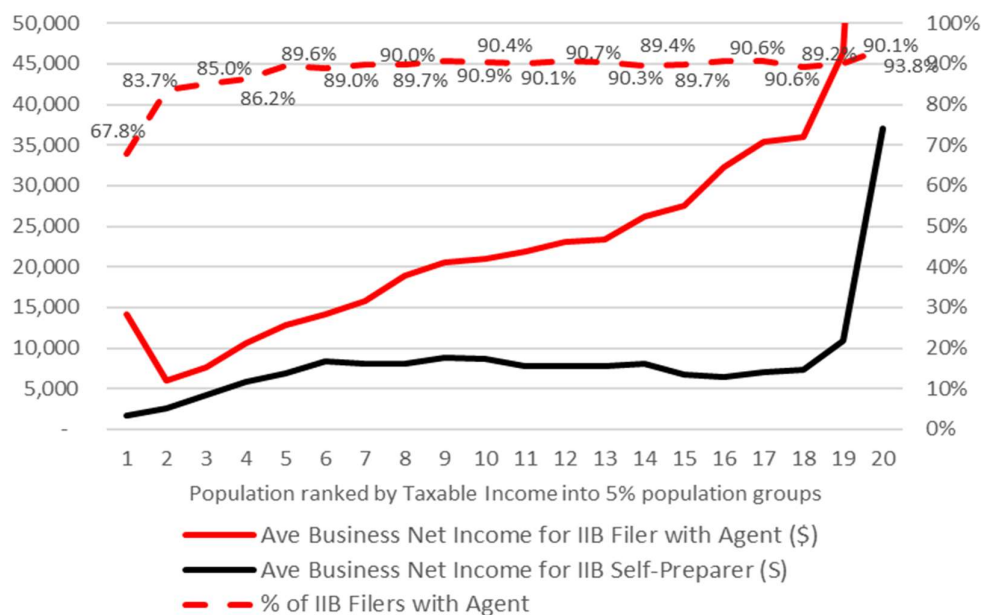
Achieving high levels of income tax compliance from taxpayers operating in the small business sector is a significant and perennial challenge for governments and revenue bodies in all countries, particularly given the large numbers of actors typically involved and in the absence of comprehensive systems of tax withholding and third-party reporting. For the financial year 2015-16, the ATO reported that over 3.7 million individuals reported income in their returns from business activities, either directly from self-employment or from a distribution of a partnership or trust.[10]

Over many years, the ATO has reported its ongoing concerns for the incidence of unreported business income and the small business sector has been a prominent focus of its compliance improvement efforts. In support of these efforts and to improve overall tax system integrity, the government has over recent Budgets announced a range of

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[10]   This number of individuals was included in 2015-16 released historical reports and has since in later years been revised where the current definition reports some 4.7m individuals as having some business activity and therefore in small business: see https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Small-business-income-tax-gap/?anchor=Latestestimateandtrends#Latestestimateandtrends (accessed 25 January 2023).

measures (Table 7) that, once fully established, are expected to increase tax revenues by around AUD 1,400 million per year.

Table 7: Recently Announced Measures to Improve Income Tax Integrity of Small Business

Budget	Announced measure	Estimated revenue (2020-21) AUD m
2017-18	• Extension of the Taxable Payments Reporting System (TPRS) to contractors in the courier & cleaning industries.	194
	• One-year extension of funding for ATO compliance activities	19
2018-19	• Expansion of the TPRS to the following industries: a) security providers and investigation services; b) road freight transport; and c) computer system design and related services.	330
	• Black Economy Package — new and enhanced ATO enforcement against the Black Economy	856

Sources: Budget papers (various years) (www.budget.gov.au).

In reporting its most recent tax gap findings for the IISB taxpayer segment, the ATO indicated that the total net tax gap for this taxpayer segment for 2015-16 was estimated at AUD 9.3 billion (equivalent to 12.6% of the tax base). It is important to note that this gap estimate represents all forms of non-compliance, not just unreported income from business activities. While the ATO did not separately quantify the tax forgone from unreported business income, this amount is likely to have been in the region of AUD 5-6 billion, based on the decomposition of non-compliance set out in Table 3.

To better understand the incidence and sources of this non-compliance, Appendix 2 ('Demographic features and associated tax gap impacts of selected tax return items') sets out the results of analyses of reported net business income in taxpayers' returns based on demographic and tax agent usage criteria, and related average tax gap projections derived from published findings of the ATO's tax gap research program. Key findings from these analyses are as follows:

- Both the incidence rate of reported business income and relative amount of average business income reported rise in line with increasing age up to 50-59 years. However, average reported incomes peak in the 40-49 age grouping and fall thereafter, especially for users of tax agents.

- In terms of regional location, average reported net business income varies by no more than around 10% across the three regional groupings, although the incidence rate is substantially higher in rural regions (29.3% compared to 20.9% in major urban and 22% in regional urban).

- Unsurprisingly, the usage of tax agents by taxpayers reporting net business income rises in line with increasing taxable incomes, exceeding 85% at the top end income ranges, and a similar pattern is observed for the average business income tax gap. The average tax gap for users of tax agents is consistently and substantially higher (in a relative sense) than that of taxpayers preparing their own returns across all income levels, genders, and age groupings.

5.2   Income tax gap directly impacts shared tax bases

Income forms the basis on which individual's ability to pay income tax is determined – but it is also the foundation on which other obligations and entitlement to various government in-kind and cash transfers are determined. In this section, two case study examples are presented to illustrate how the income tax gap can impact other obligations and entitlements.

5.2.1   Case Study 1: individual income tax design compromises government transfer income tests

In addition to determining overall income tax liabilities, income tests are also used to determine whether an individual: 1) can claim certain tax offsets and how much; 2) is entitled to a rebate for private health insurance premiums; 3) must pay a Medicare levy surcharge; 4) is required to make a repayment on their Study and Training Support Loans (STSL),[11] and 5) is entitled to government benefits or pensions and how much.

However, as shown in Table 8 ('Income Measures Adopted by a Range of Taxes and Transfers: 2016-17', Appendix 6), the definition of income used by various government agencies (e.g., by the ATO to determine tax liabilities, by government social service agency Centrelink when determining benefit and pension entitlements, and by the Australian Bureau of Statistics (ABS) in preparing the national accounts) varies widely. Clearly, tax gap will impact all these income-related measures as well as numerous State-based entitlements which use income to determine eligibility and level of benefit.

Table 9 presents estimates of how capturing all tax gap-related income would impact tax liabilities and transfer entitlements, assuming no behavioural response by those individuals as a result of all income sources being reported (such that tax gap reduces to zero). What is apparent is that capturing all income sources is not only important to income taxpayers, it is important also to their welfare entitlements. What Table 9 does not reveal is income received but not reported by non-taxpayers in receipt of transfer payments – or people outside the tax system (noted in Table 3 and discussed further in section 5.3). It is therefore critical in any tax gap study that every effort is made to capture not only taxpayers but also people outside the tax system.

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[11] STSL comprises Higher Education Loan Program (HELP), VET Student Loan (VSL), Student Financial Supplement Scheme (SFSS), Student Start-up Loan (SSL), ABSTUDY Student Start-up Loan (ABSTUDY SSL), and Trade Support Loan (TSL). See https://www.ato.gov.au/Individuals/Study-and-training-support-loans/Types-of-loans/ and https://www.ato.gov.au/Rates/HELP,-TSL-and-SFSS-repayment-thresholds-and-rates/ (accessed 25 January 2023).

Table 9: No Behavioural Response Impact of Capturing All Tax Gap-Related Income on Income Tax, STSL Repayments and Transfers

Modelling Sample: 2016-17 ATO 2% Sample File	
Transfer Modelling: When age<60yo, taxable government transfers are assumed to be from Newstart with a means test where up to income for the means test (Table 8, Appendix 6) if between AUD2,711 and AUD6,622 is reduced 50c in every AUD earned and 60c for every AUD earned above AUD6,622. Transfer recipients +60yo are assumed below pension means test threshold	
Population Impacted	699,200 (4.8%)
Taxable Income Increase (AUD m/% Change)	47,175 (5.5%)
Tax Increase(AUD m)	17,285 (9.1%)
Govt Transfers Increase (AUD m)	-507
STSL Repayments Increase	281 (10.6%)

Source: authors' calculations using 2016-17 ATO 2% Sample file

5.2.2   Case Study 2: Student Loan Scheme design compromises individual income tax

The STSL scheme, which is designed to provide a loan to students to fund their tertiary education student fee contribution, adopts a much broader definition of income than taxable income (TI), as demonstrated in Table 8 ('Income Measures Adopted by a Range of Taxes and Transfers: 2016-17', Appendix 6). These loans can be repaid by individual debtors to government either voluntarily or through the income tax system when a borrower's 'repayment income' (RI) exceeds a legislated threshold (Table 10).

Highfield and Warren (2015) demonstrated how the system for collecting repayments of loans granted to students under STSL interacted with, and impacted on, the integrity of the individual income tax system. From examining patterns of income and deductions in a sample of tax returns for STSL debtors for the 2010-11 income year, evidence was found for the bunching of STSL debtors around STSL repayment thresholds, with indications of over-claimed deductions for work-related expenses highlighted as a likely significant contributing factor. The potential to defer the repayment of loans by failing to lodge tax returns was also recognised, along with numerous policy shortcomings that further impeded the collection of student loans. Since 2015, many reforms, including a number in line with recommendations in the 2015 article, have been enacted to improve the design of all student loan schemes and their collection by the ATO (Appendix 3, 'Recent STSL reforms and their rationale').

Table 10: STSL Repayments, 2016-17 (AUD)

Repayment Income	Assessed Loan Repayment	Repayment Income	Assessed Loan Repayment
0-54,868	NIL	76,223-82,550	6% of RI
54,869-61,119	4% of RI	82,551-86,894	6.5% of RI
61,120-67,368	4.5% of RI	86,895-95,626	7% of RI
67,369-70,909	5% of RI	95,627-101,899	7.5% of RI
70,910-76,222	5.5% of RI	101,900+	8% of RI

Note: RI repayment income is calculated using your taxable income, total net investment loss (including net rental losses), and amounts of reportable fringe benefits, reportable superannuation contributions and any exempt foreign employment income.

In the seven years up to 30 June 2019 since the analysis in Highfield and Warren (2015), the number of STSL debtors increased by 77% to around 3 million and the value of STSL debt grew by 161% to over AUD 66 billion. In addition, the ATO in its tax gap estimates for individuals not in business reported finding evidence of significant non-compliance, particularly in relation to deductions for work-related expenses (WRE). Given the large number of taxpayers involved and the significant incidence of WRE deductions, this non-compliance obviously has major implications for the assessment of STSL repayments which are determined by adopting a related income-based measure. However, typically the focus on individuals (the primary tax) non-compliance is largely exclusive when consideration should also be given to how this non-compliance impacts the collection of STSL repayments and also whether the operation of the STSL scheme itself in turn impacts the integrity of the individual income tax. Given the enormous size of this community asset and its significant degree of interaction with the income tax system, close management in a tax compliance context appears justified.

Since income tax gap estimates reflect non-compliance with income tax obligations and therefore reporting of TI, it will also reflect underreporting of RI (defined in Table 8, Appendix 6) and therefore under-repayment of STSL loans. Table 9 outlined the aggregate under repayment of STSL resulting from the underreporting of RI by personal income taxpayers. In the discussion below, attention is given to the over-claiming of WRE by STSL debtors and the issue of non-lodgement of returns by some STSL debtors.

Overclaimed work-related deductions by taxpayers who are STSL debtors

For this article, the issue of over-claimed WRE deductions is relevant in two respects: 1) what might be the impact of over-claimed WRE deductions on the rate of loan repayment via the income tax system?; 2) does the design of the repayment mechanism itself induce an even higher level of over-claimed deductions than might otherwise be the case?

To help answer these two questions, WRE deductions are examined for both STSL and non-STSL debtors by age and income levels from AUD 48,869 to AUD 67,369 (i.e., immediately prior to and the middle of STSL repayment threshold (Table 10)) using the ATO's 2% individuals sample file for 2016-17. In addition, adjustment rates for WRE deductions identified from the ATO's INIB gap estimates for 2015-16 are applied to

WRE claims contained in 2016-17 tax returns (drawing on the ATO sample file population) to identify their likely impact on income tax revenue, the assessment of loan repayments via the tax system, and any unusual patterns in the incidence of WRE deductions between STSL and non-STSL taxpayers.[12] The relevant data are set out in Table 11 and Appendix 4 ('Estimated tax impacts of over-claimed WRE deductions by STSL debtors') while the key observations and findings are outlined below:

- WRE deductions of STSL debtors were overstated by around AUD 1.8 billion in 2016-17, resulting in AUD 603 million of forgone tax revenue and an estimated AUD 136 million of deferred loan repayments.

- By virtue of their WRE deduction claims, almost 23,000 taxpayers with STSL debts kept below the minimum repayment threshold, thus avoiding an obligation to make loan repayments and effectively deferring their repayments to another year.

- When examined in age groupings, there are indications of 'bunching' of WRE claims (i.e., an abnormal increase in average WRE claims around repayment thresholds) for STSL debtor taxpayers in the 30-39 and 40-49 age groups.

Table 11: STSL Debtors and Over-Claimed Work-Related Deductions, 2016-17

Metric	Number/ value
Number of STSL debtors lodging tax returns (000's)	2,114
Number of STSL debtors with STSL debt repayment (000's)	634
Value of STSL assessed debt repayments (AUD m): Estimated	2,644
Number of STSL debtors' returns with WRE (000's)	1,411
Value of STSL debtors' WRE deduction claims (AUD m) – Actual	3,142
– Estimated over-claimed WRE (AUD m)	1,823
Impact of eliminating over-claimed WRE by STSL debtors on:	
Income tax revenue (AUD m):	603
STSL assessed debt repayments (AUD m)	136
Number of STSL debtors with assessed debt repayments (000's)	22

Sources: ATO Statistics, ATO Sample File, and ATO individuals' income tax gap findings.

Non-lodgement of tax returns by STSL debtors

Some STSL debtors avoid or delay the repayment of their STSL debts by failing to lodge a tax return on time (or at all) where they have an obligation to do so and their income is above the minimum RI threshold (Table 8, Appendix 6) and above the TI tax free threshold (Table 5). As indicated in Table 12, STSL debtors who do not lodge tax returns account for over one-quarter of all STSL debtors.

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[12] Using ATO statistical tabulations, the incidence of WRE claims (i.e., % of taxpayers making such a claim) was 63.9% in 2015-16 and 63.7% in 2016-17, while the average value of claims was $2,548 and $2,487 respectively.

Table 12: STSL Debtors by Age

Age group	STSL debtors who lodged 2016-17 returns	STSL debtors expected to lodge 2016-17 returns /1	Total STSL debtors as of 30 June 2017	STSL debtors not lodging returns (%)
<20	67,000	70,440	200,341	65
20-29	1,084,000	1,139,649	1,372,464	17
30-39	517,000	543,541	702,317	23
40-49	225,000	236,551	355,576	33
50-59	88,000	92,518	156,322	41
60-69	25,000	26,283	61,885	58
70+	4,000	4,205	23,697	82
All	**2,010,000**	**2,113,187**	**2,872,603**	**26**

Sources: ATO Sample File and STSL tabulations, and authors' computations and assumptions.
/1. These data are estimates based on prior year patterns of tax return lodgement.

The ATO's published tax gap findings concerning people who should lodge returns but fail to do so – who the ATO describes as 'people outside the system' (POTS) – are extremely limited in detail and do not shed any light on the characteristics of POTS, including those with STSL debts. Furthermore, the ATO's individuals 2% sample only includes taxpayers who lodge returns and receive assessments within the 16-month period following the end of the relevant financial year. The topic of POTS at large is discussed in section 5.3.2.

5.3   Unreported income of non-lodgers is important

Some individuals choose not to report their assessable income simply by not lodging a tax return. In its published tax gap research findings, the ATO uses the (somewhat misleading) terminology 'people outside the system' (POTS) to refer to this population of individuals.[13] This non-compliance risks detection in the ATO's enforcement programs that are undertaken to pursue 'at risk' individuals not lodging tax returns when required to do so.

The ATO publishes little information on the nature and scope of its programs to enforce the lodgement of tax returns (e.g., risk criteria, numbers pursued, and numbers lodged). However, it is known from information published by the ATO on its website and from published reports that it adopts a risk-based approach to undertaking lodgement enforcement action, relying on taxpayers' prior year tax levels (i.e., indicators of relative net tax liability) and other risk criteria such as third-party reports of income and assets.

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[13] As explained later in this article, many of the individuals who fall within this definition are registered with the ATO, have a tax file number, and pay their income tax via the employer withholding arrangements (PAYG Withholding); however, for a variety of reasons they do not lodge an income tax return. Past ATO experience indicates that many of these individuals (but an unknown proportion) would, in fact, receive a refund of excess tax credits if they chose to lodge a tax return. While the failure to lodge a return constitutes an act of non-compliance, describing this cohort of individuals as 'people outside the tax system' conveys a misleading description of their taxpaying status.

The published findings from the ATO's individuals' income tax gap research shed little light on non-compliance by POTS, disclosing only aggregate 'revenue forgone' data. From the published data set out in Table 13 it would appear, on the surface at least, that the failure to lodge returns does not represent a major compliance issue in terms of tax revenue at risk, especially for the INIB segment where most tax revenue is collected via employer wage withholding arrangements.

Table 13: Individual Income Tax Gap: People Outside the Tax System: 2015-16

Tax gap element	People outside the tax system		
	Individuals not in business	Individuals in small business	Total
Revenue forgone (AUD m)	111	670	781
Net gap (AUD m)	8,444	9,309	17,753
Revenue forgone/ total tax paid	1.3	7.2	4.4

Source: https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Individuals-not-in-business-income-tax-gap/?page=6#Step1Estimateunreportedamountsandextrapo ; https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Small-business-income-tax-gap/?page=5#Step1Estimateunreportedamountsforsamplea   (accessed 25 January 2023).

However, the picture presented in Table 13 belies a more complicated compliance issue which appears to be related, in part, to the interaction of the PAYG withholding mechanism and the tax-free threshold of the individual income tax.

How many individuals fail to lodge tax returns when required to do so?

The income tax law requires a person who is an Australian resident to lodge a tax return if they derive income from a business or if their income from other sources exceeds the tax-free threshold (AUD 18,200 per year). Individuals are also expected to lodge a return to claim a refund of excess tax credits (e.g., tax withholdings or imputation credits) where their assessable income is below the tax-free threshold.[14] Different rules apply to non-residents, including special provisions for working holiday makers (i.e., visa holders 417 and 462) that came into effect from 1 July 2017.[15] In general, individuals falling into this category are not required to lodge a return unless their income exceeds AUD 37,000.

In its published tax gap materials, the ATO reports that it estimates the impact of people outside the system (non-registration or non-lodgement) by drawing on comparisons of Australian Bureau of Statistics (ABS) Census of Population and Housing (census) data to tax return data to estimate the number of non-lodging individuals who are not in business. It then estimates a dollar impact drawing on its random sample data (in respect

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[14] https://www.ato.gov.au/Calculators-and-tools/Do-I-need-to-lodge-a-tax-return/ (accessed 25 January 2023).

[15] In general, individuals defined as working holiday makers are taxed at a rate of 15% on all income from employment up to $37,000 and are not required to lodge a tax return unless their income exceeds $37,000.

of those lodging tax returns) to determine the final amount. However, the precise details of its analysis are not published.

For this study, the report simulates a comparison of ABS census data and published ATO statistical data. Table 14 details by age those individuals who can be expected to lodge and not lodge tax returns for 2016-17. As is evident from the data presented, approximately 14.6 million individuals are expected to lodge a tax return for the 2016-17 financial year, while roughly 10 million (including 5.4 million aged under 18 years and 1.8 million of working age (i.e., 25-64 years)) will not. While there are many factors that adequately explain the circumstances in which large numbers of adult individuals do not have income over the tax-free threshold (e.g., full-time students, at home spouses, invalids, prisoners, and retirees) and, therefore, do not have an obligation to lodge a return, their approximate number has not been quantified. Nor has the number who should lodge but fail to do so.

Table 14: Individuals Population, 2016-17

Age group	Number lodging tax returns/1	Number in population	Lodging tax returns (%)	Number not lodging tax return	% Males lodging tax returns	% Females lodging tax returns
0-15		4,922,404	0.0%	4,922,404	0.0%	0.0%
16-17	142,146	584,724	24.3%	442,578	24.2%	24.5%
18-24	1,716,924	2,333,668	73.6%	616,744	73.6%	73.6%
25-29	1,628,336	1,849,231	88.1%	220,895	90.2%	86.0%
30-34	1,644,796	1,833,059	89.7%	188,263	93.7%	85.8%
35-39	1,486,531	1,661,236	89.5%	174,705	93.7%	85.3%
40-44	1,417,372	1,604,013	88.4%	186,641	91.4%	85.3%
45-49	1,443,306	1,648,503	87.6%	205,197	90.6%	84.6%
50-54	1,324,157	1,535,714	86.2%	211,557	89.1%	83.4%
55-59	1,245,082	1,506,432	82.7%	261,350	86.0%	79.5%
60-64	981,363	1,332,034	73.7%	350,671	78.9%	68.7%
65-69	650,019	1,193,472	54.5%	543,453	59.9%	49.2%
70-74	388,181	958,102	40.5%	569,921	44.8%	36.4%
75 and over	514,610	1,635,412	31.5%	1,120,802	35.6%	28.3%
Totals	**14,582,824**	**24,598,004**	**59.3%**	**10,015,180**	**61.5%**	**57.1%**

/1. This number includes over 1 million individuals who lodged a return more than 12 months after the end of the 2016-17 financial year.

Source: ABS 3101 Demographic Statistics and ATO (2019).

To shed some light on the incidence of return non-lodgement, analysis is made of available (albeit, limited) data on the operation of the employer wage withholding arrangements which impact most individuals.

Table 15 sets out data concerning the aggregate value of income tax withholdings received from employers and the corresponding amounts claimed by individuals in their tax returns for each financial year over the period 2009-10 to 2016-17. The difference between these two amounts represents the value of tax withholdings not reported in tax returns, either because the individuals concerned failed to report corresponding wage income in their returns or because they did not lodge a tax return at all. Significantly, unclaimed tax withholdings are substantial in absolute terms and, for reasons not readily

understood, increased substantially (i.e., +80%) in 2012-13 when the tax-free threshold was increased from AUD 6,000 to AUD 18,200. With the substantial increase in the tax-free threshold, one might reasonably have expected a reduced rate of growth in return lodgement (which in fact did occur) as more individuals are relieved of a tax burden and, as a result, withholding at source. The significant rise in the level of unclaimed tax credits in 2012-13 and its level in subsequent years is not readily explained, particularly considering the ATO's expansion of its tax return prefilling service.

Table 15: POTS and Unclaimed PIT PAYG-Withholding Tax Credits

Measure	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
PAYG w'holdings (AUD m)	119,965	129,498	141,172	152,667	159,069	169,180	175,720	183,353
PAYG w'holdings in tax returns (AUD m)	114,919	124,291	136,531	144,036	150,990	161,155	169,047	174,499
PAYG w'holdings not in tax returns (AUD m)	**5,046**	**5,207**	**4,641**	**8,631****	**8,079**	**8,025**	**6,673**	**8,854**
(%)	4.2	4.0	3.3	5.7	5.1	4.7	3.8	4.8
Total tax paid (AUD m)	127,354	139,915	153,422	162,115	173,639	186,222	193,580	192,076

** The income threshold for the imposition of income tax was increased from AUD 6,000 to AUD 18,200 in 2012-13.
Source: 2016-17, 2017-18, and 2018-19 Taxation Statistics

Complementing the data in Table 15, Table 16 sets out a range of scenarios for the 2016-17 financial year that make projections of related non-compliance arising from omissions of income in returns received and processed and the non-lodgement of returns, under assumptions of their respective incidence and average amount per individual wage earner. For all the scenarios presented, it is assumed that the amount of employees' withholdings not disclosed in returns settles at AUD 7.5 billion.

Table 16: Modelling Scenarios: PAYG Withholdings Not Claimed in Tax Returns

Citizen category	Scenarios: % of unclaimed tax credit and share of total (AUD 7.5 billion)	Potential citizen population impacted (000's) Average tax credit unclaimed per individual (AUD)				
		1,000	**2,000**	**3,000**	**4,000**	**5,000**
Individuals who lodged a tax return	**Scenario 1:** 50% (AUD 3.75 billion)	3,750	1,875	1,250	938	750
	Scenario 2: 60% (AUD 4.5 billion)	4,500	2,250	1,500	1,125	900
	Scenario 3: 75% (AUD 5.63 billion)	5,625	2,812	1,875	1,406	1,125
Individuals who did not lodge a tax return	**Scenario 1:** 50% (AUD 3.75 billion)	3,750	1,875	1,250	938	750
	Scenario 2: 40% (AUD 3.0 billion)	3,000	1,500	1,000	750	600
	Scenario 3: 25% (AUD 1.87 billion)	1,875	938	625	469	375

Source: Authors' computations and assumptions.

Drawing on the data presented and projections made it will be seen that the numbers of individuals who either omit some wage income from their returns or fail to lodge a return at all is significant under most scenarios and accompanying set of assumptions. For example:

- *Scenario 1:* Assuming an average of AUD 1,000 unclaimed withholding for cases of omission and AUD 2,000 for non-lodgers, there were around 5.6 million 'non-compliers', admittedly with a likely high proportion of this number not having any net tax liability; and

- *Scenario 3:* Assuming an average of AUD 2,000 unclaimed withholding for cases of omission and AUD 4,000 for non-lodgers, there were more than 3.2 million 'non-compliers', admittedly with a likely high proportion of this number not having any net tax liability.

From the data presented and in the absence of any other public data it is not possible to conclude with any confidence which scenario comes closest to reality in terms of reflecting each population of non-compliers. However, for the purpose of further analysis and discussion in this article it is assumed that in the region of 40% of unclaimed credit is attributable to non-lodgers at an average amount of tax credit of AUD 2,000-3,000 per individual; applying these assumptions gives an estimate in the range of 1.0-1.5 million wage earning individuals who should lodge a tax return but fail to do so.

Should this estimate prove reasonably accurate, it is concerning that the tax affairs of such a large number of the individuals lack a level of official 'finality and certainty' for each financial year notwithstanding the fact that many of them may, at the end of the day, have no net tax liability. The income tax system relies fundamentally on the principle of self-assessment and, seemingly, many citizens are failing to meet the standard expected. This is especially relevant in circumstances where an individual's assessed taxable income (and related income measures) are used widely across government for a range of other purposes (e.g., transfers, loan repayments, and health insurance).

One group of individuals where there would appear to be an issue with the non-lodgement of returns concerns those aged under 24 as shown in Figure 9. Following the global financial crisis in 2007-08, the proportion of individuals under 30 years of age lodging returns declined although the rate of decline since 2012-13 appears to have stabilised following an increase in the tax-free threshold from AUD 6,000 to AUD 18,200. This decline in younger individuals filing returns could in part be associated with the large increase in unclaimed tax withholdings in that same year (shown in Table 15). Just why clearly needs further study as part of the tax gap project and could be related to the misconception that their aggregate income is less than the tax-free threshold despite already having substantial tax withholdings on income earned.

Fig. 9: Disappearing Young Tax Filers
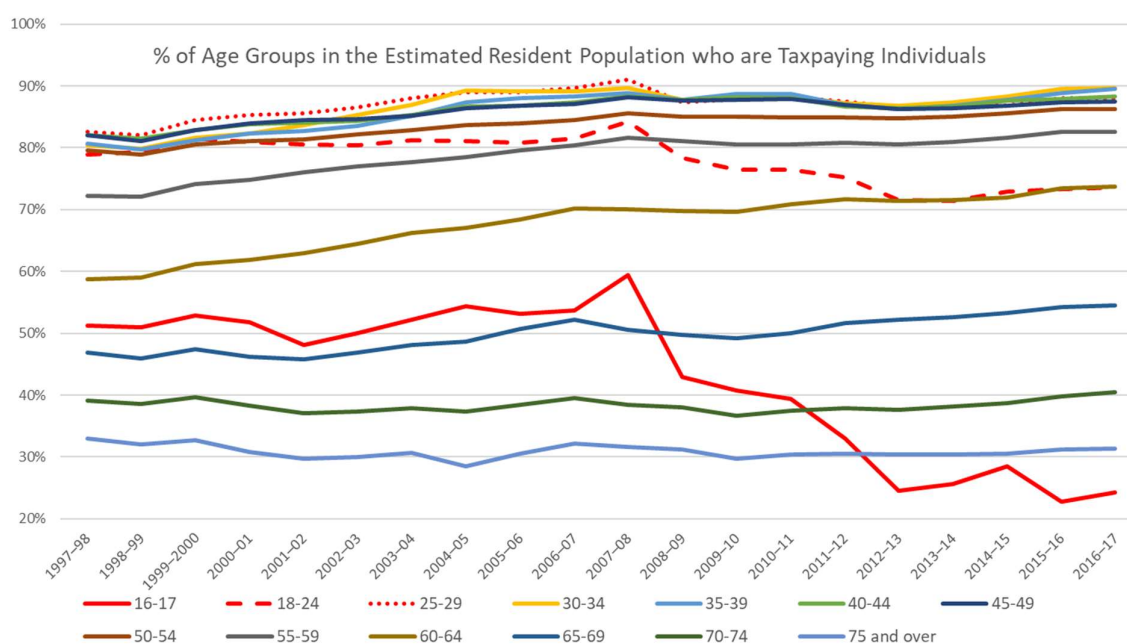
Source: ABS 3101.0 Australian Demographic Statistics; ATO (2019).

One final aspect on individuals' compliance with their lodgement obligations concerns the requirement to lodge returns on time. The tax law sets out clear rules specifying the due date for the lodgement of tax returns, while the Commissioner of Taxation is empowered to grant extensions of time to individuals or certain classes of taxpayers where their circumstances justify such action. For example, in practice tax agents (who prepare over 70% of all individuals' tax returns) are granted extended periods of time (i.e., up to 11 months after the end of the financial year) to lodge the tax returns of their clients provided certain criteria are met. In general, individuals who prepare their own return are required to lodge a return by 31 October (i.e., within four months of the end of the financial year).

According to the ATO, between 82-83% of returns are lodged on time each year. However, this measure pays regard only to the population of individuals who lodge their returns within 12 months after the end of the relevant income year. When account is taken of the additional returns lodged more than 12 months after the end of the relevant income year (all of which can be considered 'late'), the total population of returns lodged late is substantial in relative terms. Table 17 sets out data in respect of the 2014-15 year of income to indicate the scale of this recurring non-compliance issue – some 3.3 million individuals (almost 24% or roughly one in four individuals).

Table 17: Estimates of Individuals Income Tax Returns Lodged Late, 2014-15

Measure	2014-5 Returns Received and Processed			
	By 30 June 2016	By 31 Oct. 2016	By 31 Oct. 2017	By 31 Oct. 2018
Total returns processed (000)'s	12,900 (est.)	13,214	13,747	13,967
Total late returns processed (000's)	2,257	2,571	3,104	3,324
Total returns lodged on time (%)	82.5	80.5	77.4	76.2

Sources: ATO Taxation Statistics 2014-15, 2015-17 and 2016-17; and Commissioner of Taxation (2017), p. 100.

By aggregating estimates of the population of returns lodged late and the number not lodged at all, it can be demonstrated that in the region of 5 million individuals (over 30% of the estimated total population of individuals) either lodge returns late or not at all. While the overall amount of revenue leakage associated with this non-compliance appears to be insignificant in relative terms given the operation of employer withholding arrangements, taxpayers' tardiness in lodging their tax returns impedes proper functioning of the tax and transfer systems and would seem in need of reform. In particular, arrangements characterised by a more dynamic and timely use of technology and the ATO's vast data holdings might potentially have a major role to play in transforming this area of tax administration. Ideas for responding to the deficiencies highlighted are set out in section 6.

6.   ADDRESSING THE INCOME TAX GAP CHALLENGES

Measuring and identifying the causes of tax gap is only the beginning of our understanding of the important contribution tax gap research can provide to improving the design and administration of different taxes and their inter-relationships. In this section, attention is given to identifying potential policy reforms to the income tax system (section 6.1), changes in its administration (section 6.2), and to broader reforms designed to address how the income tax interacts with other taxes and transfers that use income as the base for determining entitlements (section 6.3).

6.1   Policy reforms needed to reduce the tax gap

The insights provided in this article, drawn from the ATO's published tax gap findings and related projections and the ATO 2% individuals sample file, indicate that the individual income tax net tax gap of at least AUD 18 billion in 2016-17 is equivalent to 7.8% of total theoretical tax liability and 5.2% of all taxable income. When the ATO's published findings and projections for other taxes are also considered the total revenue leakage exceeds AUD 30 billion for 2016-17. And these estimates of revenue leakage

do not account for the considerable flow-on impacts that result from the significant level of interactions between the income tax system and Australia's relatively large transfer system which includes many means-tested payments.

While it is not possible to eliminate all non-compliance, the reported tax gap findings highlight several areas ripe for policy reform, given the tax revenue at stake and potential numbers of taxpayers involved. These include deductions for work-related expenses, net rental income and the collection of student loans. Ideas for reform are discussed in the following sections.

6.1.1   Deductions for work-related expenses

As evident from the ATO's published tax gap findings and the additional insights provided in this article, reform of the rules concerning the deductibility of WRE should be a priority for government action. Simply put, considerable sums of tax revenue are lost annually because of over-claimed deductions and the associated non-compliance is too pervasive to be addressed in an effective and sustained manner using only administrative measures. There is also a significant compliance burden associated with existing arrangements where over 9 million citizens are engaged in efforts to understand their correct WRE entitlements, maintain records of expenditure, and/or visit tax agents and prepare claims in tax returns, very often for relatively small amounts of tax. More broadly, the very high incidence of itemised WRE deduction claims is a major impediment to fundamental reform that would enable significant automation of the personal income tax system for many millions of taxpayers, as recommended in the Australia's Future Tax System Review Panel's report (Pt 2, Vol. 1, 2009, p. 55) and in line with global best practice:

> Under the current framework, there are significant difficulties in correctly quantifying work-related costs, in apportioning expenses between income-earning purposes and private purposes, and in defining and claiming the deductions. These complex arrangements constitute one of the impediments to further pre-filling of tax returns and, ultimately, removing the need to complete a tax return for many employees.

For the reasons indicated and in anticipation of recommended arrangements for total automation of tax returns, the Australia's Future Tax System Review Panel (2009) study recommended that the rules for WRE deductibility be tightened (Recommendation 12) and that a specific form of standard deduction be introduced to eliminate the majority of itemised WRE deduction claims (Recommendation 11). [16] In its report, the Review Panel expressed concern for the complexities associated with WRE deduction claims and the resultant compliance burden on taxpayers, ATO administration costs, and the potential for significant revenue leakage from over-claimed deductions.

Further support for reform of WRE deductions can be found in the discussion paper for the government's 2015 tax reform exercise (Australian Treasury, 2015), in the report of the House of Representatives Standing Committee on Tax and Revenue report titled

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[16] The Australia's Future Tax System Review Panel report (2009) recommended a standard deduction that would consist of: 1) a nominal base amount available to those with labour and/or capital (non-business) income who do not elect to claim itemised expenses (WREs, including some self-education expenses, and cost of managing tax affairs) above a minimum claim threshold; and 2) a proportion of labour-related income up to a capped amount (the claims threshold).

Taxpayer engagement with the tax system (2018, p. iv) and in the Inspector-General of Taxation's recent study *The future of the tax profession* (2018, Recommendation 5.2). In its 2017 report titled *Report on the inquiry into tax deductibility*, the House of Representatives Standing Committee on Economics also acknowledged that there were major issues to be addressed concerning deductions for WRE and recommended more fact gathering to help determine the nature of the response required.

Having regard to ATO's tax gap findings and in line with the views in the Australia's Future Tax System Review Panel report (2009) regarding the need for simplification, several reform options that should be considered as a matter of some urgency are:

1) tighten the rules for deductibility of employees' WRE;

2) establish a minimum claim threshold, set at a level to eliminate the large volume (Table 18) of relatively small value claims (that cannot be verified administratively); and/or

3) introduce a standard deduction, along the lines recommended in the Australia's Future Tax System Review Panel report (2009).

If adopted, savings from these measures could contribute to a lowering of marginal tax rates and/or adjusting their respective thresholds. In addition to reducing income tax revenue leakage, reform of WRE could have flow-on impacts to the administration of other government revenue streams (e.g., the collection of student loans and the payment of various means-tested transfers).

Table 18: Individuals Not in Business (INIB) with WRE Deduction Claims

Value of WRE Deduction Claims (AUD)	Proportion of WRE Claims (%)	Proportion of Total WRE Claims (%)	Proportion of Total Taxable Income of WRE Claimants (%)	Proportion of Total Tax Relief from WRE Claims (%)
1-500	31	3	25	3
500-1,000	16	5	14	4
1000-1,500	10	5	10	4
1500-2,500	12	9	12	9
2,500+	31	78	39	80
All	**100**	**100**	**100**	**100**

Source: ATO 2% individuals sample file and authors' calculations

6.1.2   *Income from rental properties*

Section 5.1 of this article drew attention to the ATO's published tax gap research findings for the individual income tax and net rental income, wherein significant understatements were identified, pointing to estimated tax revenue leakage of AUD 1.5 billion in 2015-16. However, this amount understates the full value of the rental income tax gap for individuals as it excludes the taxpayer segment 'individuals in small business'. Assuming a similar rate of non-compliance for both taxpayer segments, the total rental income tax gap is estimated at around AUD 2.5 billion in 2016-17 (section 5.1.2). While at first glance this level of non-compliance and related tax leakage may

be surprising to many observers, when viewed in a broader context the gap estimate can be easily explained.

Over 2 million individuals taxpayers report net rental income in their returns each year and neither payments of rental income nor interest charged on mortgages, the major expense item in respect of such income, are subject to any form of systematic third-party reporting to the ATO as is the case for most other significant categories of income. In the absence of such reporting and given the very low rates of audit coverage of these taxpayers, almost all this reported income and expenditure goes unverified each year. For the 2016-17 income year, the ATO Taxation Statistics (2019) indicate that over 2.2 million taxpayers reported around AUD 44 billion of rental income and claimed deductions against such income of over AUD 47 billion, including AUD 22 billion in respect of mortgage interest paid to lenders. And these amounts do not take account of the net rental income received by entities.[17] The ATO has, in the past, drawn attention to non-compliance with net rental income; most recently, the government responded in the 2017-18 Budget to address one aspect of non-compliance with net rental income (i.e., proprietors' travel expenses). However, recent tax gap findings point to the need for further action.

Under current tax laws, a wide variety of income types and other amounts are subject to third-party reporting obligations to the ATO and a number of these (e.g., interest and dividends) are less significant in monetary terms than rental income, much of which is collected via real estate/property agents.[18] While there is limited third-party reporting in the current tax system for items other than amounts of income, financial institutions are already obliged to report interest income paid to investors and it does not seem a significant additional burden to introduce a reporting obligation in respect of mortgage interest paid on investment-related properties, given the incidence of negative gearing and tax revenue at risk.

Third-party reporting obligations, supported by a robust system of matching with taxpayer records, are a proven means of detecting and deterring non-compliance and their extension to rental income and mortgage interest payments would, in addition, complement the ATO's current initiatives targeting the prefilling of tax returns.

6.1.3   Collection of student loans

As discussed in section 5.1.1, STSL debtors' tax returns are characterised by a fair incidence of deduction claims for WRE that have been shown to involve a high level of non-compliance. Given that Highfield and Warren (2015) highlighted that there was 'bunching' of HELP debtors around repayment thresholds (Table 19), any factors potentially contributing to tax revenue leakage directly impact repayment of STSL. With the potential of an increasing number of debtors having become eligible to make repayments from 2020 due to the reduced minimum threshold, there is the strong likelihood of even greater non-compliance in respect of WRE deduction claims along with a direct impact on the rate of repayment.

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[17] When account is taken of the rental income and deductions reported in partnership and trust returns, the value of income and deductions that potentially could be subject to third-party reporting is almost $120 billion per year.

[18] In line with this suggestion, the ATO has already taken administrative action to establish third-party reporting for digital platforms such as AirBnB to report rental income received on behalf of their clients.

Does the definition of 'repayment income' require further adjustment?

STLS repayments are calculated having regard to an individual's level of 'repayment income' which is broader than taxable income because it includes specific other amounts: i) total net investment losses (which includes rental income losses); ii) total reportable employee fringe benefits; iii) reportable super contributions; and iv) exempt foreign employment income. However, because deductions for WRE claims reduce an individual's level of repayment income any overstatement of such claims can directly reduce the amount of loan repayment properly payable on assessment (subject to the minimum repayment threshold criterion being met). This amount of deferred loans repayments is estimated at around AUD 136 million for 2016-17 (Table 11).

With the incidence of over-claimed WRE deductions by employees so high, there are strong grounds for reviewing the definition of 'repayment income'. Highfield and Warren (2015) recommended that the definition of repayment income should be expanded and consideration given to writing back all WRE deductions, or at a minimum, deductions for self-education expenses. In the absence of any substantive reform to employees' WRE deductions in their own right, a reform along these lines is considered highly desirable.

Table 19: Repayment Thresholds and Rates, 2016 to 2021

Income Year	Minimum Repayment Threshold (AUD)	Maximum Repayment Threshold (AUD)	Loan Repayment Rates (%)	Repayment at Min. Threshold (AUD)	Repayment at Max. Threshold (AUD)	Debtors Impacted (000's)
2015-16	54,126	100,520	4 to 8	2,165	8,041	530
2016-17	54,869	101,900	4 to 8	2,195	8,152	634
2017-18	55,874	103,766	4 to 8	2,235	8,301	700 (est.)
2018-19	51,957	107,214	2 to 8	1,039	8,577	800-900 (est.)
2019-20	45,881	134,573	1 to 10	459	13,457	Over 1m (est.)

Source: ATO and authors' calculations.

6.1.4   *Automation of tax return preparation and assessment*

Earlier sections of the article have drawn attention to the significant amounts of revenue leakage resulting from overclaimed WRE deductions and unreported rental income. And, as explained in section 5.3.2, there is a recurring compliance issue that sees over 3 million individuals lodge their returns late and potentially well over 1 million who simply opt out of the tax assessment process by not lodging a tax return at all. A further area of weakness results from the large compliance burden imposed on taxpayers (including those with relatively simple tax affairs), as indicated by the very high usage

of tax agents in Australia[19] and as quantified in official reports.[20] In our view, these weaknesses together provide a strong case for fundamental reform of the tax return preparation and assessment process.

The Australia's Future Tax System Review Panel report (2009) proposed a system where most taxpayers would receive a fully completed prefilled tax return '*as a default method of settling their tax affairs each year*' (Recommendation 123, emphasis added).[21] Leading up to the system envisaged, there would be a series of 'foundational' policy measures (e.g., reform of WREs along the lines outlined in section 6.1.1, the elimination of some small value deduction claims (e.g., gifts), an expanded system of (real-time) third-party income reporting, and a streamlining of some tax offsets (which has already partially occurred). With such reforms in place and the technology and data available, the ATO would be able to automatically generate tax returns for most individuals – returns that would be accurate and complete and, as a result, reflect an individual's correct tax liability. A model of how such a system could operate, drawing on knowledge of administrative approaches developed incrementally and operating for many years in overseas jurisdictions (e.g., Denmark, Norway, and Sweden) is set out in Box 1. With the arrangements envisaged, the need for this cohort of individuals to engage tax professionals would be significantly reduced.

Box 1: Transforming the Individual Income Tax Return and Assessment Process

1) Prescribed third parties (e.g., employers, financial institutions, and companies) would have an obligation to report relevant information to the ATO progressively over the course of a financial year, with final end-of-year reporting required shortly after the end of the financial year (e.g., within 14 days).

2) All taxpayers with simple affairs (as defined) would be eligible to receive a prefilled tax return.

3) Taxpayers would receive a prefilled tax returns online (e.g., accessed via the government internet portal, myGov), with their availability advised by electronic messaging. (NB: a paper version could be made available for taxpayers meeting prescribed criteria although these would be minimal in overall numbers.)

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[19] According to Taxation Statistics 2017 (ATO, 2019), the proportion of individuals that engage a tax professional to prepare their return is around 72%; this rate of usage has been relatively consistent over recent years and has not been impacted by the ATO's introduction and ongoing refinements to its system of prefilling returns as part of the electronic filing process.

[20] The most recent assessment of the magnitude of taxpayers' compliance burden for the income tax can be found in a report published by the Australian Treasury in 2015, *Stocktake of regulation: Final report*. In its report, Treasury estimated the compliance burden of individuals (not in business) at $7.3 billion per year in 2014, equivalent to around $560 for each citizen lodging an annual tax return.

[21] A similar recommendation (i.e., Recommendation 5) is contained in the final report of the House of Representatives Standing Committee on Economics Inquiry into Tax Deductibility (2017, p. xiii).

4) Prefilled tax returns would set out full details of a taxpayer's income, the quantum of their standard deduction (if relevant), any tax offsets and credits. There would also be a preliminary computation of net tax liability, including details of any refund potentially payable.

5) Taxpayers would be required to simply confirm (electronically) the accuracy and completeness of the information displayed in their prefilled return. ***For most taxpayers, the prefilled return would be fully accurate and complete***; where this was not the case, taxpayers would be under an obligation to provide the further information required to determine their correct tax liability. In both situations, the requirements on taxpayers would constitute an act of 'self-assessment'.

6) Once taxpayers had confirmed the accuracy of their prefilled tax return, any refund due would be paid to them shortly thereafter, directly credited to their nominated bank account. Processes would be required to deal with taxpayers who did not respond.

7) The introduction of arrangements enabling the progressive reporting of taxpayers' incomes (as described in (1) above) would provide potential for a more dynamic form of in-year monitoring of taxpayers' affairs, in particular their tax withholdings, resulting in reduced potential for downstream non-compliance (e.g., tax debts). It would also facilitate the work of government agencies responsible for the payment of transfers by enabling the earlier detection of incorrect payments.

Given the scale and nature of the weaknesses highlighted, we strongly advocate adoption of the reforms required that provide the conditions for full automation of the tax return assessment process along the lines described.

6.2   A client experience model which is *holistic* in approach

As shown in Table 8 ('Income Measures Adopted by a Range of Taxes and Transfers: 2016-17', Appendix 6), a range of Commonwealth (Australian federal government) taxes and transfers are based on income-related measures (as are a number of State-based measures). While there is high level of citizen engagement with most categories of these taxes and transfers, the system is complex and prone to errors and non-compliance opportunities. Tax gap research has demonstrated that there is a 'tax cost' resulting from errors and non-compliance but there is also a similar cost to transfers (section 5.2.1 and Table 9).

In the Australia's Future Tax System Review Panel report (2009, Pt 2, Vol. 2, pp. 697, 701, emphasis added), it was envisaged that a tax and transfer system for the 21st century 'should allow individuals to engage with it in ways that meet their needs and preferences – *a citizen-centric design*. It should help people make informed decisions that are in their best interests. It should be transparent and trusted in its operation and aligned with the "natural systems" of individuals and businesses (the things they do anyway)'. For example, information held in in the systems of government agencies and flows between them should be visible to clients – people need to know what information provided by third parties has affected their taxation position or their transfer entitlements.

The Australia's Future Tax System Review Panel report acknowledged that a major barrier to reform was the traditional 'agency-by-agency' approach to developing and delivering government services, which still appears to be much in place. It envisaged the need for a new more holistic (whole-of-system) approach that brought together policy design and implementation across agencies and portfolios to achieve the transformation envisaged.

In seeking to lay a path for future developments, the Australia's Future Tax System Review Panel report (2009) concluded that a focus on six enablers would position Australia to deliver an improved client experience when engaging with the tax and transfer system. In brief, these were:

1. The development of a tax and transfer client account for every citizen and the increased use of defaults and nudges, including prefilled tax returns.

2. Policy changes to align definitions and processes and to simplify rules for determining tax liabilities and transfer entitlements.

3. Greater use of real-time third-party reporting.

4. Information standards to support interoperability.

5. A modern privacy and secrecy framework.

6. Institutional reform.

Adoption of these recommendations would do much to reduce the income tax gap, and a possible catalyst for such changes could be the development of a single client account applied across all governments – federal, state, and local. The Australia's Future Tax System Review Panel report (2009) recommended such a policy at the federal level in 2009, arguing that all citizens should have a single client account (or possibly a structure of accounts) with government, which could be viewed and managed online. This would provide convenient access to information about all their tax and transfer affairs and help them better and sooner understand the breadth of their obligations. The account would also provide access to all third-party information reported to government that was relevant to their tax obligations and transfer entitlements.

While new and revamped third-party reporting measures have been introduced in recent years (e.g., Taxable Payments Annual Reporting (TPAR)[22] and Single Touch Payroll[23]), tax gap analysis has shown that there is a strong case for expansion of reporting in respect of other important compliance risk areas such as rental incomes and further categories of business and self-employment income. The Australia's Future Tax System Review Panel report (2009, Pt 2, Vol. 2, p. 711) emphasised that 'closer to real-time' reporting, as opposed to annual reporting, of such information and the visibility of these flows through a person's client account would enable the system to be more responsive to changes in circumstances and more transparent to individuals.

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[22] ATO, 'Taxable payments annual report (TPAR)', https://www.ato.gov.au/business/reports-and-returns/taxable-payments-annual-report/ (accessed 25 January 2023).
[23] ATO, 'Single Touch Payroll', https://www.ato.gov.au/Business/Single-Touch-Payroll/ (accessed 25 January 2023).

This third-party reporting of client data would also need to be timely; a current weakness of the existing tax legislation on the reporting of investment income (by financial institutions and public companies) is that it only needs to be reported on an annual basis. It should not be difficult in this digital age to require payments made to investors to be reported contemporaneously to the ATO, as is now the case with employers when reporting employment income.

7. CONCLUSION: TAX GAP SHOULD INFORM MAJOR TAX POLICY AND ADMINISTRATION REFORMS

As demonstrated in this article, the preparation of tax gap estimates provides broad-ranging and evidence-based insights into taxpayers' non-compliance with current income tax laws, as well as pointers to the design and administrative limitations of other taxes and transfers that use taxpayer's income as their base. Moreover, it highlights the complex ways in which individuals may behave in response to aspects of tax (and transfer) design. The net benefit, from a revenue agency perspective, is a substantially increased level of knowledge of taxpayer behaviour and administrative effectiveness, that supports its management of compliance and risks and ability to account for its performance. From a tax policy perspective, tax gap provides valuable feedback on the appropriateness of existing policy design and its administrability, and benchmarks against which to assess future policy reforms. By adding to the basket of indicators available to both policy-makers and administrators to assess tax system health, tax gap strengthens overall accountability for tax system performance.

Particularly in today's digital era, further exploitation of tax gap analysis methodologies can provide governments with whole-of-system insights into the overall effectiveness and health of the tax and transfer system and related compliance (and non-compliance) behaviour. As demonstrated in section 5, there are extensive linkages and relationships between the tax and transfers system, not to mention numerous other areas of citizens' responsibilities impacted by government regulation (e.g., superannuation, child support obligations, and student loans). And these relationships extend vertically to governments at the subnational level where taxes are applied on a similar base (e.g., employment income subject to State payroll tax). With the ongoing imperative for all governments, especially in the post-COVID 19 environment, to reduce burgeoning government debt balances by enhancing the management of their respective revenue and expenditure systems, it is inevitable that new ways must be found to manage these mutually independent revenue systems. Tax gap methodologies offer the tools to build the case for these new approaches.

With the foregoing perspectives in mind, Figure 10 summarises the potential lessons from a comprehensive program of tax gap analysis for short-term, medium term and longer-term planning horizons that could help guide governments in their response to frontier challenges arising from the ascendancy of the digital economy and other developments.

In relation to INIB, the availability of individual income tax gap estimates (and those for other taxes) poses several obvious questions: are they of a sufficient scale to justify further attention? If so, are existing administrative responses adequate for their mitigation? If not, what additional administrative responses are required or is the non-compliance of sufficient magnitude (i.e., monetary scale and numbers of taxpayers impacted), complexity, and urgency as to warrant policy reform?

As set out in this article, much of the non-compliance evident from the individual income tax gap research findings to date and analyses in this article indicates that the issues are systemic and well entrenched and involve very large numbers of taxpayers, to the extent that their effective mitigation is beyond an administrative response only – policy reforms are required.

In this context, repair of the tax system to address longstanding and costly areas of weakness in tax compliance assumes high importance and warrants urgent consideration of appropriate policy responses. In particular, policy reforms concerning employees' work-related expenses and unreported rental property income justify urgent attention given the potential dual benefits that await to be reaped – significant additional tax revenues and a much-enhanced capacity to reform the income tax return preparation and assessment process for most individuals (section 6). With a sizeable and continuing large fiscal deficit confronting the Commonwealth government for the foreseeable future because of the impact of COVID-19 pandemic and more employees working from home, there is a clear priority to learn the lessons coming from income tax gap analysis and prioritise policy responses to reduce tax gap – not just administrative reforms.

Fig. 10: Tax Gap Insights into Frontier Challenges

	SHORT-TERM: PERFORMANCE AND ADMINISTRATIVE CHANGES	MEDIUM-TERM: TAX POLICY REFORM	LONG-TERM: BIG PICTURE ENTITY-CENTRIC SYSTEM ACROSS GOVERNMENT
Future frontier challenges	Administration performance measurement Data oversight	Client experience model Comprehensive real-time data collection Policy performance	Complex inter-related (mutually inter-dependent) revenue systems (tax base focus but not just tax)
Tax gap facilitated responses	Tax gap research provides feedback organizationally both for the short run - from data collection and disaggregation - and long run - through trends revealed and what it brings to accountability and transparency from its publication. Data demands of tax gap force a unified and real-time approach to data collection.	Tax gap highlights the benefits from adopting a client experience model administration where each client is linked (using a single all-of-government client identifier) to the broad base on which like taxes (and transfers) are imposed, not on the basis of a particular tax. Tax gap reduction requires third-party data from multiple sources which, when collected in real-time, can enable preparation of automated assessments for both annual tax liabilities as well as regular transfer payment entitlements. Tax gap can inform tax policy on the benefits of 'compliance by design' approaches, forcing an awareness of inconsistently defined bases and the need for taxes to be attributed to an entity. It can also contribute to a better understanding of how different aspects of the same base are taxed and managed with appropriate responses.	Tax gap enables **mapping of** interactions arising from use of the same base components by different taxes, interactions between different base components, as well as interaction with transfer payments using shared base components using a unique client number.

Source: Authors' compilation

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9.   APPENDICES

APPENDIX 1: METHODOLOGY FOR ALLOCATING THE INDIVIDUAL INCOME TAX GAP FOR 2016-17

Step 1: projecting the 2015-16 individual income tax gap to 2016-17

To allocate the net tax gap across the 2016-17 ATO 2% sample of income taxpayers, the 2015-16 estimates need to be projected up to the 2016-17 financial year. This is undertaken using data published by the ATO in its publication Taxation Statistics 2016-17 (2019).[24] However, considerable care needs to be taken in using these data. This is because the data reported for 2016-17 represent only those returns processed within 16 months after the end of the financial year (to 31 October 2018) while the corresponding data for 2015-16 represents returns processed within 28 months of that income year. Only the data for 2014-15 in Taxation Statistics 2016-17 approximates to the full population of taxpayers for a financial year. Using this knowledge and the Taxation Statistics published on the ATO website for 2012-13, 2013-14, 2014-15, 2015-16 and 2016-17, the revisions apparent each year for the last two years of the data reported in each Taxation Statistics release are used to estimate the likely full population of taxpayers for the 2016-17 financial year after all taxpayers have lodged their returns.[25] The results of these projections for 2016-17 are in Table 3.

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[24] ATO Taxation Statistics are reported at: https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Taxation-statistics/ (accessed 25 January 2023).

[25] For example, in the 2014-15 Taxation Statistics, the data reported for 2014-15 relates to that 16 months after the end of the 2014-15 fiscal year. In the 2015-16 Taxation Statistics, the data reported for 2014-15 relates to that 28 months after the end of the 2014-15 fiscal year while in the 2016-17 Taxation Statistics data reported for 2014-15 relates to all tax filers assumed to be filing returns for 2014-15. Using this

Step 2: adjusting the 2% individuals sample file

The tax gap estimated for 2016-17 must be allocated to a sample of all taxpayers. However, the 2016-17 ATO 2% individuals sample file[26] relates only to a sample of (277,202) individuals who had lodged their 2016-17 individual income tax returns by 31 October 2018, some 16 months after the end of the relevant financial year. This represents a population of 13.87 million individuals. To allocate the tax gap estimates in Table 3 for 2016-17 to all taxpayers, the sample needs to be reweighted to reflect the population of taxpayers after all filers have filed their returns. Using the methodology outlined in section 3.1, this results in an estimate of 14.58 million individuals, meaning that the coverage achieved by the 2016-17 ATO 2% individuals sample file is 95.117% of the population or equivalent to a sample of 1.902% of all tax filers. It is important to acknowledge that this approach assumes that those who have not yet lodged a tax return are similar in nature to those who lodged their returns within the 16-month period after the end of the financial year.

Step 3: allocating income tax gap to individuals lodging income tax returns

Table 3 details the tax gap attributed by the ATO to IISB and INIB filers in 2015-16 and our projection of the aggregate tax gap estimate to 2016-17. The tax gap for 2016-17 must now be allocated to the 1.902% individuals sample file for 2016-17. The approach adopted in this article involves first segmenting the sample into INIB and IISB and secondly, applying to each group the level of non-compliance reported by the ATO in the random enquiry program associated with their gap estimates.

The ATO defines the INIB taxpayer population as all those individuals with only salary and wages, government transfers and some simple passive income, such as dividend, interest, rental income annuities. Using this definition, 26.2% of the 1.902% sample of taxpayers (277,202) are attributed to the IISB taxpayer population and 73.8% to INIB. It is important to note that because of the ATO's definition of INIB any individual with more than AUD 1 of business income is assigned to the IISB population. The individuals sample file also only includes individuals who lodge tax returns, not people outside the tax system (POTS). The estimate of that part of the tax gap shown in Table 2 attributed to POTS cannot, therefore, be allocated to individuals in the sample file.

In terms of the assumptions about non-compliance by taxpayers, if it was assumed (unrealistically) that all individuals are non-compliant, then the tax gap estimated by the ATO could simply be distributed between individuals based on their share of the variable associated with the tax gap. However, in practice the incidence of non-compliance varies between groups of individuals and potentially between income, deductions, and tax reliefs.

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knowledge, the average level of revisions across the variables in the taxation statistics for 4 years can be determined relating to revisions between (a) 16 months and the 28 months reporting period data and (b) 28 months and the outcome when individuals have lodged all returns. The averaged revisions to the taxation statistics variables estimated in (a) and (b) are then used to project the 16 months of data reported in 2016-17 Taxation Statistics results for 2016-17, to what they will be based on previous experience, when filers have lodged all returns for 2016-17 (the second column in Table 3).

[26] https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Taxation-statistics/Taxation-statistics---previous-editions/Taxation-statistics-2016-17/?anchor=Individualssamplefiles#Individualssamplefiles (accessed 25 January 2023).

For the INIB population, the ATO reported that '[i]n the full sample of 1,403 cases the incidence of adjustment was 75%, with 80% of agent-prepared returns being adjusted. This compares with 61% of returns adjusted for people who prepared their own tax (self-preparers)'.[27]

In allocating tax gap between taxpayers in the 1.902% sample file, it has been assumed that for INIB, 80% of those using an agent are non-compliant in their filed return and for self-preparers, 60% are non-compliant. Since there is no disaggregated information available on where this non-compliance originates, we have assumed it is across their whole filed return and proportional to the aggregate trend identified by the ATO in their tax gap estimates.

As a result, 80% of INIB taxpayers with a tax agent and 60% who are self-preparers are randomly selected and the aggregate tax gap for INIB is then distributed across INIB based in the randomly selected filers share of the variable assumed associated with this gap. There are a number of limitations of this approach including that non-compliance could be across 100% of filers but varying as to where it might be. Equally, some groups might be much more non-compliant than others. This will mean that any distributional impact analysis must be heavily qualified. Also, any revenue estimates are likely to be impacted as the effective average marginal tax rate is likely to vary (and therefore the estimate of associated income) between each case.

In the case of IISB, the allocation approach is more complex as the sources of the tax gap reported by the ATO are not disaggregated to the same level of detail. All that is reported is that 76% of net tax gap is related to income, 14% to deductions, 4% to non-pursuable debt, and 7% for individuals outside the tax system (as noted previously). To overcome this lack of data, the assumption is made that rates of mis-reporting evident for IINB taxpayers in respect of WRE and rental income and deductions apply equally to IISB taxpayers such that when this is applied, the residual relates directly to business income. The results from this approach are shown in Table 3 with AUD 3,102 million of AUD 6,928 million tax gap unreported by IISB being allocated to business income. This assumption is not unreasonable because assigning taxpayers with one or more dollars of business income to IISB means that there are many individuals whose circumstances are not too different from those classified within the INIB taxpayer population.

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[27]   https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Tax-gap/Individuals-not-in-business-income-tax-gap/?anchor=Trendsandlatestfindings#Trendsandlatestfindings (accessed 25 January 2023).

APPENDIX 2: DEMOGRAPHIC FEATURES AND ASSOCIATED TAX GAP IMPACTS OF SELECTED TAX RETURN ITEMS

This Appendix sets out additional insights and supporting data concerning selected demographic features (e.g., age, gender, region of residence) of taxpayers' returns that disclose: 1) deduction claims for work-related expenses (WRE); 2) net rental income; and 3) net business income; and associated tax gap projections, drawing on the published findings of the ATO's tax gap research program.

The authors acknowledge that there is a degree of uncertainty associated with the underlying approach for this analysis and related observations. First, the ATO's tax gap sample for 2015-16 was fairly small and stratified only by income levels and agent/non-agent usage for return preparation purposes. While the overall size of the sample was sufficient to be assured that the overall gap estimates are representative of the population at large, examining each strata at a finer level entails the use of smaller sample sizes and, as a result, larger confidence levels. The highly skewed nature of tax gaps in practice, as reported by the ATO in its published findings, provides further uncertainty as to the representativeness of small sample sizes in a strata. Second, due to data limitations the authors were not able to confirm whether the tax gap sample used for 2015-16 was representative of other variables explored in Appendix 2 (i.e., age, gender, region (broadly defined), and occupation (broadly defined). They could be, but they may not be.

Work-related expenses (WRE) deductions

Taxpayer age (Figure 11): Across all taxpayers, the incidence rate of WRE claims is at its highest level for taxpayers aged 20-29, 30-39 and 40-49 years and, not surprisingly, falls away significantly for taxpayers aged over 59 years. However, average WRE claims are much higher for taxpayers aged 30-39 years and the WRE tax gap is at its highest level for taxpayers in this age group. For tax agent-prepared returns, both the incidence of WRE claims and their relative value (% of taxable income) are higher than self-preparers across all age groupings and, in particular, for taxpayers aged 20-29 years.

Fig. 11: Age, WRE and Related Tax Gap
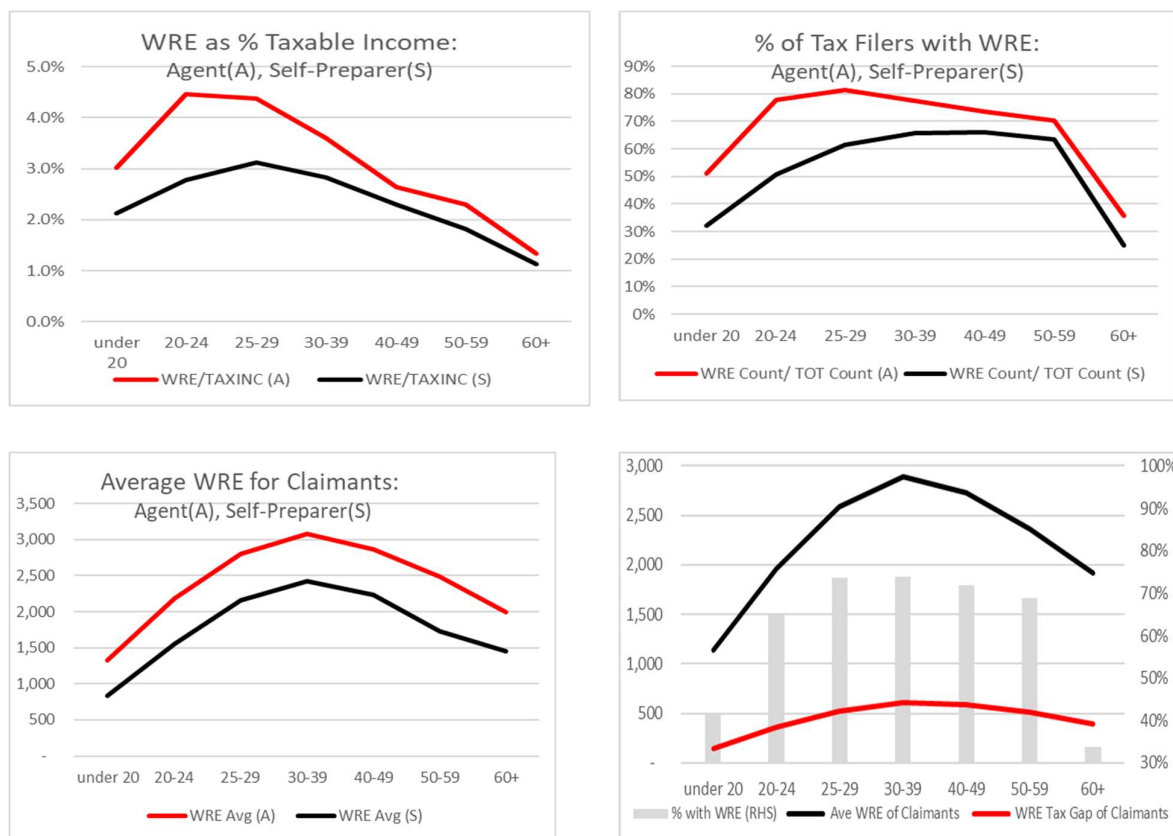
Taxpayer gender (Figure 12): Overall, average WRE claims of male taxpayers are some 50% higher than for female taxpayers, while the incidence rate of WRE claims is broadly similar (between 62-65%). These two factors contribute to a marginally higher (i.e., around 20%) average WRE tax gap for males. For tax agent-prepared returns, the incidence of WRE claims, their average claim value, and average WRE tax gap are substantially higher for male taxpayers.

Fig. 12: Gender, WRE and WRE Tax Gap
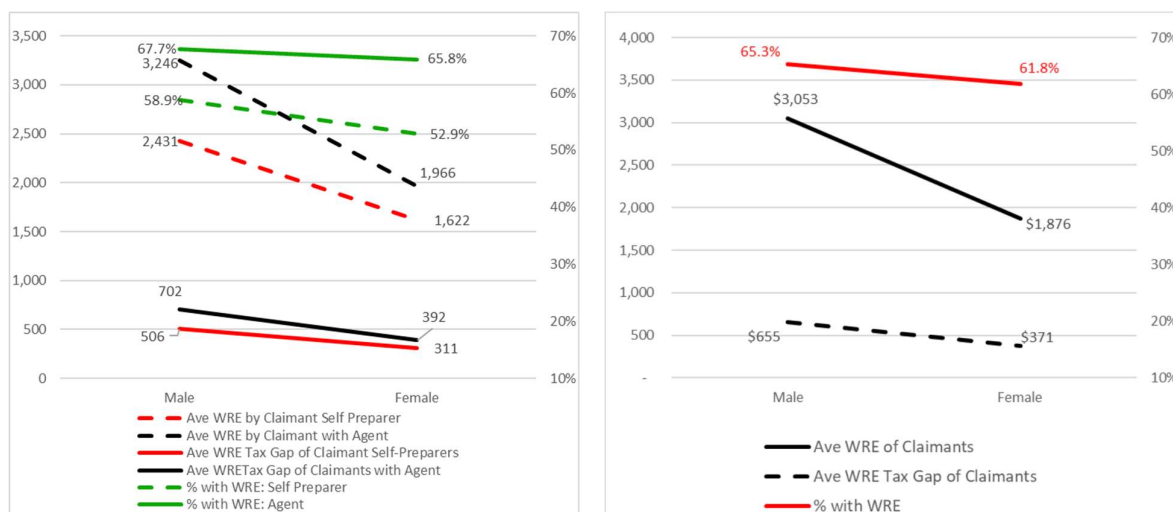
Region of residence (i.e., major urban, regional urban, or rural) (Figures 13 and 14):
For all taxpayers, the data reveal only minor differences across the three regional groupings. Both the incidence rate and average claim value are broadly similar across the three regional groupings, while the marginally lower tax gap impact of WRE claims in regional urban areas is most likely attributable to the lower average incomes (and associated marginal rates of tax) of taxpayers in this regional grouping. For tax agent-prepared returns, the incidence of WRE claims, their average claim value, and average WRE tax gap are marginally higher in major urban regions.

Fig. 13: Region, WRE and Related Tax Gap
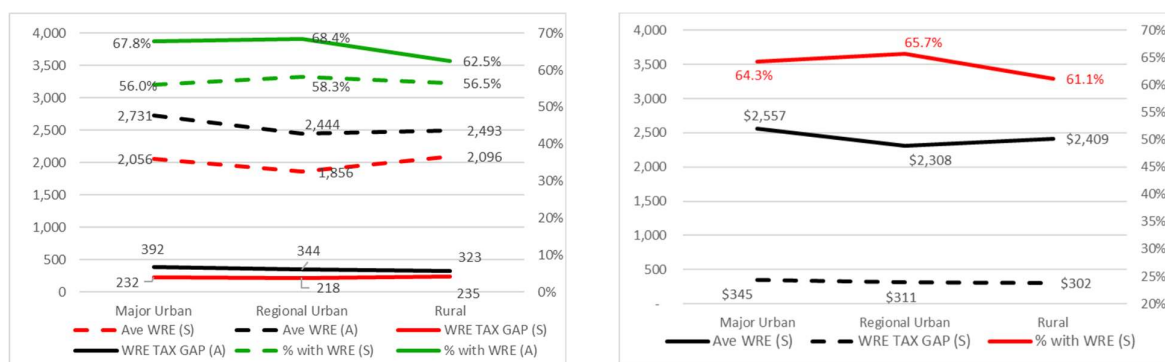
Fig. 14: WRE Tax Gap for Selected Demographic Groups of Taxpayers
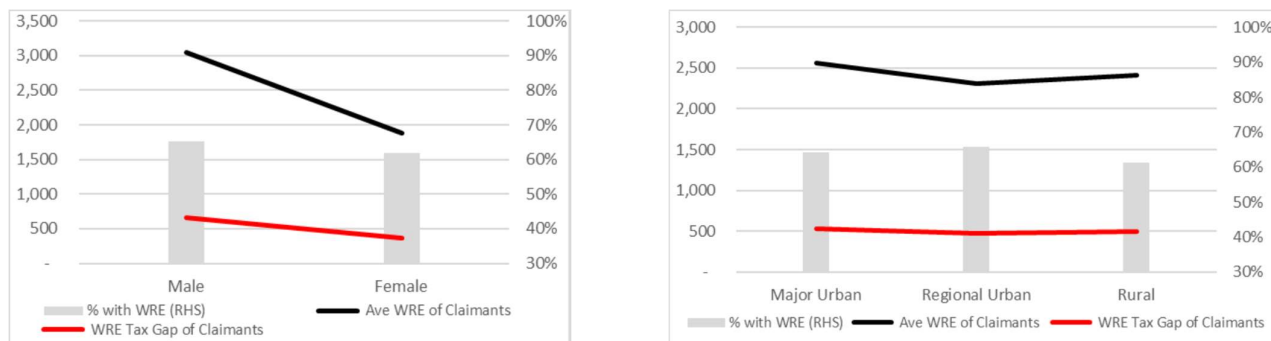
Occupational groupings (Figure 15): The average WRE claim value varies significantly (i.e., by a factor of 100%) across occupational groupings, with significantly higher averages observed mainly for taxpayers in 'white collar' groupings (i.e., managers and professionals); similar but less pronounced differences are observed in relation to the incidence of WRE claims and the average WRE tax gap.

Fig. 15: Occupational Groupings, WRE and WRE Tax Gap
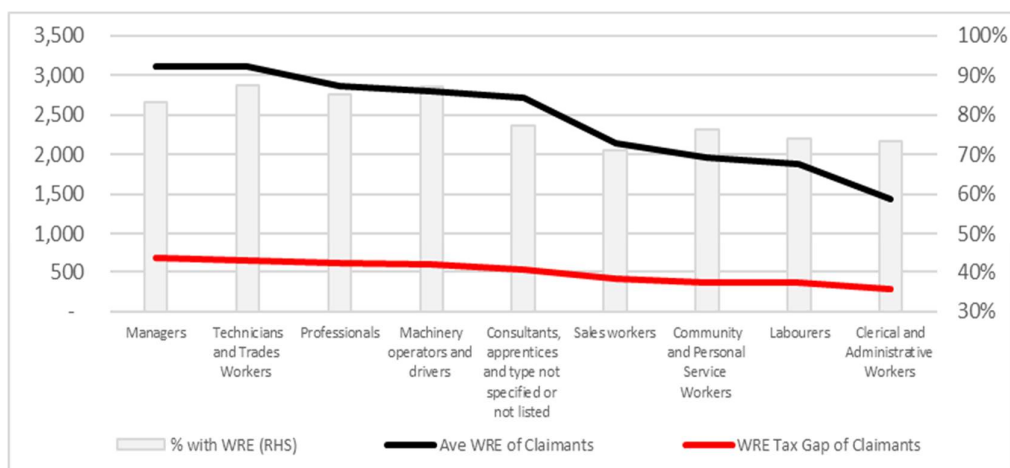
Net rental income

Taxpayer income and tax agent usage (Figure 16): Unsurprisingly, tax agent usage rises in line with increasing taxpayers' incomes, exceeding 85% at the top end income ranges, and a similar pattern is observed for the average business income tax gap. The average tax gap for self-preparers is consistently and substantially lower (in a relative sense) than that of taxpayers using agents across all income levels.

Fig. 16: Income, Net Rental Income, and Related Tax Gap
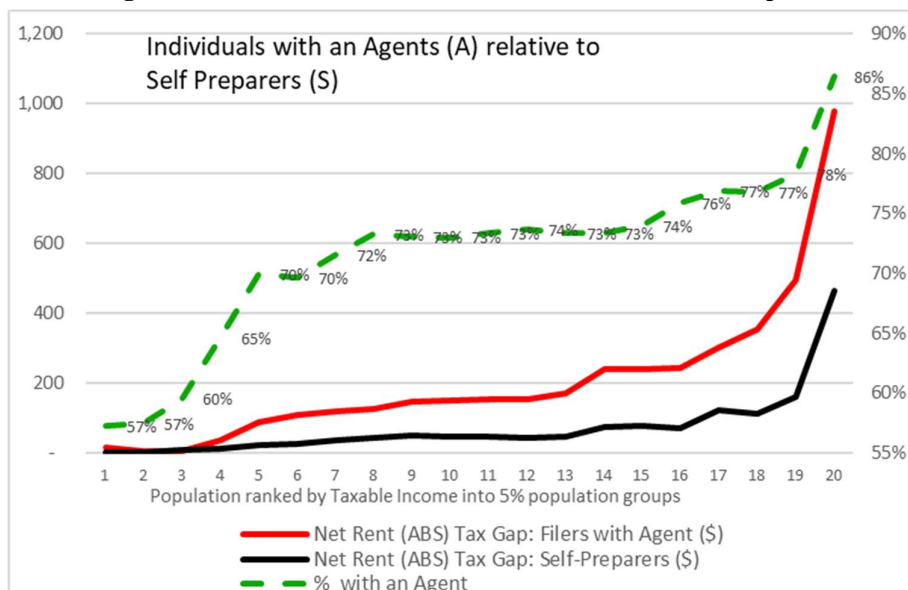
Taxpayer age (Figure 17): Across all taxpayers, both the incidence rate of net rental income and amount of average rental income reported all increase consistently across age groups up to 50-59 years, with the latter measure falling significantly for taxpayers over 60 (i.e., in/approaching retirement). For tax agent prepared returns, both the incidence rate of net rental income and amount of average rental income reported are significantly higher than self-preparers across all age groupings. While projected average tax gaps are higher than those of self- preparers across all age groupings the differences are not significant.

Fig. 17: Age, Net Rental Income, and Related Tax Gap
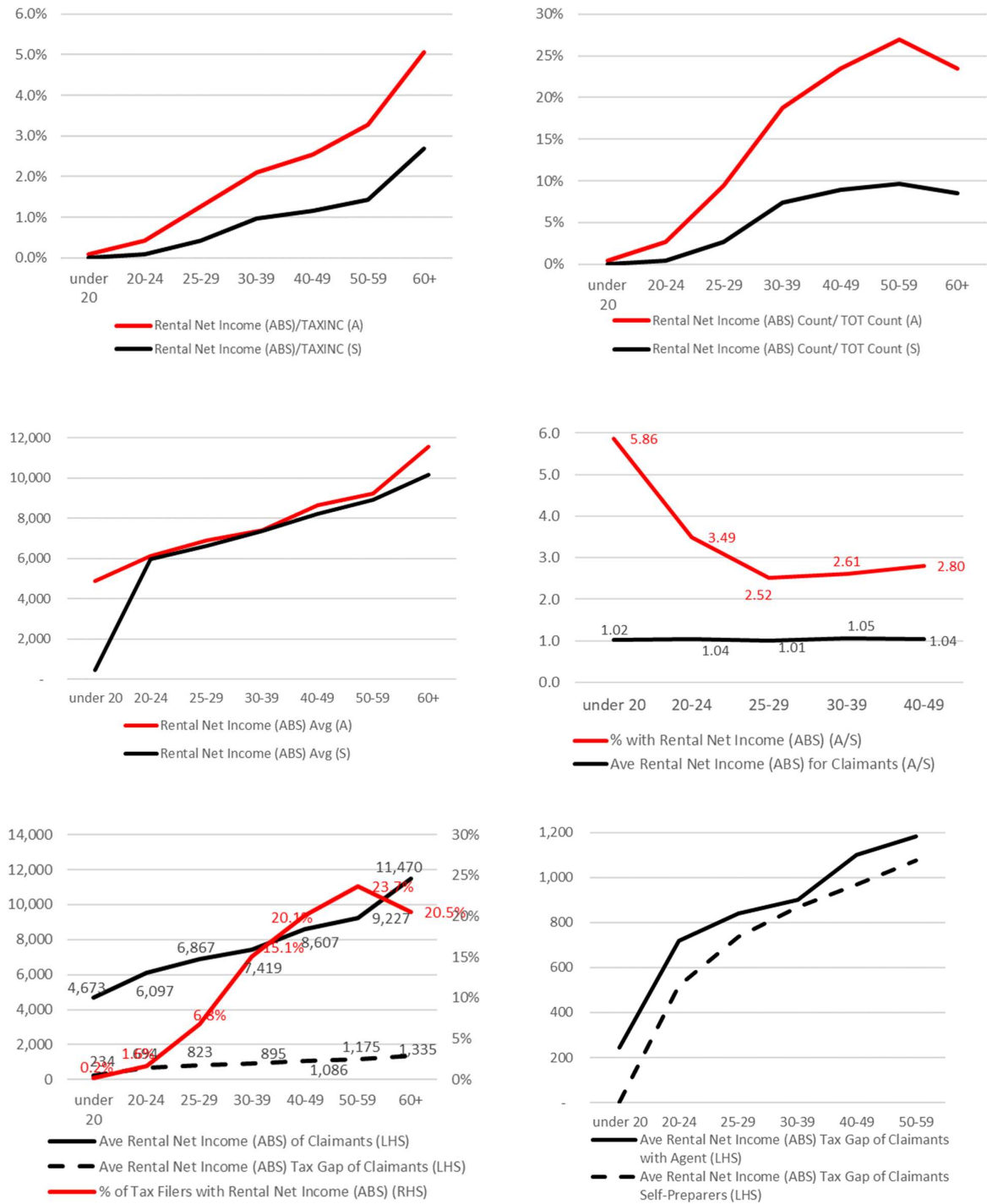
Gender (Figure 18): Overall, average net rental income of males is almost 20% higher than for female taxpayers, while the incidence rate is broadly similar (16.1% to 15.5%). With higher incomes in general, the average rental income tax gap is over 30% higher for male taxpayers. For tax agent prepared returns, the incidence of net rental income is marginally higher for female taxpayers (20.1% to 19.6%); however, both their average rental income reported and average rental income tax gaps are projected at between 10-20% lower.

Fig. 18: Gender, Net Rental Income and Tax Gap
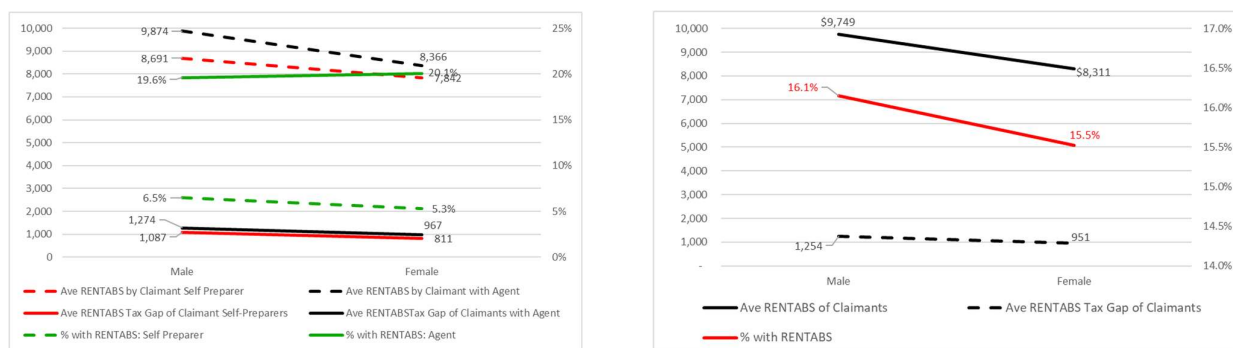
Region of residence (i.e., major urban, regional urban, or rural) (Figure 19): Average rental income value, the incidence rate of average rental income, and the average rental income tax gap all are substantially higher for taxpayers living in major urban regions in contrast to taxpayers in rural regions.

Fig. 19: Region, Net Rental Income and Tax Gap for Claimants (A: Agent, S: Self-Preparer)
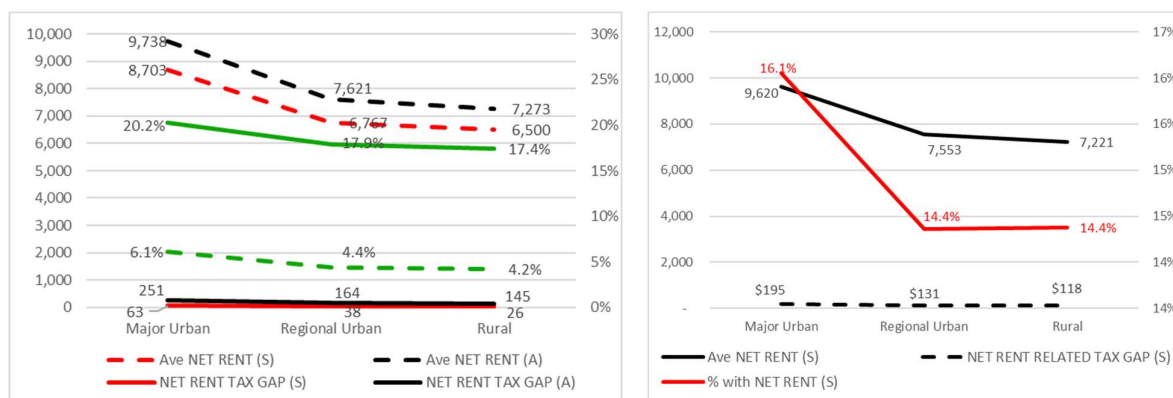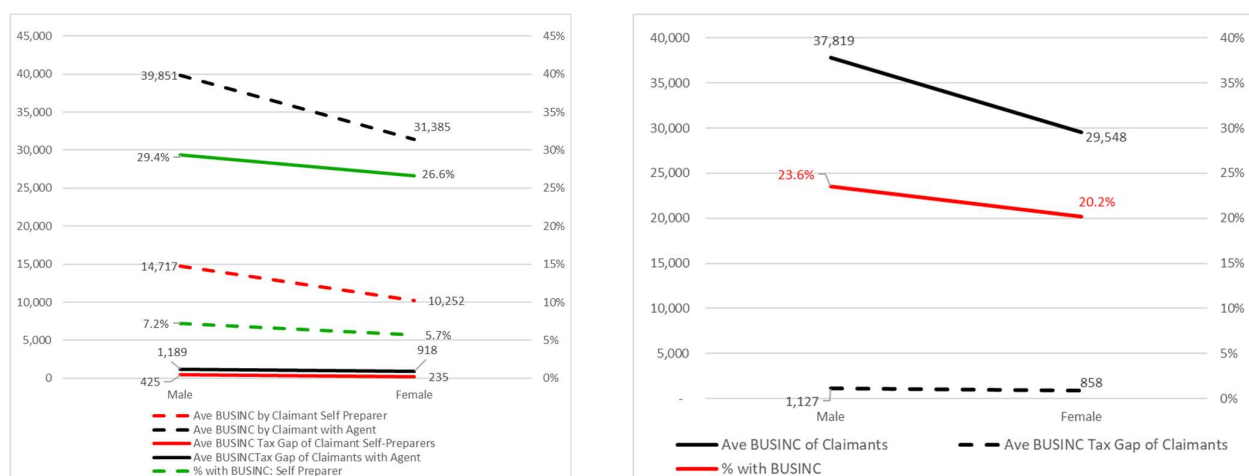
Net business income

Taxpayer age (Figure 20): Excluding taxpayers aged under 25, both the incidence rate of reported business income and relative amount of average business income reported all increase consistently across age groups up to 50-59 years. However, average incomes reported peak in the 40-49 age grouping and fall thereafter, especially for users of tax agents. For tax agent prepared returns, both the incidence rate of net business income and amount of average business income reported are significantly higher than self-preparers across all age groupings. The projected average tax gaps as shown in Figure 18 are substantially higher relatively to those of self-preparers across all age groupings.

**Fig. 20: Age, Business Income, and Related Tax Gap**
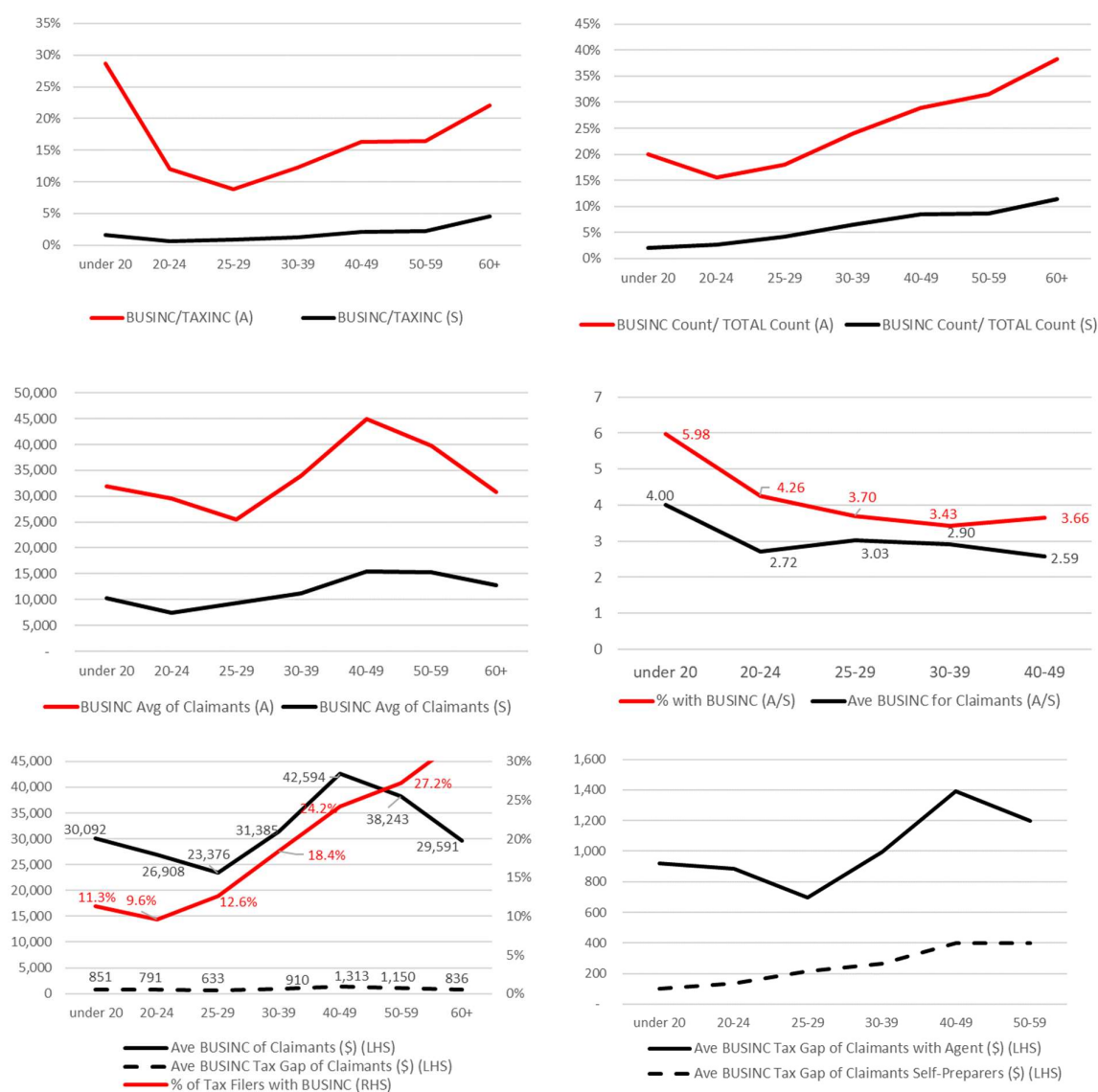
Gender (Figure 21): Overall, average net business income of male taxpayers (AUD 37,819) is around 25% higher than for female taxpayers (AUD 29,548), while the incidence rate is slightly higher (23.6% to 20.2%). With higher incomes in general, the average business income tax gap is around 30% higher for male taxpayers. For tax agent prepared returns, the incidence of net business income is marginally higher for male taxpayers (29.4% to 26.6%), while their average business income reported is over 25% higher. Average business income tax gaps are substantially higher relatively to those for both male and female taxpayers than for self-preparers.

Fig. 21: Gender, Business Income and Tax Gap

Region of residence (i.e., major urban, regional urban, or rural) (Figure 22): Overall, average reported net business income varies by no more than around 10% across the three regional groupings, although the incidence rate is substantially higher in rural regions (29.3% compared to 20.9% in major urban and 22% in regional urban). Average net business income tax gaps are broadly similar. For tax-agent prepared returns, the incidence rate is substantially higher in rural areas (36.2% compared to around 27% in other regions), while the average reported business income is some three times higher than for self-preparers. Average net business income tax gaps are marginally higher in rural regions.

Fig. 22: Region, Business Income and Tax Gap for Claimants (A: Agent, S: Self-Preparer)
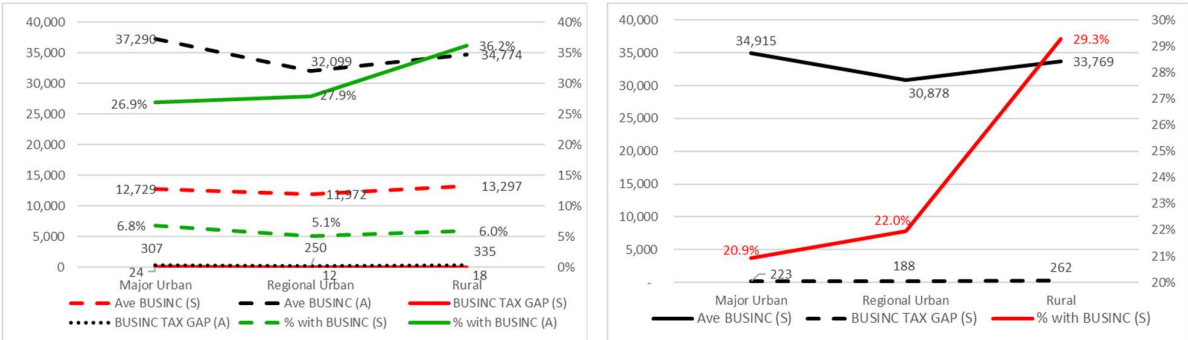
APPENDIX 3: RECENT STSL REFORMS AND THEIR RATIONALE

Over recent years, a series of changes have been made to improve the sustainability of the STSL scheme. These are outlined in the following section.

1) **Repayment schedule and rates of repayment**

For the income years 2004-06 to 2015-16, the initial introductory rate of debt repayment stood at 2% while the maximum repayment rate was set at 8%. Effective from 2018-19, the initial introductory rate of repayment was reduced from 4% to 2%, with a reduction also in the initial repayment threshold – from AUD 55,874 in 2017-18 to AUD 51,957. The maximum repayment rate of 8% remained unchanged. This reform sought to increase the number of debtors making repayments while easing the burden of STSL debtors entering the repayment regime, recognising that the rate of repayment applies to a debtor's total RI, not the excess over the threshold entry level.

From 1 July 2019, a new (lower) minimum repayment threshold came into effect, set at AUD 45,881 with a 1% initial repayment rate, and with a further 17 thresholds and repayment rates, up to a top threshold of AUD 134,573 at which 10% of income is repayable (see Table 19).

2) **Indexation of STSL repayment thresholds**

From 1 July 2019, STSL repayment thresholds are indexed using the Consumer Price Index (CPI) instead of average weekly earnings. This change aims to ensure that repayment requirements are adjusted in line with the cost of living and streamlines the indexation factors used previously.

3) **STSL debtors living and residing overseas**

Up to the financial year ending 30 June 2016, STSL debtors living and working overseas without any obligation to lodge a tax return in Australia were not required under the law to make repayments of their STSL loans debts regardless of the level of their income outside of Australia. As observed in Highfield and Warren (2015) and by other researchers (e.g., Chapman & Higgins, 2013), this was an obvious weakness in the repayment regime, delaying the collection of STSL debt and was clearly inequitable *vis-à-vis* the treatment of debtors residing in Australia. Effective 1 July 2017, debtors planning to live and work overseas for over 183 days or more in any 12-month period are required to update their contact details with the ATO and submit an *overseas travel notification* within seven days of leaving Australia. They are also required to lodge information annually concerning their worldwide income for the purpose of determining any obligation to make STSL debt repayments.

4) **Amending the order of repayment of some student loan debts**

From 1 July 2019, Student Financial Supplement Scheme (SFSS) debts are repaid after STSL debts are discharged. Previously, SFSS debts were paid concurrently with STSL debts. The repayment thresholds for SFSS have also been brought into line with the STSL repayment thresholds from 2019–20, instead of the current three-tier repayment threshold.

5) Increasing the FEE-STSL loan limit for 2019

From 1 January 2019, students studying medicine, dentistry and veterinary science courses benefited from a substantial increase in their loan limit, from an estimated AUD 130,552 in 2019 to a new limit of AUD 150,000, an increase of 15 percent. Students studying all other courses have a loan limit of AUD 104,440. These amounts will continue to be indexed annually.

6) Introduction of a new combined renewable STSL loan limit

Combined STSL loan limit

A new combined STSL loan limit has been introduced, effective from 1 January 2020. Only new HECS-HELP borrowing counts towards a person's STSL loan limit, however existing FEE-STSL entitlements already incurred are being carried over (FEE-HELP, VET FEE-HELP and VET Student Loans). The combined STSL loan limit amount, commencing on 1 January 2020, is the 2019 FEE-HELP loan limit amount indexed by CPI. From 1 January 2020, the FEE-HELP loan limit will become the combined HELP loan limit and a person's FEE-HELP balance will become their HELP balance.

Renewable STSL balance

The renewable component came into effect at the same time as the combined STSL loan limit, 1 January 2020. Repayments starting from the 2019–20 income year will be credited to a person's STSL balance. The ATO will advise the Department of Education of an individual's compulsory or voluntary repayment against their STSL debt. The department will use this repayment information to increase a person's STSL balance by the same amount reported.

Any compulsory or voluntary amounts that are repaid will be able to be re-borrowed in the future, up to the current HELP loan limit. This will enable individuals to pursue further study to retrain, change careers, or further specialise in their current profession. The same maximum loan limits, depending on the course of study, will continue to apply.

7) Removal of FEE-HELP loan fee for Table B providers

From 1 January 2019, students studying an undergraduate course of study at a Table B provider are no longer charged the 25% FEE-HELP loan fee. This only applies to courses of study with a census date on or after 1 January 2019.

APPENDIX 4: ESTIMATED TAX IMPACTS OF OVER-CLAIMED WRE DEDUCTIONS BY STSL DEBTORS

The ATO sample file population of Study and Training Support Loans (STSL) is detailed in Table 20.

Table 20: ATO 2% Sample File: WRE Claims of STSL and Non-STSL Taxpayers, 2016-17

Metric	ATO sample file populations		
	STSL taxpayers	**Non-STSL taxpayer**	**Totals**
No. of records in sample file	40,2018	236,984	277,202
No. of taxpayer records with WRE claims-total	26,846 (66.8%)	149,555 (63.1%)	176,401
No. of taxpayer records with WRE claims- aged 20-29	14,616 (54.4%)	24,927 (16.7%)	39,543
No. of taxpayer records with WRE claims- aged 30-39	7,385 (18.4%)	36,796 (24.6%	44,181
No. of taxpayer records with WRE claims- aged 40-49	2,924 (10.9%	35,943 (24.0)	38,867

Source: ATO 2% Sample File, 2016-17

Analysis of WRE deduction claims of STSL debtors (by age groupings) is outlined in Figure 23 from which it is possible to make the following observations:

Age group 20-29

- STSL taxpayers in this age group exhibit a consistently lower average WRE claim value to non-STSL taxpayers across the income ranges specified.

- The incidence of WRE claims for STSL taxpayers, while initially lower than for non-STSL taxpayers, converges around the STSL repayment threshold level for 2016-17 (i.e., AUD 54,869) and is sustained for incomes up to around AUD 63,000.
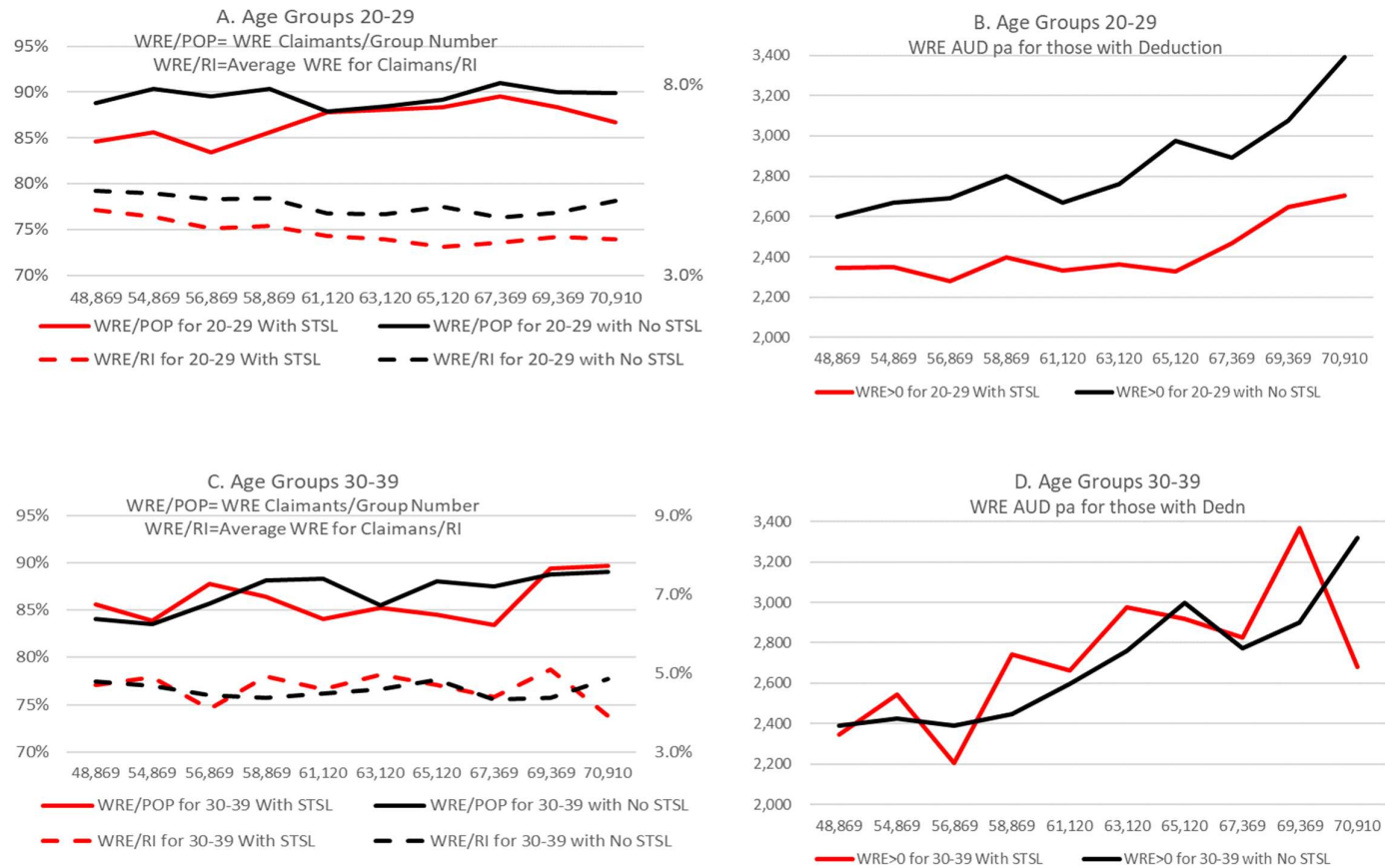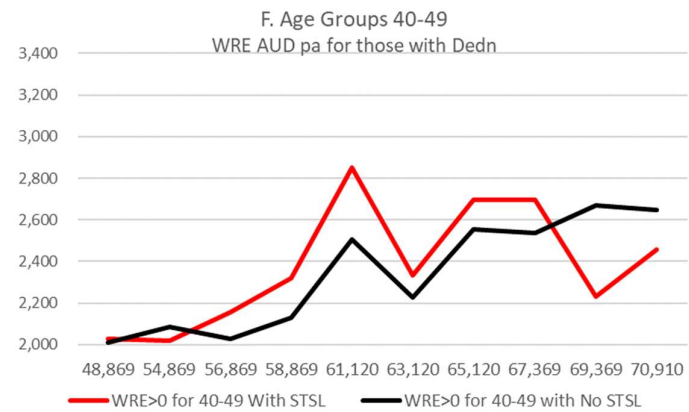
Age group 30-39

- While subject to some degree of volatility, the average WRE claim value across the specified income ranges of STSL taxpayers in this age group is generally higher than non-STSL taxpayers; the volatility observed appears to be with consistent with the practice of 'bunching' (i.e., an abnormal increase in average claim values resulting taxpayers' over-claiming deductions to avoid a higher rate of loan repayment).

- The incidence of WRE claims for STSL taxpayers, while initially marginally higher than for non-STSL taxpayers, falls below the corresponding rate for non-STSL taxpayers for the middle-income ranges specified, only to rise significantly at the higher end of the income ranges specified.
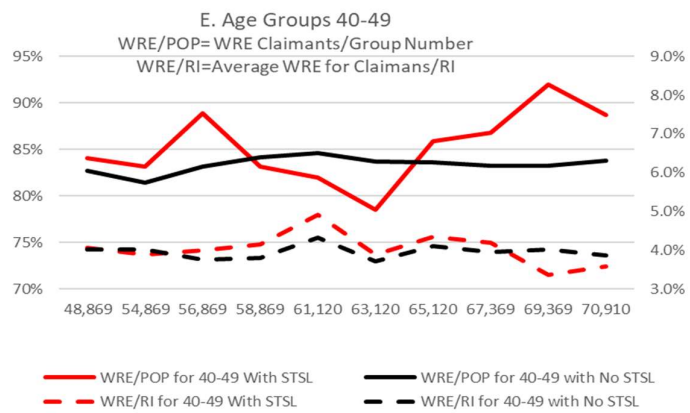
Age group 40-49

- While subject to some degree of volatility, the average WRE claim value across the specified income ranges of STSL taxpayers in this age group is generally higher than for non-STSL taxpayers; the volatility observed appears to be consistent with the practice of 'bunching' (i.e., an abnormal increase in average claim values resulting taxpayers' over-claiming deductions to avoid a higher rate of loan repayment).

- The incidence of WRE claims for STSL taxpayers, while initially higher than for non-STSL taxpayers, falls below the corresponding rate for non-STSL taxpayers for the middle-income ranges specified, only to rise significantly at the higher end of the income ranges specified.

Across all age groups

- Applying the ATO's tax gap findings for WRE in 2015-16 and projecting their impact for the 2016-17 financial year, it is likely that STSL taxpayers over-claimed WRE deductions by approximately AUD 1,823 million; the impact of these over-claims on the collection of STSL debts through the tax assessment system is estimated at AUD 136 million, including around 23,000 taxpayers who avoided assessed repayments and effectively deferred their repayment to another day (NB: these latter two amounts do not represent the full impact of deferred collections as other non-compliance has not been taken into account.)

**Fig. 23: STSL Debtors and Work-Related Expenses**

A. Age Groups 20-29
WRE/POP= WRE Claimants/Group Number
WRE/RI=Average WRE for Claimans/RI

B. Age Groups 20-29
WRE AUD pa for those with Deduction

C. Age Groups 30-39
WRE/POP= WRE Claimants/Group Number
WRE/RI=Average WRE for Claimans/RI

D. Age Groups 30-39
WRE AUD pa for those with Dedn

E. Age Groups 40-49
WRE/POP= WRE Claimants/Group Number
WRE/RI=Average WRE for Claimans/RI

— WRE/POP for 40-49 With STSL   — WRE/POP for 40-49 with No STSL
- - WRE/RI for 40-49 With STSL   - - WRE/RI for 40-49 with No STSL

F. Age Groups 40-49
WRE AUD pa for those with Dedn

— WRE>0 for 40-49 With STSL   — WRE>0 for 40-49 with No STSL

APPENDIX 5

Fig. 6: Tax Gap and Its Source Across Different Tax Filer Groupings (AUD pa, % Share by Gap Source)
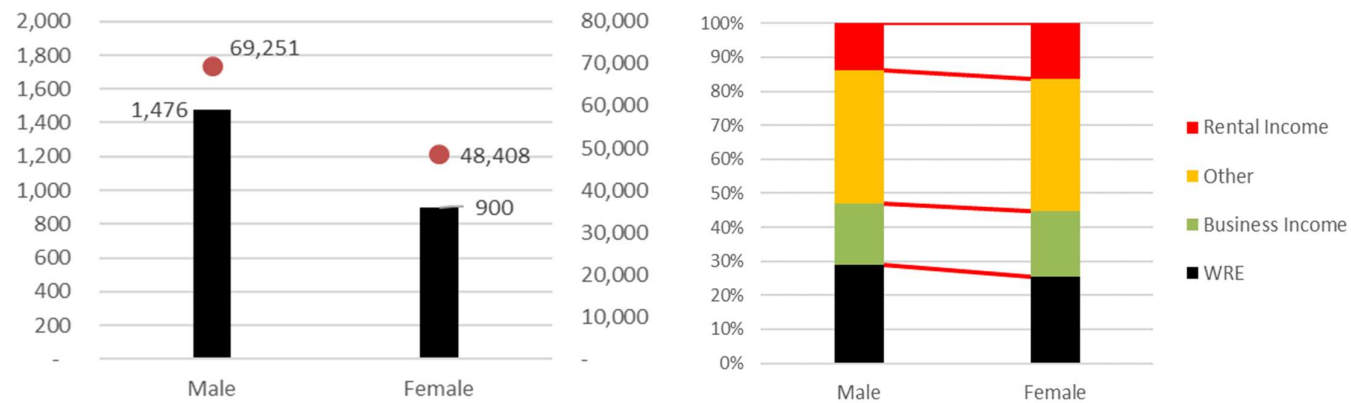
6A Age.
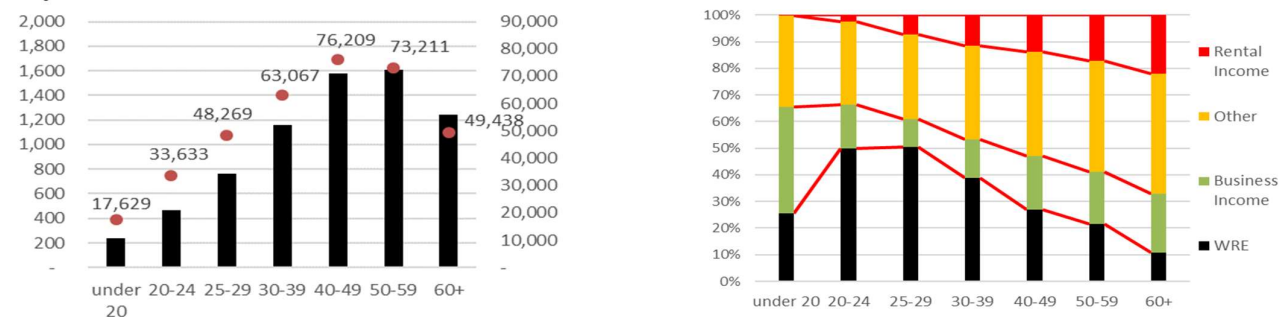
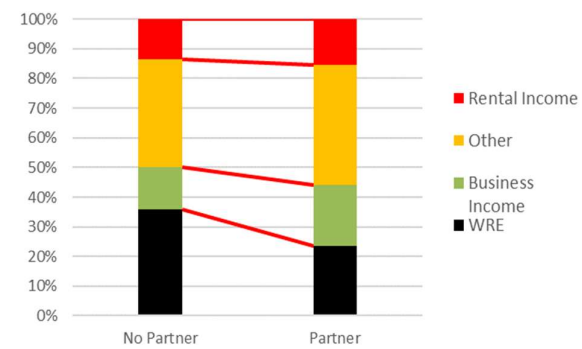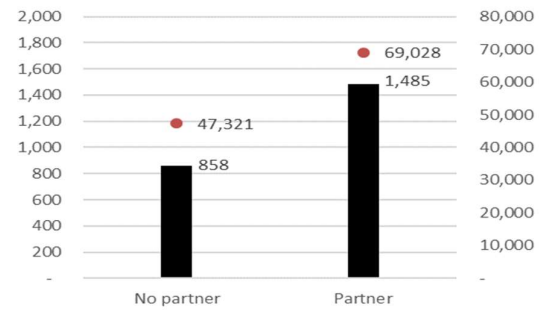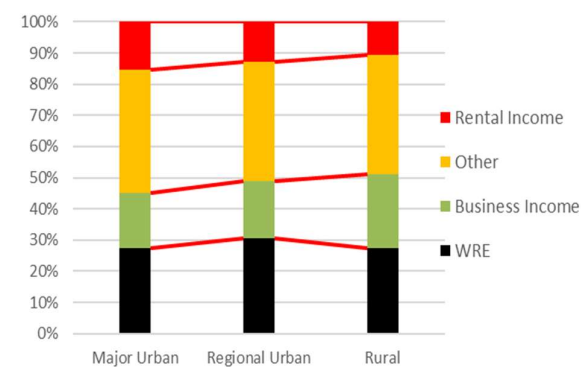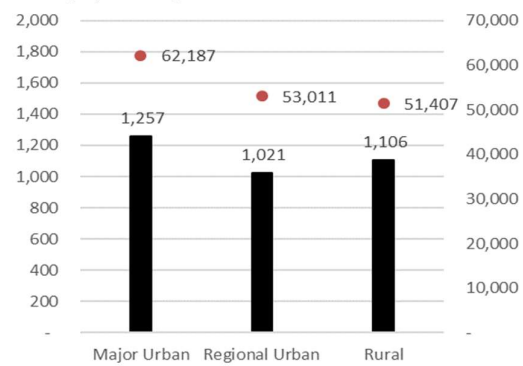
6B Occupation:
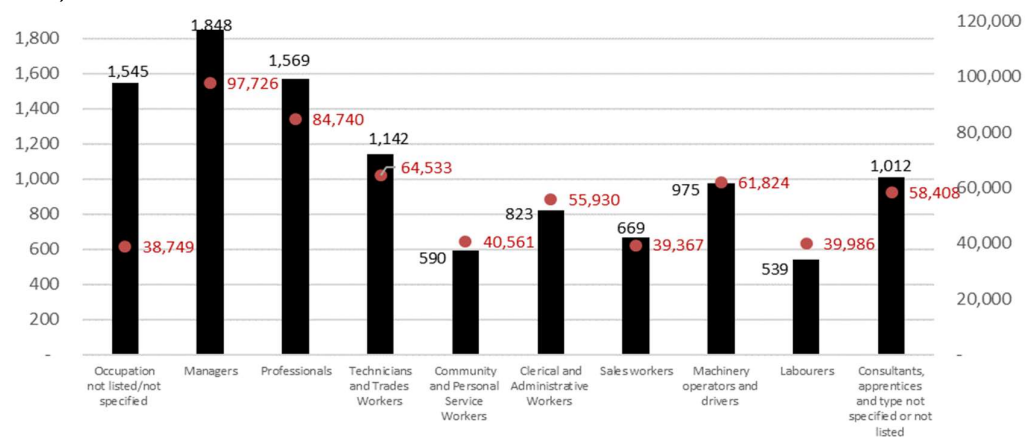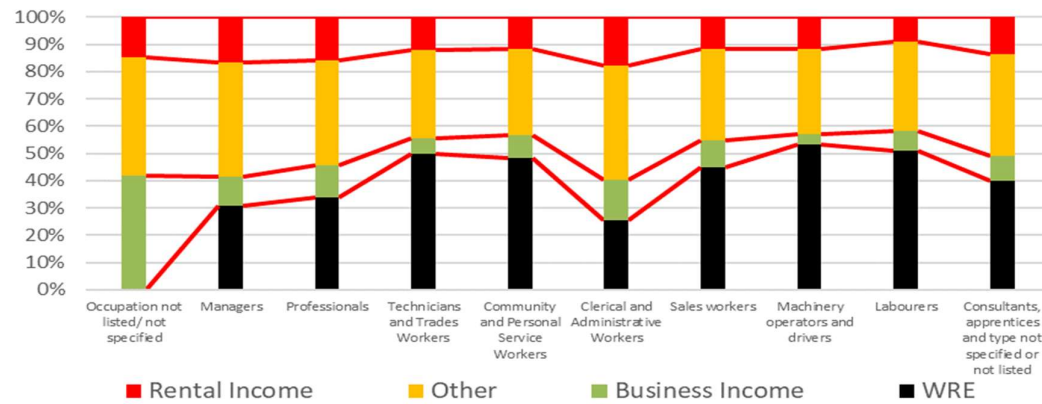
6C Gender

6D Partner Status

6E Geographical region

APPENDIX 6: TABLE 8: INCOME MEASURES ADOPTED BY A RANGE OF TAXES AND TRANSFERS: 2016-17

Household Income (National Accounts)	Individual Income Tax	Income Tax Offsets	STLS Repayments	Medicare Levy/PHI Insurance Rebate	Pension Income Test
HOUSEHOLD GROSS INCOME =	TAXABLE INCOME (TI) =	ADJUSTED TAXABLE INCOME (ATI) =	REPAYMENT INCOME (RI) =	INCOME BASES FOR LEVY AND REBATE	PENSION INCOME TEST (IT) -
Gross operating surplus: Dwellings owned by persons (e.g. Rent actual and imputed) +	Salary or wages +	Taxable income +	Taxable income +	Taxable income +	Taxable income +
Gross mixed income (e.g. income from unincorporated enterprises) +	Allowances, earnings, tips, directors fees etc	Total net investment loss (includes both net financial investment loss and net rental property loss) +	Total net investment loss (including net rental losses) +	Total net investment losses (including both net financial investment losses and net rental property losses)	Total net investment losses
Secondary income (e.g. public and private transfers) +	Employer lump sum payments +	Reportable fringe benefits from employers +	Reportable fringe benefits from employers +	Reportable fringe benefits from employers +	+
Property income (Interest (actual and imputed), dividends, royalties) +	Employment termination payments (ETP) +	Reportable employer superannuation contributions	Reportable super contributions	Reportable super contributions (incl. reportable employer super contributions and deductible personal super contributions)	Reportable fringe benefits from employers +
Compensation of employees (Cash and in-kind payments for labour)	Australian Government allowances and payments +	+	+	+	Reportable superannuation contributions +
	Australian Government pensions and allowances +	Tax-free government pensions or benefits +			
	Australian annuities and superannuation income streams +	Deductible personal superannuation contributions +			
	Australian superannuation lump sum payments +			Net amount on which family trust distribution tax paid	
	Attributed personal services income +	Target foreign income +	Exempt foreign employment income amounts		Taxable and tax-exempt foreign income +
	Gross interest +	Assessable First Home Super Saver less Child Support paid			
	Dividends +				
	Employee share schemes +				Deemed income from assets tests applied to financial investments (excl. home), homeowners' home, superannuation income streams (non-assessable non-exempt income), and tax-free pensions or benefits.
	Income less deductions and carry forward losses (supplementary section of tax return)				

Table 8 Sources:

Column 1 - https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5204.02018-19;

Column 2 - https://www.ato.gov.au/Individuals/Tax-return/2019/Tax-return/Income-questions-1-12/;

Column 3 - https://www.ato.gov.au/Individuals/Income-and-deductions/Income-tests/;

Column 4 - https://www.ato.gov.au/Individuals/Study-and-training-support-loans/When-must-you-repay-your-loan/#Yourrepaymentincome;

Column 5 - https://www.ato.gov.au/individuals/medicare-and-private-health-insurance/medicare-levy-surcharge/

Column 6-https://www.humanservices.gov.au/individuals/services/centrelink/age-pension/how-much-you-can-get/assets-test and https://www.humanservices.gov.au/individuals/topics/what-adjusted-taxable-income/29571

(accessed 25 January 2023)

The impact of demographic variables on value-added tax compliance in South Africa

Anculien Schoeman[*]

Abstract

Research into the impact of demographic variables – including gender, age, formal education and tax knowledge – on tax compliance has produced mixed results. This article reports on an online between-subjects experiment conducted with individuals owning/managing small businesses to determine the impact of such variables on tax compliance behaviour in South Africa, specifically when there are changes in the VAT rate.

The study finds that before there are changes in the VAT rate, gender, education and tax knowledge have an effect on tax compliance decisions. By way of contrast, when there is a change in the VAT rate (specifically an increase), the only demographic variable that is found to have a significant effect on tax compliance is education.

The results of the study are both confirmatory and innovative and provide useful further evidence for tax policy-makers, administrators and researchers on the impact and implications of demographic variables on tax compliance in a developing country setting.

Keywords: demographic variables, tax compliance, small business owners/managers, VAT rate, experiment

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1.   INTRODUCTION

> 'Taxes are the lifeblood of government and no taxpayer should be permitted to escape the payment of his just share of the burden of contributing thereto.' (Arthur Vanderbilt, in James, 2015).

Value-added tax (VAT) is one of the main tax revenue streams globally and is applied in more than 170 countries and territories (Organisation for Economic Co-operation and Development (OECD), 2020). It is an indirect tax that is collected based on consumption and is a self-declared tax where suppliers need to collect the VAT from the consumers (by including the VAT in the selling price) and pay it over to the revenue authorities (South African Revenue Service (SARS), 2015). VAT is a key component of South Africa's tax mix and contributes 24.5% of its total tax revenue received (National Treasury and SARS, 2018, p. viii).

In order to increase tax revenue collection, the VAT rate in South Africa was increased from 14% to 15%, effective from 1 April 2018 (Gigaba, 2018). Similarly, countries such as Sri Lanka are raising VAT rates again to meet debt repayments, after the VAT rates were cut during the Covid-19 pandemic (Caragher, 2022). An increase in the VAT rate would typically be expected to lead to an increase in tax revenue; however, if more non-compliance emerges than before, less tax revenue may be collected. An increase in VAT has two potentially opposing effects: the mechanical effect which leads to an increase in VAT revenue and the disincentive behavioural effect which reduces VAT revenue. The possibility of VAT non-compliance is additional to the disincentive effect.

Tax non-compliance poses a substantial risk to all governments due to revenue losses, resulting in the inability to provide necessary public goods and services. A key issue identified from the literature is that certain groups within demographic variables are more non-compliant than others. Different demographic variables may influence tax compliance behaviour, and four broad categories are principally addressed in this study: gender, age, formal education and tax knowledge. Factors affecting tax compliance behaviour do not necessarily act in isolation, and thus, the interrelationship between the demographic variables is also explored.

The broad research question guiding this study is: to what extent do demographic variables impact the VAT compliance of individuals who are small business owners/managers when a change in the VAT rate is involved? The effect of demographic variables on tax compliance was considered both before and after VAT rate changes. The direction and magnitude of the change in the VAT rate and the interrelationship with demographic variables were therefore considered.

The aim of the study is to analyse the impact of demographic variables on VAT compliance in the context of a rate change. The focus is on individuals owning/in managing positions of small business entities in South Africa. A business is classified as small when its gross income is less than ZAR 20 million[1] in a 12-month period (section 12E(4)(a) of the *Income Tax Act* 58 of 1962). SARS has identified the small business sector as a risky area due to the missing trader problem and due to low tax

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[1] ZAR 20 million was equivalent to USD 1,410,290 on 1 October 2018, which was during the time when the experiment the subject of this study was conducted: see Oanda, 'Currency converter', https://www1.oanda.com/currency/converter/.

registrations. SARS subsequently indicated that there would be an increased focus on VAT in the small business sector and that a larger portion of small businesses in general would be audited (SARS, 2012, 2017). For this reason, the study focused only on small business entities.

There are a number of contributions made by this study. The first contribution is at a theoretical level, where the study adds to the limited body of knowledge of VAT compliance relative to income tax compliance. Further, the study expands on the limited knowledge, if any, about the impact of VAT rate changes on VAT compliance, taking the demographics of individuals owning/managing small business entities into account. The limited knowledge available about tax compliance in an African country is also expanded upon. The data collection method, being an experiment, also adds to the various other strategies used in prior research, and it is considered it overcomes the problem of taxpayer dishonesty due to the hypothetical scenario provided and anonymity of the collection procedure. There are also contributions on a more practical level, taking into consideration the pressure of raising the VAT rate in South Africa and elsewhere: the results of the study should assist policy-makers in identifying non-compliant groups, permitting greater audit focus to be shifted to these groups. Further, the revenue authority could target their deterrence nudges[2] more specifically to those demographic groups which are identified to be more non-compliant (Antinyan & Asatryan, 2019).

The primary data was collected online via an experimental method and was analysed quantitatively to determine the effect of the independent variables (a change in the VAT rate and various demographic variables) on the dependent variable (tax compliance behaviour).

The study finds that before there are changes in the VAT rate, gender, education and tax knowledge have an effect on tax compliance decisions. By way of contrast, when there is a change in the VAT rate (specifically an increase), the only demographic variable that is found to have a significant effect on tax compliance is education.

The next sections explore the literature informing this study (section 2) and the research methodology (section 3). The findings are then analysed and discussed in section 4, followed by concluding remarks in section 5 highlighting limitations and possible areas for future research.

2. LITERATURE REVIEW

A major research approach dealing with tax compliance is the economic deterrence theoretical approach. This approach adopts as its fundamental premise the notion that rational persons will wish to maximise their earnings and that they will weigh the possibility of successfully evading taxes against the probability of being caught and punished (referred to as the expected utility theory) (Allingham & Sandmo, 1972; Hamid, 2013). This approach considers a situation rationally and ignores normative issues relating to what is right and wrong (Wenzel, 2005).

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[2] Deterrence nudges such as messages about audits and penalties could be effective in increasing tax compliance and in turn, tax revenue collection in the short run. These messages should have a positive effect if sent to the right taxpayers. Nudges are relatively easy and low-cost to implement (Antinyan & Asatryan, 2019).

One of the economic deterrence factors identified as influencing tax compliance is tax rates. Some studies conclude that there is a positive relationship between the increase/decrease in the tax rate and a decrease/increase in tax compliance or tax revenue collection (Allingham & Sandmo, 1972; Alm, Jackson & McKee, 1992; Ottone, Ponzano & Andrighetto, 2018) whereas others have found that a higher marginal tax rate decreases tax evasion (Feinstein, 1991; Yitzhaki, 1974). Allingham and Sandmo's model was amended by Yitzhaki (1974), making the penalty payable dependent on the unreported tax, not the unreported income and found that in certain circumstances an increase in the tax rate should increase compliance and lead to individuals declaring more income.

Most of the studies on factors influencing tax compliance relate to income tax; only a limited number of studies consider tax compliance in the context of VAT (Kosonen & Ropponen, 2013; Naritomi, 2019). Moreover, the majority of these studies have been conducted in developed countries – mostly the United States of America (USA), European countries, Australia and New Zealand. A limited number of studies have been conducted in developing countries such as Brazil, China, Indonesia and Malaysia, with studies related to developing African countries including Nigeria, Ghana, Kenya, Uganda and Tanzania (Ali, Fjeldstad & Sjursen, 2014; Carsamer & Abbam, 2020; Mascagni & Santoro, 2018). Studies specifically relating to South Africa have been conducted by Alderman and Del Ninno (1999); Erero (2015); Go et al. (2005); Jansen and Calitz (2017); Theron (2016); and van Oordt (2016).

The behavioural effect of changes in the VAT rate on tax compliance is largely unknown. Furthermore, limited studies determining the effect of demographic variables on tax compliance behaviour have been conducted in Africa. For these reasons, this study's aim is to focus on the impact of demographic variables on VAT compliance, also taking into account changes in VAT rates. More particularly, this study focuses on four specific demographic variables: gender, age, formal educational level and tax knowledge. These are now discussed in more detail.

Gender

The taxpayer's gender has been shown to have an effect on the level of tax compliance (D'Attoma, Volintiru & Steinmo, 2017; Hofmann et al., 2017; Richardson & Sawyer, 2001). Several studies on individuals' tax compliance have concluded that females tend to be more opposed to tax evasion and more compliant than males (Carsamer & Abbam, 2020; D'Attoma et al., 2017). This may be due to the fact that 'women feel more enforced to pay taxes' (Kogler, Muehlbacher & Kirchler, 2013, p. 14) and that positive rewards seem to act as a motivator for females (Brockmann, Genschel & Seelkopf, 2016).

However, other research also suggests that the finding that females are more inclined to be compliant is not conclusive. Some studies state that males are the more compliant gender (Friedland, Maital & Rutenberg, 1978; Kirchler & Maciejovsky, 2001), while others have concluded that gender does not necessarily correlate with tax evasion or that the trend that females are more compliant than males is diminishing (Anderhub et al., 2001; Putri & Venusita, 2019; Shafer & Wang, 2018).

The empirical evidence relating to the role of gender on tax compliance therefore generally suggests that females are likely to be more compliant than males, although the outcome is not always clear, and qualifications to this general finding can be found.

Age

In general, the studies on individual taxpayer compliance argue that older taxpayers tend to comply more than their younger counterparts (Grasmick & Bursik, 1990; Hasseldine, Kaplan & Fuller, 1994). The young are less supportive of the progressive tax system than the old, and the attitudes of the young are also more accepting towards non-compliance than are the attitudes of the old (Jurney, Rupert & Wartick, 2017). Possible reasons for this are that the old have greater financial stability, possibly earning more income than the young due to experience. They are also more dependent on public goods and services and typically have more experience with business and revenue authorities and therefore gain more knowledge about tax law, which may be associated with a higher level of tax compliance (Hofmann et al., 2017). The young also seem to be less affected by deterrence measures such as the probability of being caught and punished (Becker, 1968).

There are, however, studies that have found no statistically significant correlation between age and tax compliance (Collins, Milliron & Toy, 1992). Moreover, the interaction of age with other factors and the effect these have together on tax compliance should not be ignored. Song and Yarbrough (1978) found that individuals between the ages of 40 and 65 have strong ethical values regarding tax. As a result, these middle-aged taxpayers tend to be more compliant than the young (in this case, those younger than 40) and also more compliant than those who are older than 65.

The old tend to be more compliant than the young (Carsamer & Abbam, 2020). However, age does not always create a willingness to pay tax, as no matter how old a taxpayer is, he/she will not comply if he/she does not have a sense of responsibility to pay tax (Wijayanti et al., 2020).

Although the results are inconclusive, the majority of studies indicate that older taxpayers tend to be more compliant than those who are younger.

Education

Education may relate to two distinct ideas. The first is formal education in terms of obtaining secondary or tertiary qualifications, such as completing high school or obtaining a university degree, regardless of the field in which the qualification is obtained. The second relates more to the specific tax knowledge a person possesses and refers to the ability to understand and then to comply (or not comply) with the tax laws (Jackson & Milliron, 1986). The first of these concepts is dealt with under this heading, 'education', while the second (tax knowledge) is dealt with as a separate variable immediately after 'education'.

Studies with reference to formal educational qualifications indicate that tax compliance improves with higher education, since generally, a person with more formal education has the know-how to comply, regardless of the content of the education (Inasius, 2019; Song & Yarbrough, 1978). However, there is also evidence that people with more formal education can identify loopholes and may in fact be less compliant (Hofmann et al., 2017). The higher income earners tend to be the more qualified persons, and, as a result, they are also the people paying more taxes progressively. High-income earners may thus view tax evasion more favourably (McGee, 2012).

From the perspective of studies done on small businesses, secondary and tertiary education, in general, seem to improve the tax compliance of small and medium enterprises (Carsamer & Abbam, 2020).

Tax knowledge

Care should be taken not to assume that a more (educationally) qualified person has better tax knowledge, as the education in question might have dealt with many different topics or fields (Kirchler, 2007; Richardson & Sawyer, 2001). Although some individuals are highly qualified, they may not have sufficient knowledge to comply with tax obligations under a self-assessment system. Thus, education and training specifically in the tax field are more likely to have a positive impact on tax compliance (Kwok & Yip, 2018; Loo & Ho, 2005). The study by Inasius (2019) indicated that, in general, tax knowledge does have some impact on tax compliance but that the effect is not significant.

Although tax knowledge could assist a person in knowing how to accurately calculate their tax liability, Richardson and Sawyer (2001) noticed that knowledge of evasion opportunities negatively impacts on compliance, as this facilitates non-compliance. Tax practitioners also need to decide very carefully when aggressive tax planning would be seen as ethical, and where it is pushing the boundaries (Field, 2017).

People who are less educated may comply less, as they might not know that they even need to register as VAT vendors, or they may make unintentional mistakes due to a lack of tax knowledge obtained through education (Hofmann et al., 2017; Kosonen & Ropponen, 2013; Mascagni & Santoro, 2018). Kirchler and Maciejovsky (2001) found that self-reported tax compliance increased where the respondents had a better knowledge of the legal principles, as these respondents deemed the tax system to be fairer. In South Africa specifically, more tax knowledge seems to cultivate a better tax compliance attitude, which, in turn, ensures improved tax compliance (Ali et al., 2014).

The empirical evidence relating to the role of education and tax knowledge in tax compliance is not always conclusive, and further research is thus necessary on these topics. A clearer distinction should also be made between education level in general and tax-specific knowledge.

To summarise the findings from the literature regarding the demographic variables, females tend to be more compliant than males, and those who are older are more likely to be compliant than the young. The effect of education and tax knowledge on tax compliance behaviour is less certain. Note, however, that most of the literature relates to individuals generally, and it is not necessarily specific to individuals who are in small businesses.

3.   RESEARCH METHODOLOGY

A post-positivist approach was followed in the current study in determining causal relationships, accepting that reality is influenced by people's observations and sensations and that the results only indicate that something is probably true, not certainly true (Denzin & Lincoln, 2011; McKerchar, 2010; Scotland, 2012).

Obtaining valid data on the demographic variables that impact the VAT compliance behaviour of individuals who are small business owners/managers is challenging, as individuals may typically hesitate to be honest regarding their own or their business's

non-compliance (Alm et al., 1992). Quantitative research is typically performed under a positivist (and post-positivist) research philosophy and is often linked with experiments (Creswell, 2016; McKerchar, 2010; Saunders, Lewis & Thornhill, 2016). To ensure that the best possible data are collected, this study adopted a quantitative approach and data were collected using an online experiment to test the relationship between demographic variables and tax compliance before and after changes in the VAT rate. An experiment addresses the issue of dishonesty regarding tax compliance by sketching a hypothetical real-world scenario, removing the focus from the participant and placing it on a hypothetical person (Alm, 1991; Torgler, 2003). Nuisance factors can also be eliminated by an experiment's focusing only on the variable in question (Burtless, 1995). Another advantage of conducting an experiment is that the procedures are highly replicable. An experiment is deemed the most appropriate method of collecting primary data to determine the probable effect of one variable affecting another (Shadish, Cook & Campbell 2002).

As a result of the review of the literature relating to the effect of demographic variables on tax compliance behaviour, the following broad hypothesis was developed:

H_1: *Demographic variables affect amounts declared and associated tax compliance when there is a change in the rate at which VAT is levied.*

To address the gap in the available literature regarding changes in the VAT rate, the effect of demographic variables before and after the changes in the VAT rate was taken into account. To enable the study to test the effect of the various demographic variables on tax compliance behaviour, also considering the effects of changes in the VAT rate, the following more specific hypotheses were developed so far as individuals who are small business owners/managers are concerned:

- H_{1A}: *At the current standard VAT rate, females are more tax compliant than males.*

- H_{1B}: *Females are more tax compliant than males when there are changes in the VAT rate.*

- H_{2A}: *At the current standard VAT rate, those who are older are more tax compliant than those who are younger.*

- H_{2B}: *Those who are older are more tax compliant than those who are younger when there are changes in the VAT rate.*

- H_{3A}: *At the current standard VAT rate, the level of formal education attained affects amounts declared and associated tax.*

- H_{3B}: *The level of formal education attained affects amounts declared when there are changes in the VAT rate.*

- H_{4A}: *At the current standard VAT rate, the level of tax knowledge affects amounts declared and associated tax.*

- H_{4B}: *The level of tax knowledge affects amounts declared when there are changes in the VAT rate.*

A between-subjects online experiment following a pre-test and post-test design was conducted, involving four treatment groups that were confronted with a VAT rate change from the current 15% rate:

- those with a five-percentage-point decrease in the VAT rate (10%): the large decrease group;

- those with a one-percentage-point decrease in the VAT rate (14%): the small decrease group;

- those with a one-percentage-point increase in the VAT rate (16%): the small increase group; and

- those with a five-percentage-point increase in the VAT rate (20%): the large increase group.

The experiment commenced with questions to obtain the demographic profiles of the participants and their business entities, after which the participants responded to a hypothetical scenario by indicating the amounts they would declare on sales and purchases with a VAT rate of 15%. The participants were then randomly allocated by Qualtrics (an online instrument delivery service provider) to one of the four treatment groups and asked the exact same questions but this time with a new, hypothetical, VAT rate. Attention checks and questions regarding registration decisions were asked next, and the experiment concluded with questions regarding the participants' decisions in responding to the abovementioned scenarios.[3]

Participants were only eligible to participate in the experiment if they were classified as owners/managers of small business entities and if the entities for which they were owners/managers were able to register as VAT vendors in South Africa. Therefore, the participants were eligible to participate if their business's gross income was between ZAR 50 000[4] and ZAR 20 million in a 12-month period (section 23(3)(b) of the *Value-Added Tax Act* 89 of 1991; section 12E(4)(a) of the *Income Tax Act* 58 of 1962).

Non-probability purposive sampling was applied to conduct three rounds of pilot testing of the substance of the experiment, and responses were received from 18 participants including academics or businesspersons (Leedy & Ormrod, 2015; Saunders et al., 2016). Their responses enhanced the readability and clarity of the experiment. Volunteer, convenience and snowball sampling were then used to recruit participants for the experiment. A link to the experiment was shared with friends and family of the conductor of the experiment using social media. Additionally, the Organisation Undoing Tax Abuse (OUTA) posted the link to the experiment on their Facebook page, and the South African Institute of Tax Practitioners (SAIT) posted the link to the experiment in newsletters sent to their members for three weeks. Further, e-mail addresses were obtained from LinkedIn, which is in the public domain, and the link to the experiment was e-mailed to 15,158 addresses. Everyone receiving the link could

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[3] A copy of the questionnaire used in the experiment is available at:
https://doi.org/10.25403/UPresearchdata.13713121.
[4] ZAR 50 000 was equivalent to USD 3,526 on 1 October 2018, which was during the time the experiment was conducted: Oanda, 'Currency converter', https://www1.oanda.com/currency/converter/.

thus decide to participate or not and were asked to forward the message containing the link to people who they thought were qualifying participants (Saunders et al., 2016).

Between June 2018 and January 2019, 557 responses were received, with only 131 valid and usable for the analyses. Responses were invalid where: participants did not agree to participate in the study (8); participants did not meet the qualifying requirements (based on the income level of the business and being in a management, decision-making position in the business) (211); the attention checks were answered incorrectly (46); the experiment was not sufficiently completed for comparative purposes (160); and the participants' comments clearly indicated that they did not understand the experiment and therefore did not answer appropriately (1). The participants were randomly allocated by Qualtrics to the various treatment groups, as set out in Table 1.

Table 1: Allocation to the Various Treatment Groups

Treatment group	Number of responses
Large decrease group (10%)	33
Small decrease group (14%)	30
Small increase group (16%)	34
Large increase group (20%)	34

A sufficient sample size was deemed to be between 15 and 30 participants per treatment group. The number of responses received per treatment group was therefore sufficient (Daniel, 2012; Hogan, Maroney & Rupert, 2013; Kim, Evans & Moser, 2005; Rupert, Single & Wright, 2003).

4.   ANALYSIS OF RESULTS

Experiments are proven data collection instruments used to determine causal relationships between the independent variable (tax compliance behaviour) and dependent variables (VAT rates and demographic variables) (Leedy & Ormrod, 2015; Shadish et al., 2002). In this study, the extent to which demographic variables impact VAT compliance was considered, both before and after changes in the VAT rate.

The software package IBM SPSS Statistics 25 was used to analyse the data collected through the experiment. Descriptive statistics were obtained to analyse the data and associated correlations (Leedy & Ormrod, 2015). For the inferential statistics, the Pearson's Chi-Square[5] test of independence and the Fisher Exact test were applied. Both tests were considered appropriate for testing the association between the demographic variables and tax compliance.[6] The Fisher Exact test results are used in circumstances

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[5] Pearson's Chi-Square 'is a statistical test of association between two variables in which the expected values are compared with the observed values' (Acton et al., 2009, p. 348).
[6] See thebmj, https://www.bmj.com/about-bmj/resources-readers/publications/statistics-square-one/11-correlation-and-regression.

where the data do not meet the requirements of performing other tests.[7] The current study falls within this category.

The reliability of the data refers to the ability of the study to obtain repetitive, consistent results when the experiment is replicated on the same subjects.[8] The Cronbach alpha values were obtained to test the reliability of the data. The internal consistency of two sets of Likert-scale questions yielded Cronbach alpha values of 0.713 and 0.782, exceeding the threshold of 0.6 (Hair et al., 2010); the results are therefore deemed reliable.

Differences in responses collected over time were also observed to ensure the reliability of the data. The experiment was open from June 2018 to January 2019. The early responses were obtained from June 2018 to August 2018 and the late responses from October 2018 to January 2019. All participants had to report the amounts they would declare for sales and purchases in the 15% category. A t-test for independent groups was then done based on these amounts. The data were deemed reliable, as no statistically significant differences were found at the 5% level of significance between the early and the late responses, and it was therefore concluded that no external shocks or exogenous factors had affected the results obtained.

The experiment commenced with a number of demographic questions regarding the background of the individuals and the small business entities they owned/managed. The results were compared to relevant South African data to determine whether the sample obtained fairly represented the South African small business sector. It is evident from Table 2 that the results were representative for gender and age but not for education/qualifications. Any extrapolation to the general population should thus be made with caution.

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[7] Since one of the main assumptions for the validity of the Pearson's Chi-Square test is that no more than 20% of the cells should have expected frequencies less than five, the Fisher's Exact test is more appropriate in these cases: ibid. In the majority of cases, the cells had an expected frequency of less than five.

[8] See Business Research Methodology, 'Research methodology', https://research-methodology.net/research-methodology/reliability-validity-and-repeatability/research-reliability/. See also Middleton (2019).

Table 2: Summary of Demographic Profile

Demographic	Sample	Comparison	Comparative from?	Representative?
Gender	Male: 58% Female: 42%	Male: 55% Female: 45%	Workforce	Yes
Age	20–35: 30% 36–50: 37% 51–65: 28% >65: 5%	<20: 0.4% 20–34: 24.4% 35–49: 46% 50–64: 24.9% >64: 4.3%	SMME owners	Yes
Education/ qualifications	Up to matric: 6% Post-matric: 24% Bachelor's: 44% Master's/Doctorate: 26%	Tertiary education: 21% Secondary education: 26% Less than secondary education: 53%	SMME owners	No

Source: Small Enterprise Development Agency (2019); Statistics South Africa (2018).

4.1 The effect of demographic variables on tax compliance

The study hypothesised that particular demographic variables of the participants may have implications for their compliance decisions. To determine whether there is an association between each demographic variable and tax compliance, the results from the amounts declared before and after the treatments were applied (decrease and increase in VAT rate groups) were considered. For this, the coding was done as follows: compliance[9] for sales and purchases was indicated as a 1 where the participant was compliant and a 0 where the participant was non-compliant.[10] The difference between the compliance results from the 15% category and the decrease in VAT rate treatment group or the increase in VAT rate treatment group was then determined. The result could be 0, meaning the participant remained compliant/non-compliant in both the initial scenario (15% VAT rate) and the appropriate treatment group in the follow-up scenario (with either a decrease or increase in the VAT rate); 1, meaning the participant was compliant in the 15% category but then became non-compliant in the treatment group; or -1, meaning the participant was not compliant in the 15% category but then became compliant in the treatment group.

Figure 1 illustrates the compliance levels for each of the demographic variables under consideration for both sales and purchases prior to any change in the VAT rate. It can be seen that the extent of compliance for sales is generally better than for purchases.

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[9] Compliance: Sales: ZAR 2,000,000 is declared. Purchases: ≤ ZAR 500,000 is declared.
[10] Non-compliance: Sales: < ZAR 2,000,000 is declared. Purchases: > ZAR500,000 is declared.

Furthermore, it is evident that: females tend to be more compliant than males; individuals between 51 and 65 years of age tend to be the least compliant, but those over 65 tend to be the most compliant; individuals with the lowest qualifications tend to be the least compliant; and those with the best VAT knowledge tend to be the most compliant.

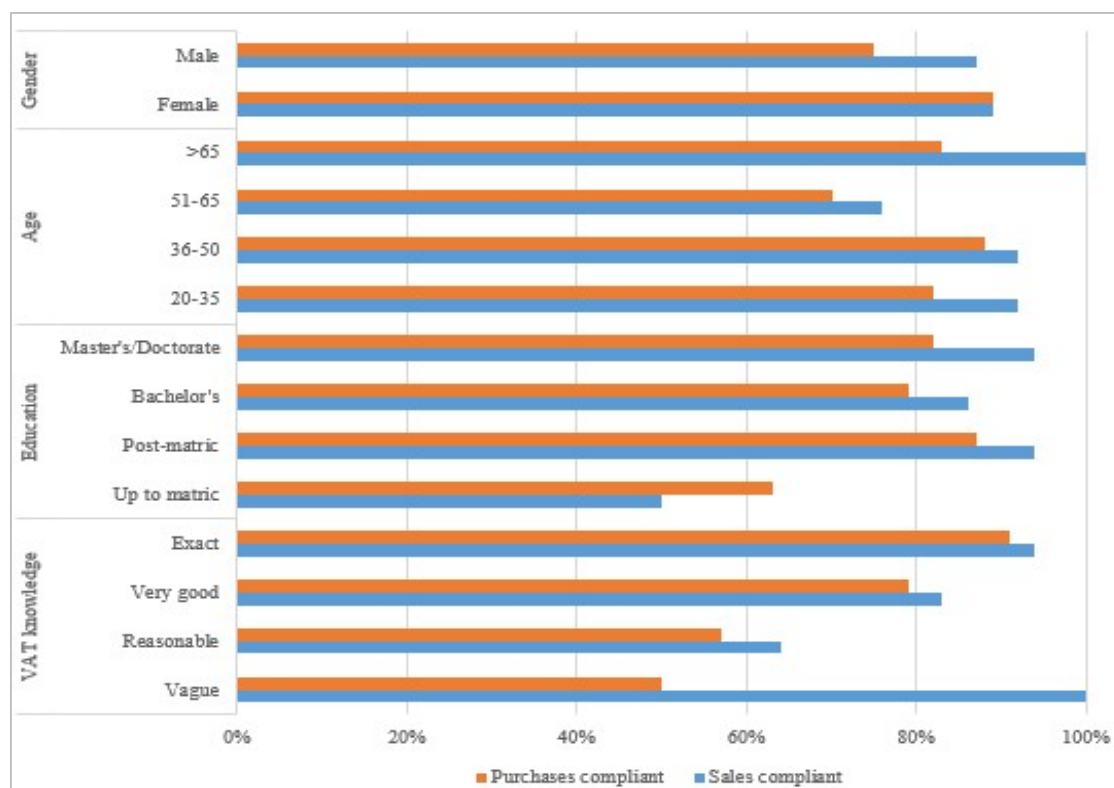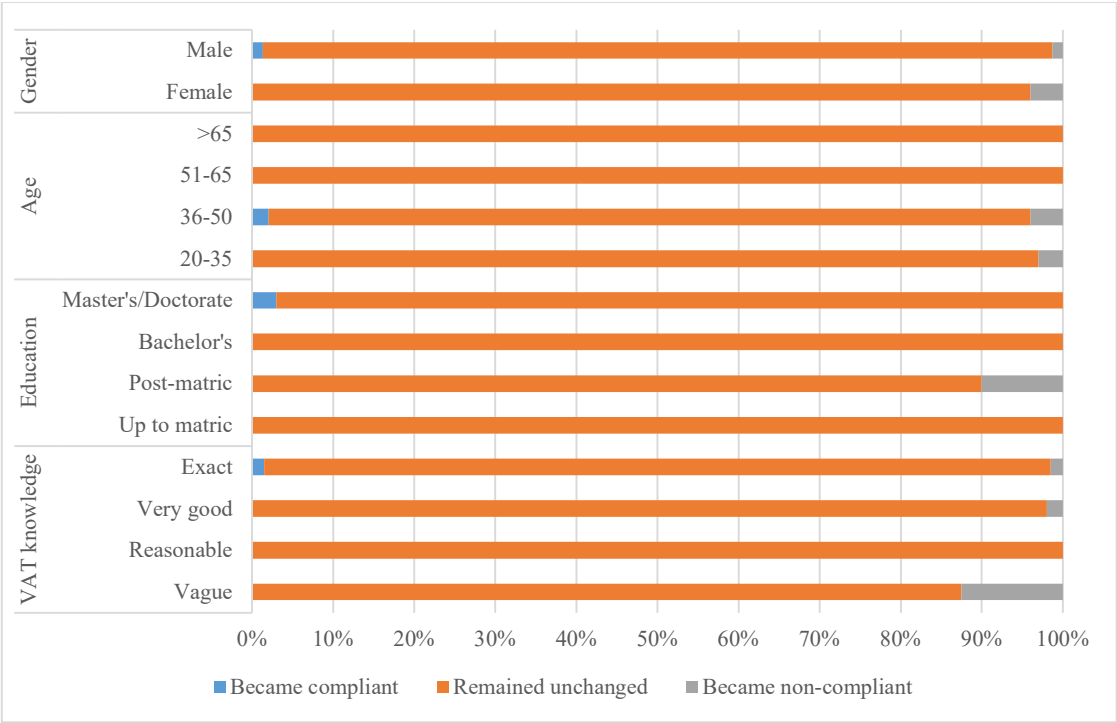**Fig. 1: Compliance per Item per Demographic Variable (15% Category)**

Figure 2 (sales) and Figure 3 (purchases) illustrate the compliance per item within each demographic variable after the change in VAT rate as a result of the treatment being applied. It is evident that after the treatments were applied, although the compliance levels mostly remained unchanged, when compliance levels did change, more individuals became non-compliant after the change in the VAT rate than those who became compliant.

Fig. 2: Compliance per Item per Demographic Variable for Sales after Treatment
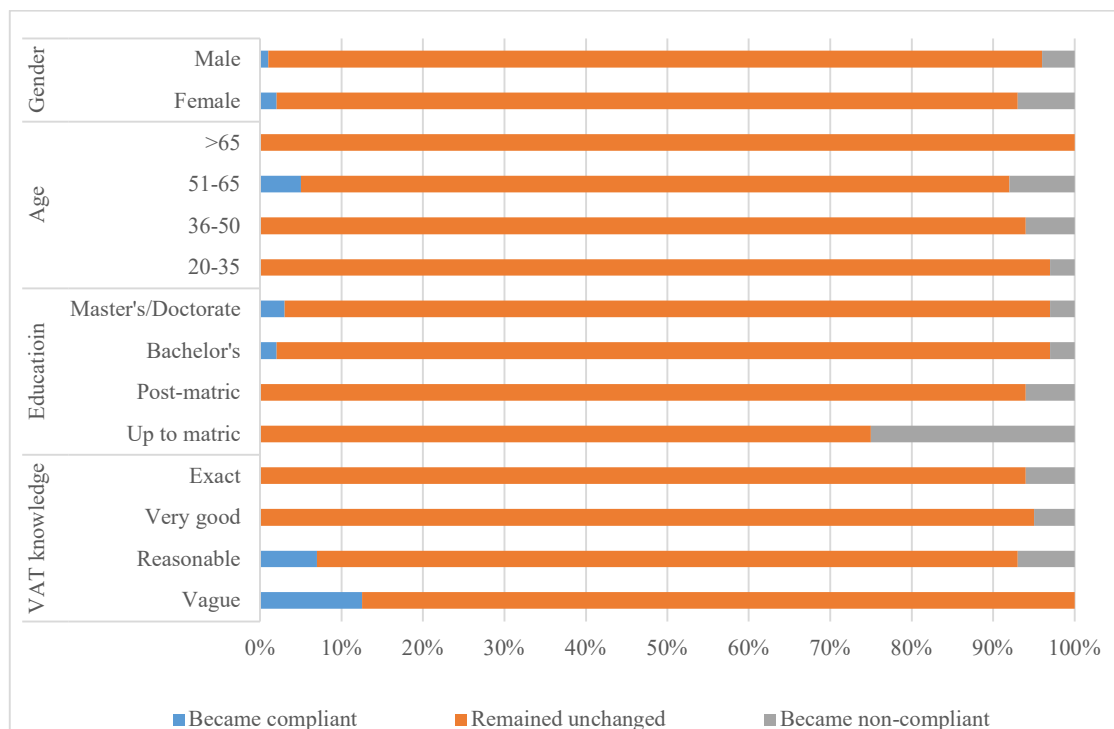
Fig. 3: Compliance per Item per Demographic Variable for Purchases after Treatment

Table 3 summarises the results of the Pearson's Chi-Square or Fisher Exact tests, where applicable, for association between the various demographic variables and tax compliance. The *p*-value indicates the significance of the results. The Cramer V values are also reported in Table 3 to show the strength of the association. Threshold values for Cramer V are: > 0.5 – high association, 0.3 to 0.5 – moderate association, 0.1 to 0.3 – low association and 0.0 to 0.1 – little, if any, association (Cohen, 1988).

Table 3: Pearson's Chi-Square or Fisher Exact for the Association between Various Demographic Variables and Compliance

Variables		Pearson's Chi-Square value	Fisher Exact test (if applicable)	Exact significance (*p*-value) (2-sided)	Cramer V
Before changes in VAT (15% category)					
Gender	Sales	0.15		0.791	0.034$
	Purchases	4.103		**0.070***	0.177
Age	Sales		5.81	0.103	0.238
	Purchases		4.144	0.227	0.18
Education	Sales		9.525	**0.015****	0.315#
	Purchases	2.666		0.455	0.143
VAT knowledge	Sales		9.629	**0.014****	0.297
	Purchases		13.982	**0.002*****	0.335#
After changes in VAT					
Gender	Sales: Increase group		1.024	1	0.104
	Sales: Decrease group		No value	0.492	0.129
	Purchases: Increase group		2.574	0.258	0.194
	Purchases: Decrease group		1.871	1	0.178
Age	Sales: Increase group		4.853	0.92	0.147
	Sales: Decrease group		3.337	1	0.162
	Purchases: Increase group		4.22	0.864	0.16
	Purchases: Decrease group		8.143	0.133	0.211
Education	Sales: Increase group		9.301	**0.063***	0.288
	Sales: Decrease group		3.37	0.587	0.201
	Purchases: Increase group		8.415	0.135	0.273
	Purchases: Decrease group		7.073	0.316	0.214
VAT knowledge	Sales: Increase group		8.904	0.177	0.295
	Sales: Decrease group		3.937	0.444	0.209
	Purchases: Increase group		6.754	0.366	0.245
	Purchases: Decrease group		8.846	0.214	0.316#

* Significant at 10% level as p < 0.1
** Significant at 5% level as p < 0.05
*** Significant at 1% level as p < 0.01
Strength of associations: $ – little, if any; blank – low; # – moderate)

From the results, the following significant associations between the demographic variables and tax compliance *before* a change in the VAT rate are noted:

- gender (purchases declared) at a 10% level of significance;

- education/qualifications (sales declared) at a 5% level of significance, the association being moderate;

- VAT knowledge (sales declared) at a 5% level of significance; and

- VAT knowledge (purchases declared) at a 1% level of significance, the association being moderate.

The following significant association between the demographic variables and tax compliance *after* a change in the VAT rate is noted:

- education/qualifications (sales declared, when there is an increase in the VAT rate) at a 10% level of significance.

There are no significant associations with tax compliance for any of the other variables in any of the other situations after a change in the VAT rate (where there is a decrease in the VAT rate and/or where purchases are involved). It is an interesting observation that only education/qualifications appear to affect tax compliance behaviour when there is a change in the VAT rate.

Those demographic variables where a significant association was identified before and/or after a VAT rate change – namely gender, education/qualifications and VAT knowledge – are now discussed in more detail. The effect of age on tax compliance is not discussed further, as it was not evident that those who are older were more tax compliant than their younger counterparts. Hypotheses H_{2A} and H_{2B} were thus not supported regarding age.

4.2   Gender

For the scenario before a change in the VAT rate where purchases were declared, there is a low significant association between gender and tax compliance. Females were more compliant in declaring purchases than males, with 89% and 75% compliance, respectively.

The results thus show that gender does not generally affect tax compliance except in the case of purchases declared, where female participants were more compliant than male participants, supporting H_{1A}. The result that females tend to be more compliant than males supports the studies done by Brockmann et al. (2016), Carsamer and Abbam (2020), Damayanti and Supramono (2019), D'Attoma et al. (2017) and Kogler et al. (2013), as these studies also all found that males are more inclined to evade taxes and are thus more non-compliant than females.

Regarding amounts declared when there were changes in the VAT rate, no significant association between gender and tax compliance was noted; thus, hypothesis H_{1B} was not supported.

4.3   Education/qualifications

From the results of the 15% category (before changes in VAT), there is a moderately significant association between education/qualifications and tax compliance for sales declared, supporting H$_{3A}$. The participants with the lowest qualifications (no qualifications after matric) only complied by 50% in declaring sales. The participants with the highest qualifications (Master's and Doctorate) were the most compliant, with a compliance rate of 94.1%. The low compliance of the participants with the lowest qualifications could be due to a lack of knowledge about VAT legislation and what compliance entails.

Regarding sales declared when there was an increase in the VAT rate, there is a low significant association between education/qualifications and tax compliance. Although the majority of the participants' compliance status did not change (100% for those who had only completed matric or a Bachelor's), there were some changes in compliance for participants with a post-matric qualification and also for those with Master's or Doctorate degrees. Of the participants with a post-matric qualification, 15.4% became non-compliant, whereas 5.3% of those with a Master's or Doctorate became compliant. The increase in the non-compliance of the participants with a post-matric qualification was somewhat expected, as people do tend to maximise their profits and may therefore declare less in sales to decrease their VAT liability. Based on this argument, however, it was unexpected that participants with higher qualifications would become *more* compliant with an increase in the VAT rate. It was expected that compliance would either remain the same or decrease. The results, however, support H$_{3B}$ in indicating that education levels do affect tax compliance.

There was variation between compliance in sales and purchases between the various treatment groups, but the participants with the lowest qualifications were consistently the least compliant. These results support the findings of Carsamer and Abbam (2020) which were likewise that participants who have a higher education are more compliant. However, a high qualification obtained does not necessarily imply a tax qualification. As Loo and Ho (2005) indicate, even though some participants may have a high(er) education, they might not possess the necessary tax knowledge to accurately complete their tax returns. Accordingly, if they lack tax knowledge, they could make unintentional errors (Kosonen & Ropponen, 2013).

4.4   VAT knowledge

For the scenario before a change in the VAT rate, an association between the perceived VAT knowledge and tax compliance for both sales and purchases declared was noted, supporting H$_{4A}$. For sales declared, there is a low significant association between perceived VAT knowledge and tax compliance. Although participants who indicated that they had a vague understanding of VAT were the most compliant in reporting sales at 100%, those with a reasonable VAT knowledge were only 64% compliant. The second most compliant participants, at 94%, indicated that they knew exactly how to calculate VAT; and they were followed, at 83%, by the participants who reported having a very good understanding of VAT.

For purchases declared, there is a moderately significant association between perceived VAT knowledge and tax compliance. A tendency for participants with the highest perceived VAT knowledge to be the most compliant (91%) and for participants with a vague VAT knowledge to be the least compliant (50%) was noted. This was expected,

as participants with a vague VAT knowledge probably do not know which purchases are allowed to be deducted.

The results indicating that VAT knowledge influences tax compliance support the findings of Kirchler and Maciejovsky (2001), Kwok and Yip (2018) and Song and Yarbrough (1978), who found that when individuals have a better knowledge of tax and higher levels of tax ethics, they are more compliant.

Regarding amounts declared when there were changes in the VAT rate, no significant association between tax knowledge and tax compliance was noted; thus, hypothesis H_{4B} was not supported. Although the results are not statistically significant, where there was an increase in the VAT rate, participants with the most VAT knowledge tended to become the most non-compliant. This was expected, as those with more VAT knowledge could potentially abuse the system and identify loopholes to minimise their VAT liability.

To establish the correlation between levels of education and perceived levels of VAT knowledge, a Kruskal-Wallis test was run due to the ordinal nature of the education data. From Table 4, it is evident that there is no statistically significant difference between levels of education and perceived levels of VAT knowledge.

Table 4: Test Statistics for Kruskal-Wallis: VAT Knowledge Perception

Total n	131
Kruskal-Wallis test statistic	5.634
Asymptotic significance	0.131
Result	Not significant

It is evident that VAT knowledge is not significantly dependent on level of education in general, supporting the findings of Kwok and Yip (2018) and Loo and Ho (2005) that education and training specifically in the tax field have a positive impact on tax compliance. Care should be taken, therefore, in assuming that a higher qualification in all cases would mean that a person has sufficient tax knowledge, as the qualification could be in a field that is completely unrelated to tax (Kirchler, 2007; Richardson & Sawyer, 2001).

When considering the mean ranks of the different groups as per Table 5, it can be deduced, however, that there is a tendency, as levels of education increase, for participants' perceived VAT knowledge to increase too, with a clear difference between VAT knowledge at matric level or lower and VAT knowledge at any tertiary education level. This supports the results of Inasius (2019) and Song and Yarbrough (1978), which indicate that tax knowledge improves with higher qualifications regardless of the field in which the qualifications are obtained.

Table 5: Mean Ranks: VAT Knowledge Perception

Ranks			
	Education	**N**	**Mean rank**
Knowledge	Matric or lower	8	38.44
	Post-matric	31	65.19
	Bachelor's	58	68.58
	Master's or Doctorate	34	68.82
	Total	131	

In summary, these analyses add to the body of knowledge already available on the possible effect of demographic variables on tax compliance, in combination with changes in a VAT rate. Indeed, the results may assist governments in focusing their attention for revenue collection on groups that tend to show higher levels of non-compliance.

5. CONCLUSION

Although prior empirical research has been conducted on demographic variables and changes in the tax rate, little empirical evidence from prior research has been obtained from a VAT perspective in an African country.

The results of the current experiment indicate that tax compliance is problematic for revenue collection, as some participants were not compliant even before there were any changes in the VAT rate. The correlation between the demographic variables and whether or not a participant complied before a change in the VAT rate shows that: females tend to be more compliant than males; the highest qualified in terms of levels of education are more compliant in declaring sales and are also relatively more compliant in declaring purchases than those with lower levels of education; and the better the perceived VAT knowledge, the higher the compliance regarding both sales and purchases.

When there is a change in the VAT rate, the only demographic variable that is deemed to have a significant effect on tax compliance is the level of education/qualifications for sales declared when there is an increase in the VAT rate. Education was expected to have an effect on tax compliance, as education can lead to more knowledge regarding available loopholes for tax evasion; yet it was also expected that higher qualified people would be more compliant, as they possibly have more knowledge on what the legal requirements are for tax compliance.

The increase in non-compliance by the participants with a post-matric qualification was somewhat expected, as people generally tend to maximise their profits and may therefore declare less in sales to decrease their VAT liability. Based on this argument, it was unexpected that participants with higher qualifications would become more compliant with an increase in the VAT rate.

As with all studies, this one has a number of limitations, but these limitations also lead to potential for future research. Only individuals who are owners/managers of small

businesses qualified to participate in the study, and thus, the views of participants are limited to the views of owners/managers of such small business entities. This does, however, provide more accurate results and insight into the tax compliance behaviour of this specific taxpayer group. Nevertheless, the experiment could be expanded in future research to test the effect of changes in the VAT rate on other types of taxpayer. Moreover, larger samples should be obtained to enrich the findings of the study.

The experiment adopted a simple design, and thus, complex market restructurings and other effects on prices after a change in the VAT rate were not taken into account. These restructurings could be built into a model for future research.

In addition, since only participants who had an electronic device and access to the internet were able to complete the experiment, there is a possibility that important data were not captured from other potential participants who did not have easy access to such resources. Researchers may therefore need to be creative in finding ways to include those who otherwise would be unable to participate in such a study because of technological limitations.

'People who complain about taxes can be divided into two classes: men and women'.[11] Although many people may complain about taxes, a large number of people do remain tax compliant. Various demographic variables may influence a person's tax compliance decisions, and when a government is aware of these influencing factors, more targeted programs can be implemented to ensure that the optimal amount of tax revenue is collected.

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Tax professionals' perceptions on Malaysian HNWIs' compliance behaviour

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Abstract

Documented evidence has shown that a significant number of high net worth individuals (HNWIs) whose contribution accounted for more than 11% of personal income tax collections have been caught in tax malfeasance over the period of 2009-2013 through IRBM tax audits. Therefore, this article examines the influence of probability of detection, perceived severity of punishment, political affiliation, role of tax professionals, conditional cooperation, and vertical fairness on HNWIs' non-compliance behaviour. Survey questionnaires were administered among tax professionals, and data was analysed using PLS software. The results reveal that the probability of detection, severity of punishment, political affiliation and role of tax professionals have a significant influence on tax non-compliance behaviour among HNWIs.

Keywords: HNWIs; non-compliance; probability of detection; severity of punishment; political affiliation

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1. INTRODUCTION

Since 2009, when the Organisation for Economic Co-operation and Development (OECD) first published a report about the engagement of High Net Worth Individuals (HNWIs) on tax compliance, this category of taxpayers has become an important subject in tax research. While there is no universal definition of HNWIs, the most commonly applicable definition is that of OECD (2009) which defined HNWIs as individuals with a net worth of at least USD 1 million held either directly or indirectly through trusts and controlled entities. OECD (2009) clarified that there are four considerations for the recent focus on HNWIs among revenue authorities. The first is the complex nature of the transactions and businesses of HNWIs. Some are internationally mobile, making it difficult to establish their principal place of residence. They also have a variety of income sources and complex business arrangements. Secondly, they contribute a significant share of tax revenue. For instance, the OECD reported the top 0.5% of individual taxpayers in the United Kingdom as contributing 17% of the total income tax; in Germany, 8% of the income total tax, and similarly, in the United States, 40% of the total federal income tax collection (OECD, 2009, p. 13). In Malaysia, the top 0.32% contributed 11.95% of total individual tax collection in 2013 (Rosli, Ling & Embi, 2018). Thirdly, this large contribution occurs despite aggressive tax planning by HNWIs (OECD, 2009), as they have more opportunity of tax avoidance through aggressive tax planning. HNWIs are more likely to engage in aggressive tax planning due to the complexity of their businesses and variety of income sources to reduce their tax burden. This makes it possible for HNWIs to engage the services of a tax agent to assist them in aggressive tax planning (OECD, 2009). Lastly, though in reality HNWIs contribute a high proportion of tax, the public mostly perceives this category as paying the least amount of tax. Therefore, this brings forth the issue of integrity of the tax administration as the offences of HNWIs are more likely to attract public attention (OECD, 2009).

Based on the above considerations, studies have been undertaken regarding HNWIs in many countries around the world. For instance, the study of OECD (2009) covered 14 countries (Australia, Canada, Ireland, Germany, France, Japan, Mexico, the Netherlands, New Zealand, Norway, South Africa, Switzerland, United Kingdom and United States) and concluded among other things that HNWIs pose a significant challenge to tax administration where the channelling of resources to this segment of taxpayers can improve the level of tax compliance. In Uganda, a study undertaken by Kangave et al. (2016) concluded that Uganda can realise a modest increase in its tax revenue through taxing HNWIs, not necessarily through a tax rate increase, but proper administration of taxes which could be achieved through the development of a comprehensive framework governing the taxation of HNWIs. In Italy, Rossi (2022) reported that Italy has introduced a new tax regime for HNWIs in 2017 with the intent to convince both Italian and foreign HNWIs to transfer their residency status to the country and pay a fixed amount of EUR 100,000 in lieu of the Italian regular income tax on their foreign source income.

In Malaysia, Rosli et al. (2018) through the study of economic determinants of tax malfeasance practices of HNWIs found that a majority with a total income of MYR 1 million to MYR 3 million tend to engage in tax malfeasance. Specifically, the documented evidence has shown that a significant number of HNWIs whose contribution accounted for more than 11% of personal income tax collections have been caught in tax malfeasance over the period of 2009 to 2013 through Inland Revenue Board of Malaysia (IRBM) audits (Rosli et al., 2018). The available records showed

that of 511 HNWIs audited during the aforesaid period, 319 were found to engage in tax malfeasance, which represented about 62% of this important category of taxpayers. A bigger challenge is that the number of this category of taxpayers is growing. The number of HNWIs in Malaysia increased from about 990 in 2015 to 1,020 in 2016 (The Star, 2017). This growth may further challenge the tax administration as additional strategies should be required to reduce non-compliance practices, and/or to create a conducive tax climate for Malaysian HNWIs residing overseas to transfer their residence status to Malaysia in anticipation of a favourable tax treatment.

However, in Malaysia few attempts have been made to understand the compliance behaviour of individual taxpayers. The only available study relating to the compliance behaviour of HNWIs in Malaysia is Rosli et al. (2018). While the study has strategic utility value for understanding the tax malfeasance of HNWIs, it was limited to economic factors such as tax rate, income level, income sources and use of tax agent, which are mainly based on data readily available at IRBM. A major argument is that there could be other factors beyond economic ones that could only be perceived by the tax agents who mostly interact with HNWIs.

Rosli et al. (2018) concluded that, considering that the probability of detection or being selected for audit is very low in Malaysia (which is expected to happen once in every five years), it could be reasonable for HNWIs to perceive a low chance of detection. However, the influence of the probability of being audited and tax non-compliance of HNWIs in Malaysia has not been examined. Moreover, there is an argument in tax compliance literature that even when the probability of detection is high, individuals could still decide to evade by weighting the cost and benefit of evasion. This means that when the cost (punishment) is higher than the benefit (proceeds from evasion or underreporting), such an individual could still evade taxes (Allingham & Sandmo, 1972). Although this has long been established in tax compliance literature, to the best of the researchers' knowledge it has not been examined with regards to HNWIs' compliance.

In support of the influence of political affiliation on tax compliance, Fairfield (2013) stressed that in jurisdictions where elites have political and investment power, it could be difficult to achieve significant increases in direct tax, thus highlighting the possible impact of political affiliation on the tax compliance of HNWIs.

Additionally, the perceived role of tax professionals in aiding evasion is another suggested area of concern in HNWIs' tax non-compliance (Rosli et al., 2018). The nature of HNWIs' incomes which are generated from multiple and complex sources imply that they could have a high likelihood to receive sophisticated financial advice from tax professionals to aid them in aggressive tax planning (OECD, 2009). In Malaysia, the law provides that any person who assists or advises a taxpayer to under-report tax liability may be prosecuted and upon conviction be liable to an MYR 20,000 fine or even imprisonment of not more than three years; however, this has not to date been put into effect (Rosli et al., 2018). Moreover, OECD (2009) also suggested the exploration of cooperative strategies in relation to the tax compliance of HNWIs. Jahnke (2015) identified and examined two types of conditional cooperation. The first is the conditional cooperation through vertical reciprocity in which taxpayers comply based on the perceptions that members of their groups also comply. The second is horizontal reciprocity based on a conditional cooperation between taxpayers and the government. While OECD (2009) highlighted horizontal reciprocity based on the conditional cooperation between HNWIs and the government, it is also important to consider

vertical reciprocity based on conditional cooperation among HNWIs. Lastly, there is also the issue of fairness perception, especially with regards to the tax rate increase for the high income bracket from 25% to 28% in 2015 (The Star, 2015). This may passively create a new perception of fairness for high income earners including HNWIs, as this could create a question regarding vertical fairness (Saad, 2010). However, the perceptions of HNWIs regarding vertical fairness have not been examined in the literature.

In line with these highlighted matters, this article examines the influence of perceived determinants of HNWIs' non-compliance to address the gap left by the study of Rosli et al. (2018). In that study, the focus was limited to economic factors only, despite the fact that there could be other factors beyond economic ones that could only be perceived by the tax agents who mostly interact with HNWIs. Furthermore, the number of HNWIs in Malaysia has been gradually increasing over time since 2013. Specifically, the article investigates the perceived determinants of tax non-compliance of HNWIs in Malaysia covering probability of detection, perceived severity of punishment, political affiliation, role of tax professionals, conditional cooperation, and vertical fairness.

The article contributes to the literature on HNWIs' compliance behaviour as this literature is in its nascent stage with only few scholarly publications such as OECD (2009), Kangave et al. (2016, 2018), Rosli et al. (2018) and Rossi (2022). More importantly, with the exception of Rosli et al. (2018), none of these studies modelled the determinants of non-compliance behaviour of HNWIs, which is also limited to the use of audit data that neglect socio-psychological factors. Therefore, investigation into the perceived determinants of HNWIs' non-compliance will produce a complementary model for HNWIs' non-compliance. As a practical matter, the IRBM may also be interested to know the possible causes of this phenomenon to help develop policies and strategies to reduce HNWI non-compliance. Therefore, the outcome of this study will assist in developing these policies and strategies, especially to promote cooperation between the government and HNWIs to boost individual tax revenue collection in Malaysia. Giving the importance of HNWIs in contributing to the revenue base of their respective countries and their widely acclaimed aggressive tax planning, by implication the model produced from this study can be adapted in many countries around the world to address the non-compliance behaviour of HNWIs in their respective jurisdictions, thereby promoting international cooperation in addressing HNWIs' non-compliance challenges.

The remainder of this article is organised as follows: section 2 reviews the literature on non-compliance within and outside Malaysia and related variables. Hypotheses are developed based on the discussion. Section 3 explains the research method employed. Results from descriptive and regression analyses are presented in section 4. Finally, section 5 summarises and concludes the article.

2.   LITERATURE REVIEW

This section provides a review on the different definitions of HNWIs and the literature on non-compliance of HNWIs around the globe. This is followed by a review of literature on the independent variables and hypotheses.

2.1   Understanding HNWIs

The most commonly applicable definition of HNWIs is that of OECD (2009), in which HNWIs are defined as individuals with a net worth totalling USD 1 million either directly or through trust and other controlled entities. Similarly, in Australia, HNWIs are considered those with net worth of USD 1 million, including their primary residence (Real Estate Conversation, 2020, citing Knight Frank Research, *Wealth Report 2020* (14th ed, 2020)), while in South Africa, HNWIs are defined based on gross income and/or gross wealth of ZAR 7 million and 75 million respectively (Kangave et al., 2016). In Uganda, three criteria are used in defining HNWIs (Kangave et al., 2018). The first is rental income or land and property transactions. This is considered due to the fact that Uganda is a real estate economy. In this, an individual is considered an HNWI if they generate a rental income of USD 142,000 annually or engage in the buying and selling of land for which the value exceeds USD 285,000 in a five-year period. Secondly, shareholding is also used as a criterion; in this, an investor in a private company whose annual turnover exceeds USD 14.3 million is considered an HNWI, and a shareholder of multiple companies with a turnover between USD 4.3 million and 14.3 million is considered an HNWI. Lastly, bank deposits are also classified as a useful indicator of wealth. A person is classified as an HNWI if they have a loan portfolio of over USD 1.5 million in a five-year period or have bank transactions of over USD 1 million annually. In Malaysia, Securities Commission Malaysia (2021) defined HNWIs in terms of both income and wealth. In terms of wealth, HNWIs are those whose total net assets or total net joint assets with a spouse exceed MYR 3 million or its equivalent in foreign currencies, excluding the value of the person's primary residence. In terms of income, consideration was given for individuals and joint annual incomes of MYR 300,000 or 400,000 or its equivalent in foreign currency (Securities Commission Malaysia, 2021). OECD (2013) classified HNWIs for some selected OECD member countries and OECD non-member countries, including Malaysia. For Malaysia, OECD (2013) classified HNWIs as individuals with a statutory income over MYR 1 million, assets over MYR 5 million, or both together over MYR 5 million.

For the purpose of this study, the definition of OECD (2013) was adopted for three reasons. First, the equivalent of USD 1 million proposed in the definition of HNWIs in OECD (2009) is closer to the MYR 5 million in assets contained in OECD (2013) compared to MYR 3 million suggested by Securities Commission Malaysia. Secondly, in relation to the definition contained in OECD (2009) which classified HNWIs as those having wealth over USD 1 million for tax purposes, this was arrived at after including South Africa, which is an upper middle-income country like Malaysia.[1] Lastly, the statutory income of MYR 1 million suggested by OECD (2013) is closer to reality. For instance, Uganda which is classified as a low income country[2] adopts an annual rental income of USD 142,000 as the measure which is equivalent to MYR 580,000. For the purpose of HNWI classification based on income, it could not be fair to classify an income of MYR 300,000 for individuals and MYR 400,000 for individuals and spouses as HNWIs for tax purposes in Malaysia based on the Securities Commission Malaysia

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[1] World Bank Group, 'World Bank country and lending groups – country classification', https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups (accessed 28 September 2019).
[2] Ibid.

classification as Malaysia is an upper middle-income country. Thus, this study considers a high amount of statutory income of MYR 1 million as suggested by OECD (2013).

2.2   Economic deterrence theory

Economic deterrence theory is said to originate from the Allingham and Sandmo (1972). The theory was developed based on the economics of crime approach. It assumed that the taxpayer earns a fixed amount income, and it left it as a matter for that taxpayer to decide the amount to under-report and to declare to the relevant tax authority as income. The theory postulates that tax compliance is primarily the function of three main deterrent variables consisting tax rate, tax audit and detection probability (Allingham & Sandmo, 1972). Although Allingham and Sandmo (1972) has set an important foundation to the economic deterrence theory, several scholars have made an effort to extend the theory by adding non-deterrence variables which also play a key role in explaining tax compliance (Alm, 1999; Torgler, 2002; Ya'u, Saad & Mas'ud, 2020). Nevertheless, no effort has so far been made in extending the deterrence theory within the context of HNWIs; hence, this study intends to bridge this gap by examining the factors responsible for tax non-compliance by HNWIs.

2.3   Tax non-compliance of HNWIs

Tax non-compliance of HNWIs is a major issue of concern for tax authorities globally (Rosli et al., 2018). Four important issues make the tax compliance of HNWIs an issue of concern among countries (OECD, 2009): (1) HNWIs have complex tax affairs; (2) their tax liabilities are a significant source of revenue; (3) they have more opportunity for aggressive tax planning through the assistance tax advisers, and (4) their behaviour affects the integrity of the tax system.

It is important to note that there are two main schools of thought in tax compliance. One is based on economic theory while the other is based on behavioural theory. The first school is an extension of Becker's (1968) economics of crime model in which the taxpayer's decision to evade depends on the risk involved in the evasion process. Allingham and Sandmo's (1972) economic deterrence theory extends Becker's (1968) economics of crime model through the consideration of probability of detection and penalties based on expected utility theory. Though economic deterrence has been prominent in tax compliance literature (Sapiei & Kasipillai, 2013), it has been argued that economic determinants alone cannot fully explain compliance behaviour, especially when detection probability is low. Eventually, the incorporation of behavioural factors, and more specifically sociological and psychological factors, was made (see Fischer, Wartick & Mark, 1992; Jackson & Milliron, 1986; Loo & Ho, 2005; Palil & Mustapha, 2011). A suggestion was made by Hasseldine and Bebbington (1991) and James and Alley (2002) that socio-psychological factors and fiscal psychological factors should be studied alongside economic deterrence variables.

Specifically, in the context of HNWIs there is a paucity of empirical evidence regarding the factors that explain tax non-compliance. For instance, the earlier studies such as OECD (2009), Kangave et al. (2016), Van Vuuren (2016), Rossi (2022), as well as Kangave et al. (2018) centred on tax administration issues of HNWIs in terms of complexity of identifying the sources and nature of their income, opportunity for non-compliance through aggressive tax planning aided by tax advisers, integrity of tax administration, audit approach, whistleblowing, offshore amnesty programs, and exchange of information programs. The only study that has focused on estimating the

determinants of tax non-compliance of HNWIs is Rosli et al. (2018). While the study has utility value, it focused mainly on economic determinants estimated through IRBM's audited data such as tax rate, income level, income source, and use of tax agent. However, observations have been made in the literature that economic factors alone cannot explain tax compliance and these need to be supported with socio-psychological factors and fiscal psychological factors (Hasseldine & Bebbington, 1991; James & Alley, 2002). Hence, this study aims to bridge the gap left by Rosli et al. (2018) by focusing on perceived economic, sociological, and psychological factors such as probability of detection, perceived severity of punishment, political affiliation, role of tax professionals, conditional cooperation, and vertical fairness that may affect HNWIs' non-compliance.

2.4   Probability of detection

Probability of detection is defined as the possibility of discovering non-compliance and rectification of deviance by tax authorities (Fischer et al., 1992). It emerged from the probability of being audited, which is considered as very narrow in detecting non-compliance, as audit is not perfect in detecting non-compliance. The two probabilities are not identical as the audit may fail to detect non-compliance by a taxpayer; however, probability of detection can represent a higher likelihood than probability of audit as detection efforts comprise several approaches such as using a computer to match third-party reports, computerised checks of tax return forms for the detection of obvious errors by taxpayers, as well as a well-rounded audit approach that touches entire levels of transactions. The probability of detection could be an important variable in the study of tax non-compliance of HNWIs because they mostly employ aggressive tax planning approaches to evade taxes (OECD, 2009); hence the need for authorities to institute various techniques that can enhance the probability of detection.

Studies have documented the influence of detection probability on tax compliance. Earlier studies such as Allingham and Sandmo (1972) and Fischer et al. (1992) reported that high probability of detection enhances tax compliance; this can be considered alongside recent evidence such as the findings of Alkhatib, Abdul-Jabbar, and Marimuthu (2018) which confirmed that high detection probability reduces evasion. Although evidence on the negative relationship between probability of detection and tax non-compliance is lacking with respect to HNWIs, the following hypothesis is developed.

H$_1$: *There is a negative relationship between probability of detection and tax non-compliance of HNWIs in Malaysia.*

2.5   Perceived severity of punishment

Severity of punishment has been defined by Earnhart and Friesen (2014) as the size of penalty imposed against offenders. Williams and Horodnic (2016) view severity of punishment as the sanctions imposed on taxpayers for non-compliance as classified into three categories: payment of the amount of tax due without penalty, payment of the amount due plus a fine, and payment of the amount due plus prison. In relation to HNWIs, the severity of punishment could be an important variable in their compliance behaviour since a significant number have been found to participate in tax malfeasance practices (Rosli et al., 2018) and there is a public belief that these categories of taxpayers are not meeting their tax obligations (OECD, 2009).

Severity of punishment has been analysed over a long period in the tax compliance literature. The earlier studies of Allingham and Sandmo (1972) and Fischer et al. (1992) reported that a high penalty leads to improvement in tax compliance. This has recently also been confirmed in the study of Alkhatib et al. (2018) in which penalty was found to negatively affect evasion due to strong fear of punishment by the taxpayers when caught in the act of non-compliance. Considering earlier literature on non-compliance (although lacking in respect of HNWIs), we propose the following hypothesis:

H₂: *There is a negative relationship between severity of punishment and tax non-compliance of HNWIs in Malaysia*.

2.6   Political affiliation

Political affiliation is defined in this study as membership of, or association with, a ruling political party. Literature relating to HNWIs indicates that those who are identified with a ruling party engage in evasion. For instance, in Uganda, Kangave et al. (2018) reported that analyses of tax compliance undertaken over the period of 2011-12 to 2013-14 for 71 top government officials revealed that the majority were not paying personal income tax even though they had stakes in commercial enterprises. Companies associated with these officials were also found not to comply with their tax obligations.

Extant literature documents a positive relationship between political affiliation and evasion. For instance, McGowan (2000) found that taxpayers who were identified with the Republican Party (right-leaning party) in the United States tend to be more opposed to taxes than those who either identified with the Democratic Party and Independents (left-leaning parties). Likewise, Hasseldine and Hite (2003) concluded that political party affiliation has a significant influence on taxpayers' behaviour, and taxpayers affiliated with the ruling party are more likely to be favourably treated by the tax authorities compared to other taxpayers affiliated to non-ruling parties. More recently, Palil, Zain and Faizal (2012) established a link between political affiliation and tax compliance in Malaysia. However, despite the link between political affiliation and tax compliance, evidence is lacking as to such effect with respect to HNWIs. Consequently, the following hypothesis is developed.

H₃: *There is a positive relationship between political affiliation and tax non-compliance of HNWIs in Malaysia.*

2.7   Role of tax professionals

The role of tax professionals refers to the influence of tax professionals in income tax reporting (Rosli et al., 2018). Tax professionals can be of varying specialisations such as tax advisers, tax preparers, tax agents, tax accountants, tax intermediaries and tax lawyers (Frecknall-Hughes & Moizer, 2015). Tax professionals play a significant role in tax compliance of HNWIs and their sophisticated application of aggressive tax planning to evade taxes. For instance, in the UK, about 70% of HNWIs employed the use of tax advisers (OECD, 2009), while 45.1% of HNWIs in Malaysia explicitly indicate that they hire tax professionals to handle their tax affairs (Rosli et al., 2018).

Studies have documented that HNWIs engage tax advisers for aggressive tax planning (OECD, 2009). In Australia, Sakurai and Braithwaite (2003) discovered that the majority of taxpayers believe that tax professionals are creative aggressive tax planners. Christensen (2015) noted that specific attention needs to be paid to the harm caused in relation to tax competition through tax powerbrokers such as 'Big 4' accounting firms

who have the ability to devise schemes for tax avoidance and evasion. Through audit data, Rosli et al. (2018) found a significant relationship between the influence of tax professionals and non-compliance; however, whether or not tax professionals aided aggressive tax planning that can result in tax non-compliance of HNWIs in Malaysia is an issue that needs further evidence. Therefore, the following hypothesis is developed:

H_4: *There is a positive relationship between the role of tax professionals in aggressive tax planning and tax non-compliance of HNWIs in Malaysia.*

2.8   Conditional cooperation

Conditional cooperation has been classified into two dimensions (Jahnke, 2015). The first dimension relates to taxpayers' compliance based on the behaviour of members of a group or society. This is regarded as horizontal reciprocity (Torgler, Schaffner & Macintyre, 2007). Specifically, horizontal reciprocity suggests that when a taxpayer believes that other members of the society that he/she belongs to are paying taxes, that taxpayer develops the motivation to pay; however, when an individual perceives that evasion is common in the society, such individual may be opportunistic in engaging in tax evasion behaviour. The second dimension is based on conditional cooperation between the taxpayer and tax authority through their interactions, such that taxpayers cooperate when the tax authority is also cooperative through information and support. This conditional cooperation is based on vertical reciprocity.

Literature on HNWIs indicates the possibility of horizontal and vertical reciprocity of conditional cooperation. For horizontal reciprocity, for instance, Kangave et al. (2016) posited that the perceptions regarding compliance of HNWIs is likely to have a bearing on the behaviour of other taxpayers. Thus, it can be deduced that when members within the HNWI group believe that others are under-reporting due to certain reasons such as aggressive tax planning or political affiliation, they could also develop a similar behaviour to evade taxes. In line with this argument, the following hypotheses are developed.

H_{5a}: *There is a negative relationship between conditional cooperation among HNWIs (horizontal reciprocity) and tax non-compliance of HNWIs in Malaysia.*

H_{5b}: *There is negative relationship between conditional cooperation between HNWIs and government (vertical reciprocity) and tax non-compliance of HNWIs in Malaysia.*

2.9   Vertical fairness

Vertical fairness in relation to taxation refers to the perception that taxpayers with different economic situations are taxed at different rates (Kirchler, Niemirowski & Wearing, 2006). This implies the need for higher income earners to pay tax at higher rates than low income earners. In relation to high income earners, which include HNWIs, Malaysia implemented an upward revision of tax rates from 25% to 28% in 2015 (The Star, 2015). This may create a new perception of fairness for high income earners, including HNWIs.

Literature has examined the influence of vertical fairness on tax compliance. In Malaysia, Saad (2010) investigated the influence of vertical fairness alongside other dimensions of fairness on voluntary compliance intention. The result revealed no significant relationship between vertical fairness and voluntary compliance intention, which implies that such perception is no motivation to either comply or not comply. In

relation to HNWIs, Rosli et al. (2018) examined the influence of tax rate on tax malfeasance in Malaysia, and the result revealed an insignificant relationship. It was concluded that the majority of HNWIs will pay tax irrespective of the rate imposed. However, Rosli et al. (2018) cautioned that when the rate is high, there could be a likelihood for HNWIs to take the risk for aggressive tax planning by shifting their wealth or income to lower tax jurisdictions. In fact, they concluded that the study of tax rate alone could not be the only factor influencing HNWIs' decisions to evade tax. Consequently, in view of this gap, it is proposed that there needs to be an investigation on the perception regarding vertical fairness and whether HNWIs perceive that the rate is fair enough to encourage compliance. Consequently, the following hypothesis is developed:

H₆: *There is a negative relationship between vertical fairness and tax non-compliance of HNWIs in Malaysia.*

3.   RESEARCH METHOD

This section describes the research model, research design, population and sample selection and data collection method and data analysis techniques.

3.1   Research model

The research model in this study is supported by Allingham and Sandmo's (1972) economic deterrence theory as well as suggestions made by Hasseldine and Bebbington (1991) and James and Alley (2002) for integrating socio-psychological and fiscal psychological factors in developing a tax compliance model. Specifically, the model is designed to explore the extent of the relationship between the probability of detection, perceived severity of punishment, political affiliation, role of tax professionals, conditional cooperation, and vertical fairness as independent variables and tax non-compliance of HNWIs as the dependent variable. The presentation of the model through both schematic presentations is as depicted in Figure 1 and through multiple regression analysis as derived in Equation 1.

Fig. 1: Model of Perceived Determinants of HNWIs' Tax Non-Compliance
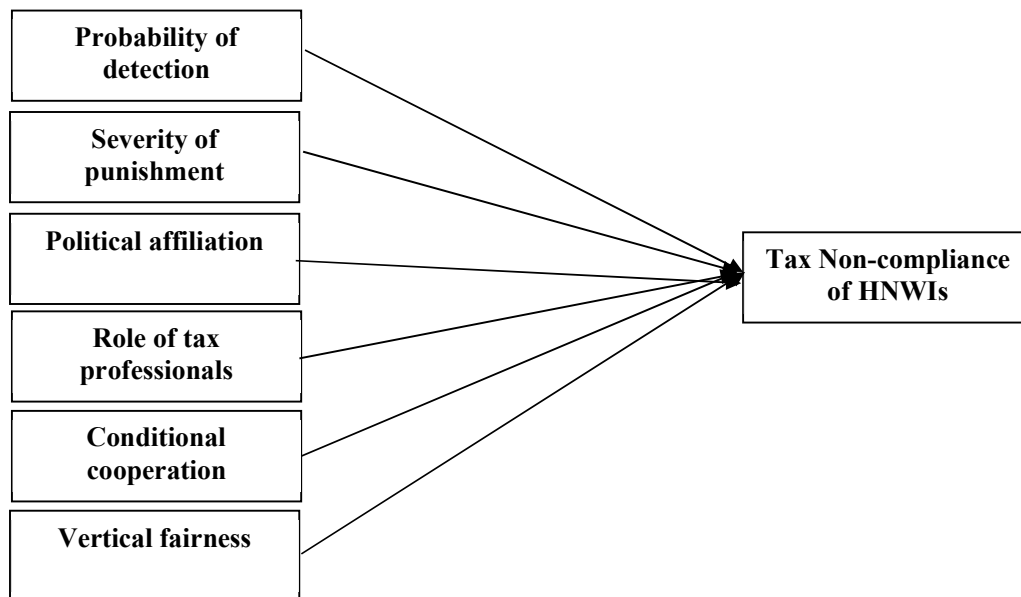
Based on the research model in Figure 1, the following multiple regression model is proposed to enable the test of the hypothesised relationships:

Tax non-compliance = α + β1 probability of detection *+ β2* severity of punishment *+ β3* political affiliation *+ β4* role of tax professionals *+ β5* conditional cooperation *+ β6* vertical fairness *+ ε*   (1)

where: *α* is the intercept, *β* is the multiple regression coefficient and *ε* is an error term.

3.2   Research design

A quantitative approach involving a survey was adopted to answer the objectives of the article. Survey instruments were developed from previous studies. The survey questionnaires that were distributed to tax professionals were divided into three main sections. The first section consisted of demographic information of the respondents, including their gender, age, highest qualification, designation, affiliation, years of service, and size of their firms. The second section comprised questions pertaining to respondents' non-compliance behaviour and the respective variables under study. For this section, the items used a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The questionnaires were prepared in the English language. Tax professionals were informed on the definition of HNWIs in the cover page of the questionnaires.

3.3   Operational definitions and measurement

The following are the operational definitions of variables, based on the literature and research context.

3.3.1   Non-compliance behaviour

Generally, non-compliance refers to taxpayers' wrongdoings such as failure to report or not report tax charged, not submitting income tax return forms, not reporting the actual income, and no tax payment or late tax payment. For the purpose of this article, non-compliance is defined as non-conforming to the tax obligations in terms of under-reporting of incomes in filing tax returns. Three (3) items were utilised to measure non-compliance behaviour for under-reporting incomes. The items, which were adapted from Yankelovich, Skelly and White Inc. (1984) are listed below:

Variable	Item
Non-compliance Behaviour (Under-reporting incomes)	HNWIs may consider it permissible not to report an income in a tax return for business done among them.
	HNWIs may believe it is acceptable to report income without including extra income generated from other sources of income.
	HNWIs may perceive that it is permissible not to report cash being paid for a contract or services rendered.

3.3.2   Probability of detection

The literature defines probability of detection as the possibility of discovering non-compliance and rectification of deviance by tax authorities (Fischer et al., 1992). Consistently, this article defines the variable as the likelihood of being detected for non-compliance. Four (4) items were used to measure probability of detection.

Variable	Item
Probability of Detection	I think HNWIs believe that IRBM is capable of detecting underreporting of large amount of income
	I think HNWIs believe that IRBM is capable of detecting overstatement of large deductions
	I think HNWIs believe that IRBM has adequate mechanism to detect underreporting of small amount of tax liability
	I think HNWIs believe that IRBM has expertise that can easily detect overstatement of small deduction

3.3.3   Severity of punishment

Consistent with the literature, severity of punishment has been operationalised as the degree of penalty imposed against tax offenders (Earnhart & Friesen, 2014). Four (4) items were used to measure severity of punishment.

Variable	Item
Severity of Punishment	As far as I know HNWIs are aware that intentional tax evaders are severely punished for refusing to pay taxes.
	As far as I know HNWIs are aware that taxpayers who openly refuse to pay taxes are treated as criminals and will be punished according to the law.
	As far as I know HNWIs are aware that penalty imposed on them is severe enough to aid tax compliance.
	As far as I know HNWIs are aware that existing enforcement procedures impose on them are sufficient enough to improve compliance.

3.3.4   Political affiliation

This article adopts the definition by Palil et al. (2012) where political affiliation refers to a membership of, or association with, a ruling political party. Five (5) items were adapted from Abodher, Ariffin and Saad (2018) to measure political affiliation.

Variable	Item
Political Affiliation	I believe HNWIs who are affiliated with the ruling party are more encouraged to pay tax.
	I believe HNWIs who are confidence in the present government are more encouraged to pay tax.
	I believe most of the HNWIs I know consider that paying tax is a national duty which does not relate to any political affiliation.
	I believe HNWIs would more be likely to pay tax if one of the political leaders they have voted is in power.
	I believe HNWIs' political affiliation may not completely impact on paying taxes.

3.3.5   *Role of tax professionals*

Adopting the definition by Rosli et al. (2018), this article defines role of tax professionals as the influence of tax professionals in income tax reporting. Five (5) items were utilised to measure the role of tax professionals.

Variable	Item
Role of Tax Professionals	HNWIs believe that tax professionals are always around to assist them during their tax audit sessions.
	HNWIs believe that tax professionals provide assistance to them in discussions and negotiation a lot with the tax auditors on the audit's findings.
	To my knowledge HNWIs believe that they would have been in a very difficult situation without the intervention of tax professionals in their audits processes.
	To my knowledge HNWIs believe that tax professionals highly assist them in strategic tax planning.
	To my knowledge HNWIs believe tax professionals assist them to reduce their tax liability through legal and constitutional means.

3.3.6   *Horizontal reciprocity*

In this article, horizontal reciprocity is defined as taxpayers' compliance based on the behaviour of members of the group or society (Torgler et al., 2007). In other words, they will behave in a similar manner as their counterparts. This variable is measured by three (3) items which were adapted from Frey and Torgler (2007).

Variable	Item
Horizontal Reciprocity	I believe HNWIs would be more likely to pay tax if others within their income group are paying.
	I believe HNWIs would also feel obligated to contribute and pay their taxes if many citizens pay their taxes.
	To my understanding some HNWIs wish to fulfill the social norm of paying their taxes by just behaving according to society's rules.

3.3.7 *Vertical reciprocity*

This conditional cooperation is defined as the cooperation between taxpayer and government through their interactions with the tax authority or government in general (Kangave et al., 2016). Three (3) items are measured for this variable which were adapted from Jahnke (2015).

Variable	Item
Vertical Reciprocity	To my understanding HNWIs would agree to a tax increase if the extra money is used to finance the provision of better public goods and services.
	To my understanding HNWIs perceive IRBM has been a supportive institution in discharging their tax obligations.
	To my understanding HNWIs perceive the central government discharge its responsibilities.

3.3.8 *Vertical fairness*

Vertical fairness is operationalised as the perceptions of HNWIs on taxpayers with different economic situations that are being taxed at different rates, following the definition of Kirchler et al. (2006). Three (3) items are used to measure vertical fairness.

Variable	Item
	I believe HNWIs may think it is fair that they are taxed at a progressively higher tax rates than other income earners.
Vertical Fairness	I believe HNWIs may think it is fair that middle-income earners are taxed at a lower rate compared to them.
	I believe HNWIs may think that the share of the total income taxes paid by them is fair relative to their earnings.

3.4 Population and sample size

The population was taken from the list of 2,722 tax professionals registered with the IRBM. In order to meet the need for representative statistical sample in empirical

research, the table of sample size determination by Krejcie and Morgan (1970) was referred to. Based on the table, a population of 2,800 requires 338 samples. However, considering the response rate in Malaysia is within approximately 18%-30%, the sample size was increased by 50% (in addition to the sample size suggested by Krejcie and Morgan, 1970), where 500 tax professionals were systematically selected.

3.5   Data collection method

Data from tax professionals on the perceived determinants of HNWIs' non-compliance were collected using a combination of postal, self-administered, and online surveys. A blend of approaches had to be adopted to increase the response rate. The data collected was analysed using SPSS (for demographic and descriptive analysis) and Partial Least Squares (PLS) Structural Equation Modelling (SEM) using SmartPLS version 3.0.

3.6   Response rate

As set out in Table 1, of 500 questionnaires which were distributed, 123 responses were collected. Of those, 23 responses stated that they did not handle HNWI clients, and were therefore dropped from this analysis.

Table 1: Summary of Survey Responses

Description	Number of Questionnaires	% Total
Questionnaires Distributed	500	100.0
Returned Questionnaires	123	24.6
Invalid Questionnaires	23	4.6
Usable Questionnaires	100	20.0

4.   RESULTS AND DISCUSSION

4.1   Demographic information

Table 2 illustrates the demographic characteristics of the respondents. From 100 respondents, 56 were males (56%) and 43 were females (43%). With respect to the type of firms that they represented, 60 (60%) respondents were from small firms, followed by mid-sized firms with 32 respondents (32%) and only 6 respondents (6%) were from the 'Big 4'. The respondents were asked about their experience as tax professionals. The results indicate that the majority (65%) had experience of five years and above as tax professionals, while the remaining respondents (34%) had experience of less than five years.

Generally, 50% indicated that the majority of their clients were small companies, followed by mid-sized companies (36%) and individuals (4%). Irrespective of this, all the tax professionals admitted that they had HNWI clients. This is important to ensure that their perceptions reflect their experience in dealing with HNWIs.

Table 2: Demographic Information

Demographic Profile	Frequency	Percentage
Gender:		
Male	56	56%
Female	43	43%
Missing	1	1%
	100	**100%**
Size of the firms:		
Small Firm	60	60%
Mid-size Firm	32	32%
Big Four	6	6%
Missing	1	1%
	100	**100%**
Number of years as tax agent:		
Less than 5 years	34	34%
5-10 years	24	24%
More than 10 years	41	41%
Missing	1	1%
	100	**100%**
Type of clients (Majority):		
Individual	4	4%
Small companies	50	50%
Mid-size companies	36	36%
Large companies	7	7%
Missing	3	3%
	100	**100%**

4.2   Descriptive results

This section describes the descriptive results on every variable under study. As set out in Table 3, for under-reporting income, the mean value for every item is below 2.50 which indicates that tax professionals perceive that the HNWIs were not in favour of under-reporting their incomes. Overall, the mean score for the three items is 2.21 with a standard deviation of 0.84. In other words, the HNWIs considered that it is tax non-compliance if they did not report a certain income, exclude extra income, as well as hide some cash income generated from other sources of income, contract or services rendered.

Table 3: Descriptive Analysis for Non-Compliance Behaviour – Under-Reporting Incomes

Under-Reporting Incomes (UI)	n	Minimum	Maximum	Mean	SD
HNWIs may consider it permissible not to report an income in a tax return for business done among them (UI1).	100	1	5	2.05	1.01
HNWIs may believe it is acceptable to report income without including extra income generated from other sources of income (UI2).	100	1	5	2.22	0.99
HNWIs may perceive that it is permissible not to report cash being paid for a contract or services rendered (UI3).	100	1	4	2.37	1.02
Under-Reporting Incomes	**100**	**1**	**5**	**2.21**	**0.84**

Table 4 provides the descriptive results of probability of detection. With an overall mean value of 3.62 and standard deviation of 0.73, the results indicate that tax professionals are of the opinion that HNWIs believe that the probability of detection is high. In other words, the IRBM has the capability to detect any non-compliance behaviour.

Table 4: Descriptive Analysis for Probability of Detection

Probability of Detection	n	Minimum	Maximum	Mean	SD
I think HNWIs believe that IRBM is capable of detecting under-reporting of large amount of income.	100	1	5	4.06	0.81
I think HNWIs believe that IRBM is capable of detecting overstatement of large deductions.	100	1	5	3.94	0.83
I think HNWIs believe that IRBM has adequate mechanism to detect under-reporting of small amount of tax liability.	100	1	5	3.28	0.93
I think HNWIs believe that IRBM has expertise that can easily detect overstatement of small deduction.	100	1	5	3.20	1.07
Probability of Detection	**100**	**1**	**5**	**3.62**	**0.73**

With regard to severity of punishment, tax professionals perceive that HNWIs were aware of the level of punishment. This is based on the overall mean value of 3.76 and standard deviation of 0.73 as set out in Table 5. Overall, HNWIs felt that the existing punishments imposed are severe enough to improve compliance among HNWIs. This may explain why the non-compliance behaviour is moderately low.

Table 5: Descriptive Analysis for Severity of Punishment

Severity of Punishment	n	Minimum	Maximum	Mean	SD
As far as I know HNWIs are aware that intentional tax evaders are severely punished for refusing to pay taxes.	100	1	5	4.04	0.88
As far as I know HNWIs are aware that taxpayers who openly refuse to pay taxes are treated as criminals and will be punished according to the law.	100	1	5	3.89	0.93
As far as I know HNWIs are aware that penalty imposed on them is severe enough to aid tax compliance.	100	1	5	3.56	1.07
As far as I know HNWIs are aware that existing enforcement procedures impose on them are sufficient enough to improve compliance.	100	1	5	3.54	0.90
Severity of Punishment	**100**	**1**	**5**	**3.76**	**0.73**

Table 6 indicates that tax professionals perceive that HNWIs' decision whether or not to comply with tax obligations does not have anything to do with their political affiliation. This is based on the overall mean value of 2.61 with a standard deviation of 0.66 as set out in Table 6. Observation of individual items also indicates similar perceptions with mean values of less than 3.0.

Table 6: Descriptive Analysis for Political Affiliation

Political Affiliation	n	Minimum	Maximum	Mean	SD
I believe HNWIs who are affiliated with the ruling party are more encouraged to pay tax.	100	1	5	2.96	1.07
I believe HNWIs who are confidence in the present government are more encouraged to pay tax.	100	1	5	2.96	1.15
I believe most of the HNWIs I know consider that paying tax is a national duty which does not relate to any political affiliation*.	100	1	5	2.27	1.09
I believe HNWIs would more be likely to pay tax if one of the political leaders they have voted is in power.	100	1	5	2.48	1.04

I believe HNWIs' political affiliation may not completely impact on paying taxes*.	100	1	5	2.38	0.99
Political Affiliation	**100**	**1**	**5**	**2.61**	**0.66**

*These items have been recoded

With regards to the role of tax professionals, the overall mean value is 3.92 and standard deviation of 0.56. Table 7 indicates that tax professionals perceive that HNWIs felt that tax professionals have been playing their roles efficiently during tax audit and tax planning. While this information is useful, it is also important to note that this is the perceptions of tax professionals on their own role in assisting their clients.

Table 7: Descriptive Analysis for Role of Tax Professionals

Role of Tax Professionals	n	Minimum	Maximum	Mean	SD
HNWIs believe that tax professionals are always around to assist them during their tax audit sessions.	100	2	5	3.98	.80
HNWIs believe that tax professionals provide assistance to them in discussions and negotiation a lot with the tax auditors on the audit's findings.	100	2	5	3.91	0.68
To my knowledge HNWIs believe that they would have been in a very difficult situation without the intervention of tax professionals in their audits processes.	100	1	5	3.96	.75
To my knowledge HNWIs believe that tax professionals highly assist them in strategic tax planning.	100	2	5	3.98	0.70
To my knowledge HNWIs believe tax professionals assist them to reduce their tax liability through legal and constitutional means.	100	1	5	3.76	0.71
Role of Tax Professionals	**100**	**1**	**5**	**3.92**	**0.56**

The descriptive results on horizontal reciprocity with an overall mean value of 3.81 and standard deviation of 0.71 are revealed in Table 8. It is clearly indicated that tax professionals perceive that HNWIs' motivation to pay tax is also dependent on other HNWIs' behaviours. This could be more visible if they are in a group of those who are obligated to contribute and pay tax.

Table 8: Descriptive Analysis for Horizontal Reciprocity

Horizontal Reciprocity	n	Minimum	Maximum	Mean	SD
I believe HNWIs would be more likely to pay tax if others within their income group are paying.	100	1	5	3.96	0.92
I believe HNWIs would also feel obligated to contribute and pay their taxes if many citizens pay their taxes.	100	1	5	3.94	0.86
To my understanding some HNWIs wish to fulfil the social norm of paying their taxes by just behaving according to society's rules.	100	2	5	3.53	0.73
Horizontal Reciprocity	**100**	**1.00**	**5.00**	**3.81**	**0.71**

In view of vertical reciprocity, the overall mean reported is 3.57 and standard deviation of 0.58. This means that tax professionals believe that the obligation of HNWIs to comply in paying tax is indirectly motivated based on the conditional cooperation with the government. Hence, willingness to contribute to tax would very much depend on taxpayers perceiving that the public would be benefited.

Table 9: Descriptive Analysis for Vertical Reciprocity

Vertical Reciprocity	n	Minimum	Maximum	Mean	SD
To my understanding HNWIs would agree to a tax increase if the extra money is used to finance the provision of better public goods and services.	100	1	5	3.64	1.11
To my understanding HNWIs perceive IRBM has been a supportive institution in discharging their tax obligations.	100	1	5	3.45	0.85
To my understanding HNWIs perceive the central government discharge its responsibilities.	100	1	5	3.63	0.86
Vertical Reciprocity	**100**	**1**	**5**	**3.57**	**0.58**

Generally, the tax professionals view the progressive tax rate threshold set for HNWIs, which is higher, as fair. This is supported by the mean score of overall vertical fairness perception of 3.49 and standard deviation of 0.68. In fact, with the comparison to middle-income earners, the high rates for HNWIs are believed to be fair and acceptable.

Table 10: Descriptive Analysis for Vertical Fairness

Vertical Fairness	n	Minimum	Maximum	Mean	SD
I believe HNWIs may think it is fair that they are taxed at a progressively higher tax rates than other income earners.	100	1	5	3.30	0.91
I believe HNWIs may think it is fair that middle-income earners are taxed at a lower rate compared to them.	100	1	5	3.69	0.91
I believe HNWIs may think that the share of the total income taxes paid by them is fair relative to their earnings.	100	1	5	3.48	0.85
Vertical Fairness	**100**	**1**	**5**	**3.49**	**0.68**

4.3 Partial least square (PLS-SEM) results

In accordance with the recommendation of Henseler, Ringle and Sinkovics (2009) and Hair, Ringle and Sarstedt (2013), the two-step data analysis process, namely measurement and structural model, was performed.

4.3.1 Measurement model

This section presents the measurement results of the under-reporting model which sets out the item loadings, composite reliability, and average variance extracted (AVE). As indicated earlier, the threshold for item loadings to be acceptable is ≥.40 while the threshold for composite reliability and AVE is ≥.70 and ≥.50, respectively. Based on Table 11, the criteria for item loadings have been met where all indicators (except SP1 and HR1) are above the minimum threshold point of ≥.40 (Hair, Ringle & Sarstedt, 2011; Hair et al., 2012, 2013). Items SP1 and HR1 cannot be removed despite their low loadings as the remaining number of the items for the variables is only two. Furthermore, the items do reflect the variables that they represent. It is important to note that this is the revised measurement model after removing eight indicators (PD2, SP2, PA1, PA2, TP1, TP3, HR3 and VR3) due to their low loadings. Additionally, the internal consistency criteria which were measured using composite reliability have also been met with the values ranging from 0.66 to 0.83 (Hair et al., 2011, 2012, 2013). The convergent validity requirement which was measured using AVE was also met. The scores ranged from 0.52 to 0.63 which are above the minimum cut-off point of ≥.50 (Hair et al., 2011; Henseler et al., 2009; Henseler, Ringle & Sarstedt, 2015).

**Table 11: Item Loadings, Composite Reliability and Average Variance Extracted (AVE)**

Constructs	Items	Loadings	Composite Reliability	AVE
Under-Reporting Income (UI)	UI1	0.55	0.78	0.55
	UI2	0.82		
	UI3	0.82		
Probability of Detection (PD)	PD1	0.83	0.83	0.63
	PD3	0.80		
	PD4	0.74		
Severity of Punishment (SP)	SP1	0.33	0.67	0.53
	SP3	0.71		
	SP4	0.81		
Political Affiliation (PA)	PA3	0.82	0.75	0.52
	PA4	0.83		
	PA5	0.45		
Tax Professional (TP)	TP2	0.55	0.81	0.60
	TP4	0.85		
	TP5	0.88		
Horizontal Reciprocity (HR)	HR1	0.35	1.00	1.00
	HR2	0.94		
Vertical Reciprocity (VR)	VR1	0.944	0.657	0.53
	VR2	0.40		
Vertical Fairness (VF)	VF1	0.79	0.78	0.56
	VF2	0.91		
	VF3	0.47		

Discriminant validity is presented in Table 12 using HTMT where the requirement is fulfilled. The values of HTMT close to 1 show lack of discriminant validity. Though some researchers recommend a threshold of 0.85 (Kline, 2011), Gold, Malhotra and Segars (2001) recommend 0.90. Based on this threshold, we can conclude that all the constructs have achieved discriminant validity criterion. Consequently, having fulfilled the requirement for the measurement criteria which eventually confirmed the validity and reliability of the measures, the results of the proposed hypothesis are presented in the next section.

Table 12: Discriminant Validity Using Heterotrait-Monorait Ratio (HTMT)

Constructs	UI	PD	SP	PA	TP	VR
Probability of Detection (PD)	0.55					
Severity of Punishment (SP)	0.31	0.47				
Political Affiliation (PA)	0.34	0.38	0.36			
Tax Professional (TP)	0.11	0.22	0.60	0.44		
Vertical Reciprocity (VR)	0.54	0.65	1.36	0.93	1.30	
Vertical Fairness (VF)	0.22	0.38	0.57	0.67	0.30	0.78

Fig. 2: Measurement Model of Under-Reporting of Incomes
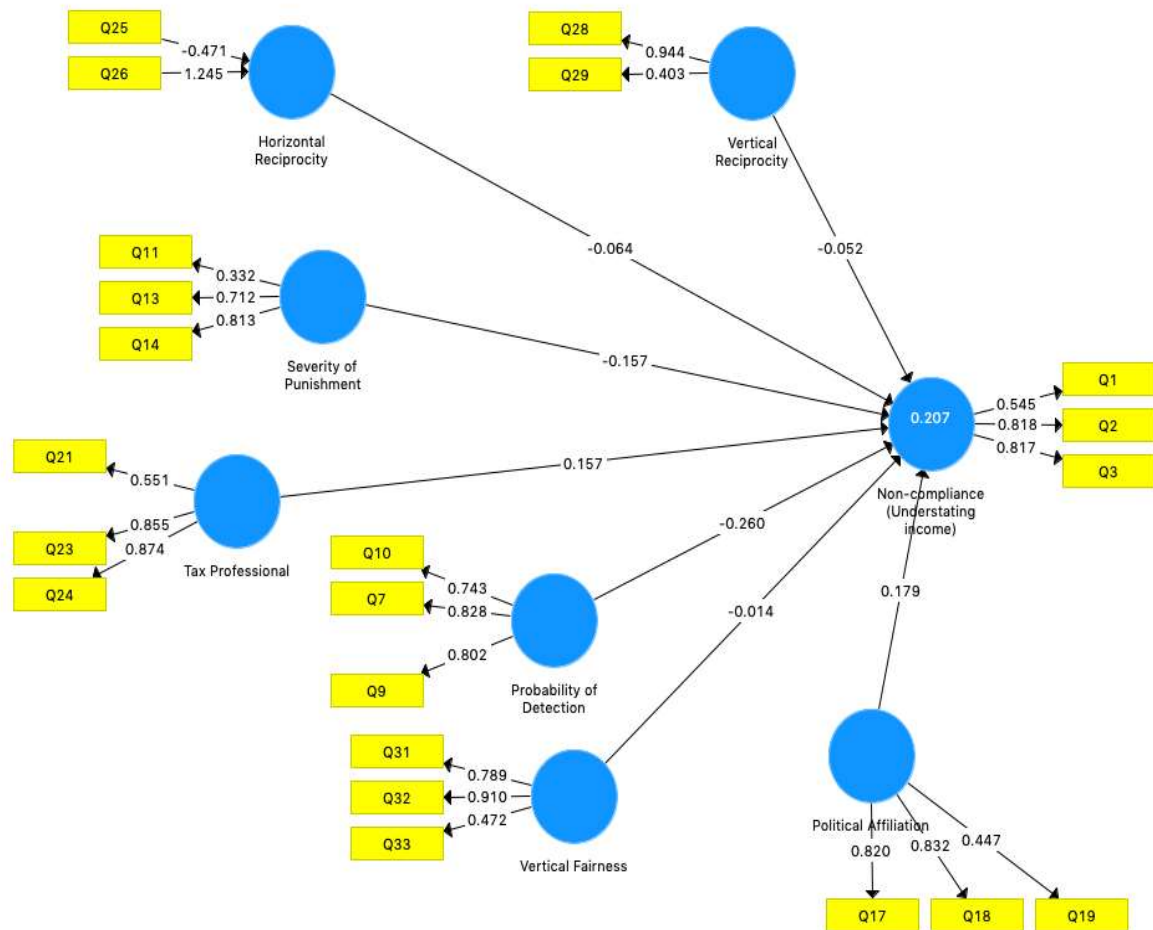
4.3.2   Structural model result

The previous section presented the measurement model for under-reporting income which clearly showed that the data met the validity and reliability criteria which is a precondition for the structural model evaluations (Hair et al., 2014). There are four criteria for assessing the structural model result as pointed by Henseler et al. (2009) and Hair et al. (2011). These criteria are: (1) an assessment of path coefficient using 5,000 bootstrap sample; (2) an assessment of R^2; (3) the effects size (f^2) of all the independent variables to the dependent variable using 0.02, 0.13 and 0.35 as small, medium, and large, respectively (Cohen, 1988); and (4) the predictive relevance of the model using construct cross validated redundancy (Q^2) following Geisser (1974) and Stone (1974).

Table 13 presents the path coefficients between the independent variables and the dependent variable. The first hypothesis (H1) postulates that there is a negative relationship between the probability of detection and non-compliance of HNWIs. The result of $\beta = -0.26$, $t = 1.89$, and $p = 0.03$ implies that the hypothesis was supported. The result shows that the higher the probability of detection, the less the likelihood for HNWIs to engage in under-reporting of incomes. The result is consistent with previous studies by Allingham and Sandmo (1972), Fischer et al. (1992) and Alkhatib et al. (2018).

The second hypothesis (H2) postulates that there is a negative relationship between severity of punishment and non-compliance of HNWIs. The postulation was supported as indicated in Table 14 ($\beta = -0.16$, $t = 1.23$, $p = 0.11$). The result indicates that the severity of punishment will to a certain extent curb the under-reporting of income practices among HNWIs. The result provides support to previous studies by Allingham and Sandmo (1972), Fischer et al. (1992) and Alkhatib et al. (2018).

The third hypothesis (H3) postulates that there is a positive relationship between political affiliation and non-compliance of HNWIs. This hypothesis was supported with $\beta = 0.20$, $t = 1.25$, $p = 0.10$. The result indicates that HNWIs' affiliation with the ruling government may influence them to engage more in the under-reporting of incomes. This is due to their perceptions that they will be favourably treated by the tax authority and be able to escape audit detection and penalty. The result provides support to previous studies by Kangave et al. (2018), McGowan (2000) and Hasseldine and Hite (2003).

Hypothesis 4 (H4) on the relationship between the role of tax professionals and non-compliance is not supported. The hypothesis postulates that tax professionals will assist HNWIs to engage in under-reporting of incomes. However, the result as set out in Table 13 ($\beta = 0.09$, $t = 0.98$, $p = 0.16$) does not provide support to the hypothesis and contradicts the literature documented by OECD (2009), Sakurai and Braithwaite (2003), Christensen (2015), and Rosli et al. (2018). The potential explanation as to the findings could be the fact that tax professionals are aware of the severe penalty of assisting in non-compliance activities. Another possible explanation is self-reporting bias as this survey was answered by the tax professionals themselves.

The fifth hypothesis (H5a) relates to the relationship between horizontal reciprocity and non-compliance. The hypothesis that proposes a negative relationship between the variables is not supported with its β of -0.05; $t = 0.53$, $p = 0.30$. This is inconsistent with Kangave et al. (2016) who posited that HNWIs' compliance behaviour is likely to have a bearing on the behaviour of other HNWIs. In other words, the result suggests that HNWIs' decision whether or not to comply is not dependent on what HNWIs are doing.

Rather, it is more a result of self-interest or on an individual basis. This is logical considering that under-reporting of income is an illegal act which should not be disclosed to others.

The next hypothesis, H5b, deals with the relationship between vertical reciprocity and non-compliance. In this instance, it is proposed that good reciprocal cooperation between the HNWIs and the government leads to less engagement in under-reporting of incomes. However, the result as indicated in Table 13 (β = -0.03, t = 0.38, p = 0.35) does not provide support to the postulation. Although the direction is consistent with the hypothesis, it is not significant. The potential explanation could be due to the fact that the respondents have different perceptions between their cooperation with the tax authority and government. They may have good perceptions with the government but not so with respect to IRBM as indicated in the descriptive results. To recap, the mean value for cooperation with the IRBM is 3.45, which is slightly lower than the mean values for cooperation with government which are 3.63 and 3.64.

Hypothesis 6 (H6) postulates that there is a negative relationship between vertical fairness and non-compliance of HNWIs. This hypothesis was not supported with β = -0.03, t = 0.09, p = 0.46. The result indicates that HNWIs' perceptions on vertical fairness do not influence their decisions to under-report their incomes. This is consistent with Saad (2010) and Rosli et al. (2018). Notwithstanding this insignificant relationship, it is important to note that if the tax rate is high, there could be a likelihood for HNWIs to take a risk through aggressive tax planning by shifting their wealth or income to lower tax jurisdictions.

Table 13: Path Coefficient between Independent and Dependent Variables

Hypothesised Relationship	β	SE	t	p	Decision
Probability of Detection (PD)	-0.26	0.14	1.89	0.03	Supported
Severity of Punishment (SP)	-0.16	0.13	1.23	0.10	Supported
Political Affiliation (PA)	0.20	0.14	1.25	0.10	Supported
Tax Professional (TP)	0.09	0.16	0.98	0.16	Not supported
Horizontal Reciprocity (HR)	-0.05	0.12	0.53	0.30	Not supported
Vertical Reciprocity (VR)	-0.03	0.14	0.38	0.35	Not supported
Vertical Fairness (VF)	-0.03	0.14	0.09	0.46	Not supported

Fig. 3: Structural Model of Under-Reporting of Incomes
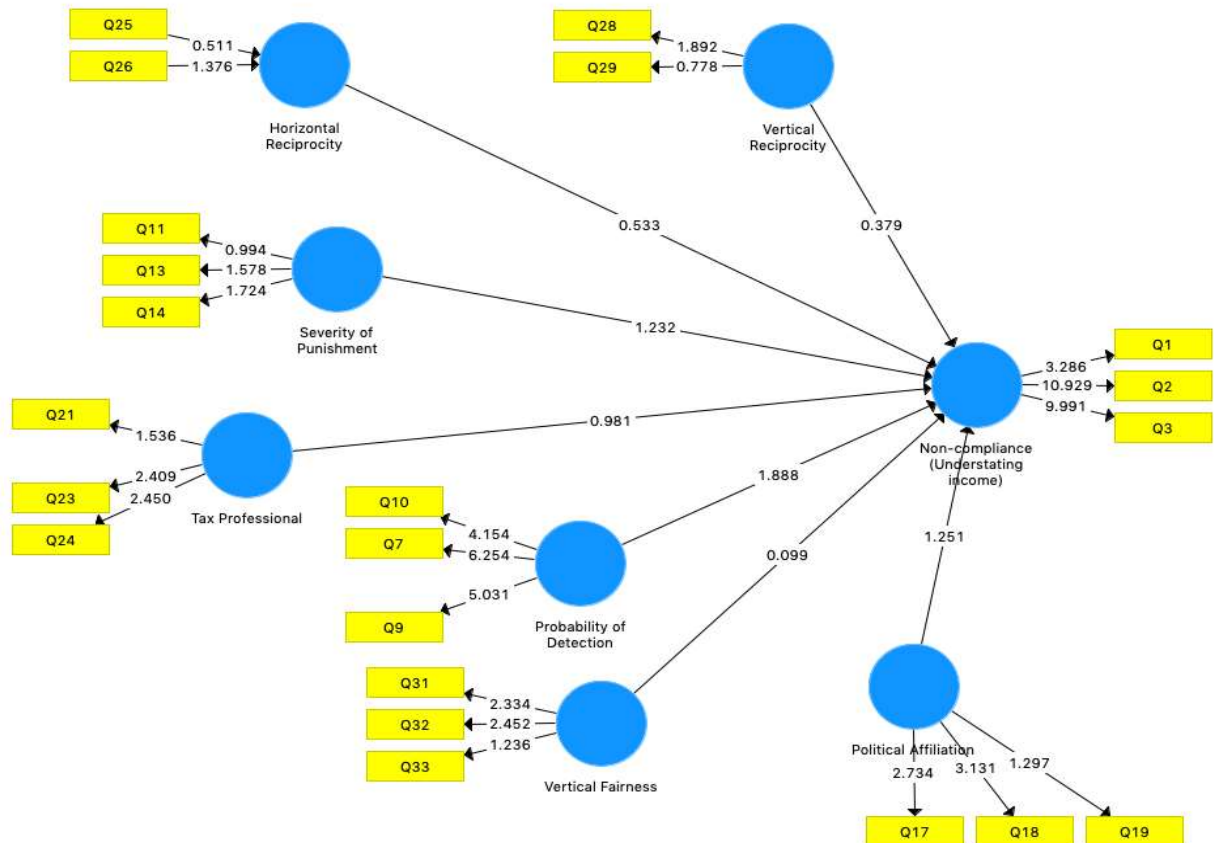
The result of the R^2 as indicated in Table 14 was determined using the recommendation of Hair et al. (2011). Hair et al. (2014) stated that the R^2 value should be at least 0.10 for a good model. Specifically, R^2 of 0.26 and above is considered substantial, 0.13 is considered moderate and 0.02 is considered weak (Cohen, 1988). Based on this evidence, we can deduce that the R^2 value of 20.7% of the current model is considered moderate because the value is greater than 13% but less than 26% as recommended by Hair et al. (2014). This highlights that the exogenous latent construct can only explain 20.7% of the variance in the current model, indicating that there are other constructs which explain the remaining 79.3% of the variance.

Table 14: Coefficient of R^2

Dependent Variable	R-square
Tax Non-Compliance (Under-Reporting Income)	20.7%

In order to better understand the effect of the exogenous constructs on an endogenous latent variable, the effect size of the predictor constructs is reported in Table 15. According to Chin (1998) and Hair et al. (2011), the effect size could be referred to as the explicit changes in R^2 of a latent construct that resulted from the removal of another latent construct. It defines whether the removed latent exogenous construct has a significant influence on the value of the latent endogenous construct. Based on Chin (1998) and Cohen (1988), the effect size (f^2) for multiple regressions is calculated as:

$$effect\ size\ (f^2) = (R^2\ included - R^2\ excluded) / (1 - R^2\ included)$$

The effect sizes (f^2) of 0.02, 0.13 and 0.35 represent weak, moderate, and strong effect (Cohen, 1988). Table 15 presents the f^2 of the predictor variables based on the R^2 of the dependent latent construct. As shown in Table 15, the effect size of probability of detection, severity of punishment, political affiliation, and tax professional are 0.07, 0.03, 0.03 and 0.02, respectively. Following Cohen's (1988) recommendation, the effect size of these latent constructs is small.

Table 15: Effect Size (f^2)

Predictor Constructs	f^2	Effects
Probability of Detection (PD)	0.07	Small
Severity of Punishment (SP)	0.03	Small
Political Affiliation (PA)	0.03	Small
Tax Professional (TP)	0.02	Small
Horizontal Reciprocity (HR)	0.01	None
Vertical Reciprocity (VR)	0.01	None
Vertical Fairness (VF)	0.00	None

Finally, the other analysis under a structural model is the predictive relevance of the current research model. The reason for this analysis is to examine the predictive capability of the model in the absence of missing cases because the model may not be able to accommodate all the constructs which could be able to explain tax non-compliance. The predictive relevance result is presented in Table 16 which shows a predictive value of 0.04. Geisser (1974) and Stone (1974) recommended that a model has predictive relevance if the Q^2 is above zero. Hence, the Q^2 of .0.04 indicates that the model has predictive relevance. In other words, the result shows that, even though not all constructs that explain tax non-compliance are included in the current model, the current constructs have the power to predict the non-compliance behaviour of HNWIs in Malaysia.

Table 16: Predictive Relevance (Q^2)

Endogenous Construct	SSO	SSE	1-SSE/SSO
Tax Non-Compliance (Under-Reporting Income)	300.00	288.670	0.04

5.   CONCLUSION

This article investigates the influence of probability of detection, severity of punishment, political affiliation, role of tax professionals, conditional cooperation and vertical fairness on tax non-compliance of HNWIs, from the perspective of tax professionals. Results indicate that tax professionals believe that probability of detection, severity of punishment, political affiliation and role of tax professionals each had an effect on the non-compliance behaviour of HNWIs in Malaysia, while conditional cooperation and vertical fairness had no significant influence on their behaviours. The findings suggest that probability of detection may play an important role in curbing non-compliance among HNWIs. Undoubtedly, tax professionals believe that the IRBM is capable of detecting under-reporting of a large amount of income committed by HNWIs. This is because the IRBM is perceived to have adequate mechanisms to detect under-reporting of small amounts of tax liability and also has the expertise that could easily detect the overstatement of a small deduction. Hence, a more aggressive tax audit should be conducted on this group of taxpayers with the IRBM's capability and ability of detecting non-compliance.

Similarly, severity of punishment appears to have a significant relationship with HNWIs' non-compliance behaviour. Tax professionals believe that HNWIs are aware that intentional tax evaders are severely punished for refusing to pay taxes, and hence control their actions to hide income. In addition, being treated as criminals and punished in line with law and penalty could increase the urgency in meeting tax obligations and aid tax compliance. Hence, revision of penalties may be an option. However, it is not suggested that fines be imposed which are too high as the system would be perceived as unfair and taxpayers would use legal methods to avoid taxes. Meanwhile, an increase in tax rate would also not be advisable as sometimes with higher tax rates, it would pressure taxpayers to be less compliant. Therefore, better understanding on tax matters and related punishment is seen as an avenue to improve compliance among HNWIs.

Interestingly, political affiliation could be the indicator for audit selection since the findings indicate its positive relationship with non-compliance behaviour. However, it is important to note that utilising this factor as an indicator for audit selection may result in public misconception on the audit and investigation activities carried out by the IRBM. Nonetheless, the audit selection should be fairly done with no discrimination, in the favour of politically affiliated individuals. If this can be well-demonstrated to the public, their trust and confidence level will be improved. Undoubtedly, tax professionals play an important role in tax compliance decisions of HNWIs. Hence, cooperation between tax authority and tax professionals may assist in improving tax compliance of HNWIs. This is particularly true in the case of grey areas that may result in different interpretations.

This article is not without its limitations. First, the use of the self-reported survey from selected tax agents in Malaysia may create bias. Next is the low response rate of 20%.

However, this response rate is a generally acceptable rate in Malaysia for a survey. Notwithstanding its limitations, this research indirectly enhances and improves the body of knowledge on the non-compliance of HNWIs. However, there is still room for improvements and gaps to be covered in future research. For instance, conducting a comparison study between countries may provide interesting findings. Conducting interviews with HNWIs may also offer explanations as to their compliance behaviour decision-making.

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