

The Effect of Taxpayer Service Provision on Tax Compliance for Large Taxpayers in Jamaica

Oronde Small

Andrew Young School of Policy Studies

Georgia State University

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Abstract

This research examines the effect of the provision of taxpayer services on filing and payment of the corporate income tax (CIT) and general consumption tax (GCT) for large taxpayers in Jamaica. We focus on the taxpayer's decision to file and pay taxes conditional on their reporting decision. These are important margins of response particularly in developing countries with relatively weak tax administrations that find it difficult to collect reported taxes. The empirical strategy adopts a regression discontinuity design (RDD) that exploits an exogenous jump in the intensity of taxpayer service delivery, which occurs when a taxpayer reaches gross receipts of J\$500 million (US\$5.7 million) and is selected into the large taxpayer office (LTO). The results indicate null effects for the CIT but positive filing and payment compliance effects for the GCT. The contrasting results for the CIT and GCT may be due to the relatively weaker legal enforcement framework of the former. The results provide suggestive evidence of a complementarity between the strength of the legal enforcement framework of the taxing regime and the provision of taxpayer services.

Keywords: tax compliance, filing, payment, taxpayer services, regression discontinuity

JEL codes: H25, H26, H32.

1. Introduction

The fiscal landscape across developing countries is characterized by significant revenue mobilization challenges, stemming from *inter alia* critically low levels of tax compliance. The compliance issues range from non-registration, to underreporting of tax liabilities, to non-filing and non-payment of taxes, to late filing and payment of taxes. Obvious consequences of these include low revenue yields, sub-standard provision of public goods and services, economic inefficiency and distributional inequity. Compared to more advanced economies the challenges are much more acute in developing countries, in part because their relatively large informal economy and weak tax administration machinery create an environment that is supportive of tax evasion and avoidance.

The thrust of recent tax administration reforms across countries aim at increasing both enforced and voluntary compliance within the context of an overarching risk based approach. In particular tax administrations have recognized the importance of tax morale or non-pecuniary factors in determining taxpayer compliance and have sought to complement traditional enforcement strategies with a softer approach, for example by adopting a more service oriented and customer centric focus. Despite the increased use of this ‘softer approach’ only a few studies have examined its compliance effects within a developing country context (Ortega and Sanguinetti, 2013; Ortega and Scartascini, 2015; Pomeranz, 2013; Del Carpio, 2013). Additionally, to mitigate risk exposure, tax administrations have sought to adopt a more strategic focus on individuals and firms that pose the greatest risk to the revenue – example large taxpayers. This is evidenced by the establishment of large taxpayer offices (LTO) as a key element in tax administration reform across

several developing countries.¹ Keen (2012) makes the point that a sensible allocation of the limited administrative resources in developing countries calls for a strategic focus on large taxpayers.² Whilst this is true for all countries it is especially true for developing countries where on average the largest 1 percent of taxpayers account for over 75 percent of tax payments (Keen, 2012).

This essay examines the effect of the provision of taxpayer services on filing and payment of the corporate income tax (CIT) and general consumption tax (GCT) for large taxpayers in Jamaica. We focus on the taxpayer's decision to file and pay taxes conditional on reporting positive tax liabilities. These are as important compliance margins as is actual reporting, particularly in developing countries with relatively weak tax administrations that find it difficult to collect reported taxes. Notably, where tax administration resources are limited, and where the outcomes of expensive audits are uncertain, it may arguably be more effective to focus on collecting pledged taxes.

We contribute to the literature on tax compliance in several important ways. Firstly we contribute to a nascent program evaluation literature in developing countries. We use unique confidential tax return data for large taxpayers in Jamaica to estimate the causal effect of the large taxpayer office (LTO) on filing and payment compliance. Secondly, since the LTO was established in large part to act as a conduit for specialized taxpayer services for the large taxpayer segment, we are able to eke out the compliance effects of more intensive taxpayer service provision. Only a few other studies have looked at the effect of taxpayer services on compliance (Alm et al, 2011;

¹ The LTO was first introduced in Argentina in the late 1970's and subsequently spread to other countries in Latin America. Peru, Bolivia Uruguay adopted LTO's in the early 1980's. In recent years LTO's have spread to many other countries in both the developing and developed world. LTO's are often set up (at least initially) as departments within the tax administration that are primarily responsible for monitoring and providing special services to the large taxpayer segment.

² Vazquez-Caro (1994) warns that the segmentation of taxpayers by size, with greater focus being placed on larger taxpayers, could create incentives for large companies to break up into smaller companies and could potentially make the compliance problem worse.

Mckee et al, 2011; Kosonen and Ropponen, 2013) but none have done so for large taxpayers and this is the first to do so in a developing country context. Thirdly, whereas most previous research on tax compliance focus on a single tax type, we examine two major taxes in that of the CIT and the GCT. Fourthly, we push beyond the one-dimensional approach adopted by most previous research and examine tax compliance along two dimensions – filing and payment. Fifth, we leverage an important difference in the strength of legal enforcement framework between the CIT and GCT to test the complementarity or substitutability in the relationship between enforcement and tax morale factors - particularly taxpayer service delivery.

The empirical strategy exploits quasi-experimental variation in the intensity of service delivery that occurs when a taxpayer is selected into the LTO. A key criteria for selection into the LTO is based on an arbitrary gross receipts threshold of J\$500 million (US\$5.7 million).³ We use a regression discontinuity design (RDD) to exploit the discrete jump in the probability that taxpayers will be selected into the LTO at the arbitrary threshold. This approach compares the compliance behavior of those located just to the right of the threshold – that are selected into the LTO, to otherwise similar taxpayers located just the left of the threshold – that are marginally not selected into the LTO. Assuming that all other key taxpayer characteristics transition smoothly across the threshold, the RDD estimates are causal.

The results suggest that taxpayer service provision did not significantly improve filing or payment compliance for the CIT, but had generally positive compliance effects along both margins for the GCT. We find that the LTO reduced the probability of late filing of GCT returns by about 22 percentage points and the number of days late that GCT returns are filed by about 14 days. The

³ The US dollar conversion was done using a 4 year (2009 – 2012) average annual exchange rate of \$87.35 JMD to \$1 USD using data from the Bank of Jamaica.

probability of paying GCT late and the number of days late that taxpayers pay is lowered by as much as 17 percentage points and 247 days respectively. For actual payments, our baseline estimates suggest significant increases in the amount of GCT paid on time and the share of reported GCT paid on time by about J\$4 million and 27 percent respectively.

We attribute the null effects for the CIT and positive compliance effects for the GCT to differences in the relative strength of the legal enforcement framework between the two taxes. The stronger legal enforcement framework of the GCT interacts positively with the services provided under the LTO, resulting in improvements in filing and payment compliance. On the other hand, the relatively lax legal enforcement context of the CIT appears to moderate the potentially positive compliance effects associated with the LTO. For the GCT, we also find evidence of heterogeneous effects across key economic sectors and activities. We find positive effects on filing and payment compliance for taxpayers engaged in non-financial sector activities and also for non-importers; but null effects for those in the financial sector and who engage in ‘significant’ importation.

In general these results provide suggestive evidence of a complementarity in the relationship between the strength of the legal enforcement framework of the taxing regime and more general non-pecuniary factors – such as the provision of taxpayer services. The results highlight possible limitations to service delivery on compliance for large taxpayers in Jamaica and possibly other developing (and developed) countries, in the absence of a robust enforcement framework. This implies a need for tax administration and tax policy reforms to be balanced in the application of enforcement and the ‘softer approach’ in order to improve compliance among the large taxpayer segment. Another policy implication, based on the observed heterogeneous effects, highlights the roll of tax enforcement intermediaries – such as industry oversight bodies that require constituent taxpayers to demonstrate tax compliance as preconditions to conduct business

activities. These may act as a possible substitute for the provision of taxpayer services, and may be a more cost effective alternative.

The remainder of this essay is as follows. Section 2 discusses the institutional context of the taxing regimes. Section 3 outlines a simple theoretical framework. Section 4 reviews the relevant literature. Sections 5 and 6 present the data and the empirical framework. Section 7 discusses the results and Section 8 concludes.

2. Institutional Context

2.1 The Corporate Income Tax and The General Consumption Tax

The CIT rate for tax years 2009 – 2012 was 33.33 percent, applied to firms' reported profits.⁴ The GCT is a value added tax (VAT) and was applied at standard rates of 16.5 and 17.5 percent over the sample period.⁵ Jamaica depends heavily on the CIT and GCT as a critical source of revenue, with respective contributions of 11 and 17 percent of total tax collections.⁶ Like most developing countries the tax regime in Jamaica is characterized by extremely high dependence on a few large taxpayers for revenue. In 2011 the top 1 percent of taxpayers accounted for 82 percent and 66 percent of reported CIT and GCT respectively.⁷ This dependence exposes the government to an extremely high level of risk from non-compliance of few taxpayers, and provides impetus

⁴The CIT rate for building societies and life assurance companies over the study period were 30 percent and 15 percent respectively. All firms in our sample were taxed at the standard CIT rate of 33.3 percent. Our sample did not include building societies and life assurance companies.

⁵ From May 2005 – December 2009 the standard GCT rate was 16.5 percent. The standard GCT rate was temporarily increased to 17.5 percent in January 2010 before being lowered to 16.5 percent in June 2012.

⁶ In this research we focus on the local and not the international component of GCT. GCT's total (local and international) contribution to tax collections averaged about 31 percent over the last six fiscal years.

⁷ We use reported taxes instead of actual tax payments because payments are measured with error. The payment data provided by TAJ does not adequately identify specific payment components and therefore potentially comingles principal tax payments with penalties and interest.

for the tax administration to boost compliance efforts in general, but particularly for large taxpayers.

2.2 Enforcement Context for the CIT and GCT

Jamaica's tax administration machinery has long been criticized as weak and inefficient. Some of the factors that led to this criticism include, limited audit capabilities, multiple registration requirements, cumbersome tax clearance procedures and lengthy delays at tax offices⁸. An obvious consequence of these deficiencies is low tax compliance. In 2011 filing and payment compliance for the CIT – measured as whether the taxpayer filed and paid on time – were 40 and 53 percent respectively. In the same year, for the GCT, 83 percent of taxpayers filed on time and 88 percent paid on time.

An interesting feature of the institutional environment that might explain the sizeable difference in filing and payment compliance rates for the GCT relative to the CIT is the stronger legal enforcement framework of the former. Tax Administration Jamaica (TAJ) laments the lack of effective penalties and other sanctions for non-compliance with the CIT. For example, though required to file estimated tax returns at the beginning of the fiscal year and make quarterly payments based upon these filings, there are no penalties in law to enforce compliance.⁹ Additionally there is strategic gaming on the part of taxpayers to delay filing and payment. For example large taxpayers often request filing extensions – as provided for under the law – and these requests are often granted. Additionally, there is a common practice for taxpayers to file “nil” returns to ‘stop the filing clock’ only to lodge a correct return many months later if at all, as another

⁸ These deficiencies likely contributed to Jamaica being ranked 171 out 183 countries on the ease of paying taxes in the 2009 Doing Business Report.

⁹ Recent amendments to the Income Tax Act in 2014 introduced penalties for non-filing of estimated tax returns. However there were no concomitant amendments to impose penalties for non-payment of estimated quarterly taxes. Therefore effective enforcement of quarterly payments for the CIT may still be relatively weak.

tactic. Additionally if TAJ raises a tax assessment, taxpayers often object, which triggers a process of ‘dispute settlement’ that further delays the application of penalties and interest. On the other hand these opportunities do not exist under the GCT. There are no extensions of filing and payment deadlines and penalties and interest begin to accrue immediately after the deadline has past.

The penalty structure across the two taxes also present an interesting contrast. Failure to file CIT on time attracts a fine of just J\$5000 (US\$57). Interest of 40 percent per annum is charged against outstanding CIT liability. On the other hand, failure to file GCT on time attracts a fine of J\$2000 (US\$23) or 15 percent of the tax due and payable, whichever is larger¹⁰. Interest of 2.5 percent compounded monthly is charge against the sum of outstanding GCT liabilities, penalties and surcharges. For large taxpayers, this structure implies higher penalties and interest for delinquents under the GCT relative to the CIT, with the difference between the two increasing linearly in the amount of unpaid tax liabilities. Figure A.1 in the Appendix presents a hypothetical picture of annualized penalties and interest for different amounts of unpaid tax liabilities under the CIT and GCT regimes.

The differences in enforcement strength between the CIT and GCT are pronounced and can significantly affect taxpayer’s compliance behavior. Figure A.2 in the Appendix show filing and payment compliance measures for large taxpayers that filed both CIT and GCT tax returns for tax years 2009 – 2012. Panel A shows much lower rates of late filing and payment for the GCT relative to the CIT. Taxpayers appear to choose which tax to comply with – GCT and which not to – CIT. Further, taxpayers appear to be more likely to file on time or earlier, but pay late or later. These patterns are consistent for both the CIT and GCT. Panel B Shows the amount taxes paid on

¹⁰ Unpaid tax liabilities of about J\$13,000 equates to the J\$2000 fix penalty for late filing. In general the GCT liability for a large taxpayers will be way in excess of this amount and thus the applicable penalty for taxpayers in our sample is most likely 15 percent of taxes due and payable.

time and the share of reported taxes paid on time for both tax types. Here again we find a similar compliance pattern – taxpayers pay a larger share of GCT liabilities on time. The compliance patterns across taxes appear to be driven largely by key features of the enforcement framework. Comparing compliance effects of the LTO across the CIT and GCT provides an opportunity to examine the potential effect of taxpayer service provision in a weak and strong enforcement context.

2.3 The Large Taxpayer Office

The high dependence on a few large taxpayers, the deficiencies in tax administration and their consequential effects on tax compliance led to the adoption of several tax administration reforms. One such reform was the establishment of the LTO in April 2009. Taxpayers are assigned to the LTO if they meet any of three main criteria. The first and principal criteria is if annual gross receipts are greater than or equal to \$500 million (US\$5.7 million).¹¹ Secondly, if the total annual taxes paid is greater than \$50 million.¹² Thirdly, if related to a primary LTO client through for example common ownership, a subsidiary or branch.

An important feature of the LTO is its central focus on service provision. Its stated mission is “*to promote voluntary compliance and enhance revenue collection by providing exemplary specialized service to the large taxpayer population through a team of highly motivated and results oriented professionals*”. This coincides with TAJ’s strategic focus – to adopt a more customer

¹¹TAJ admits that the threshold was initially to be set at J\$1 billion but because too few taxpayers would meet this mark it might not have justified the establishment of the LTO. The decision to use a threshold of J\$500 million was done in order to ensure that a sufficient amount of taxpayers would be drawn into the LTO. Information from TAJ officials is that taxpayers who meet this annual threshold for at least two consecutive years may be added to the LTO listing. This can explain why some observations with gross receipts greater than J\$500 million in a given sample year may not be listed as an LTO client. Taxpayers once on the LTO list are not generally delisted except if they go out of business.

¹² In general taxpayers that pay at least \$50 million in taxes are large and most likely will gross more than \$500 million in sales / gross receipts annually.

centric approach to tax administration. At the core of the LTO operations are the client relationship managers (CRM). These positions were specially created to channel specialized services to large taxpayers. Once selected to the LTO each taxpayer is assigned a CRM who will serve as the main point of contact with the tax administration. The CRM will introduce and provide or facilitate the provision of the range of services offered by the LTO. These services include but are not limited to, the provision of tax advice, processing of tax compliance certificates, stamping of documents, tax seminars and workshops, filing and payment reminders, registration, reconciliation of tax accounts and audits.¹³ Although some of these services are available to the general taxpayer population at the various tax offices or through the customer care center, we argue that there is a significant increase in the intensity and efficiency of service delivery for LTO taxpayers.¹⁴ Moreover the ‘one-on-one’ between LTO clients and CRM guarantees more efficient and convenient service delivery.

3 Theory

The standard economic model of tax evasion is outlined by Allingham and Sandmo (1972) (AS) – an adaptation of Becker’s (1968) economics of crime approach – and models individual’s tax compliance behavior as a rational decision. Their model predicts that higher levels of evasion are associated with low detection probabilities and low pecuniary costs if caught. The theoretical predictions of the AS model however have been criticized as inadequate in explaining observed patterns of tax compliance across countries. Complementary theories of tax compliance attempt to

¹³ CRMs are responsible for ensuring that these services are delivered to their clients. Whilst they don’t necessarily provide all these services directly, they are responsible for liaising with the relevant departments of TAJ on behalf of the taxpayer to ensure speedy and efficient provision of these services. Clients are therefore able to enjoy huge reductions in transactions and compliance costs.

¹⁴ Interviews with CRM’s from the LTO confirm that the level of services offered to LTO clients is superior to that available regularly through the tax offices and call centers. They also point out that there are clear benefits to the taxpayers from the one-on-one interaction with the CRM which are derived not only through access to services but also the development of a good relationship.

overcome some of the shortcomings of the standard approach and posit that non pecuniary or tax morale factors play an important role in explaining taxpayer behavior (Luttmer and Singhal, 2014).

Whereas the standard theory models taxpayer's reporting decisions, more recent work have examined the payment decisions of individual taxpayers conditional on income being declared (or assessed) (Hallsworth et al. 2014; Truglia and Troiano, 2015), a question much more closely related to this research. We adopt a simple model of payment compliance advanced by Hallsworth et al. (2014) with slight modifications. We assume a two period model where taxpayers earn income (Y_i^G) – drawn from an i.i.d. probability distribution $f(Y_i^G)$ – in period one and none in period two.¹⁵ The taxpayer is required to file and pay taxes on reported income at some rate (t) and the tax liability is given by:

$$T_i = t * \max[0, Y_i^G]$$

For simplicity we assume that the taxpayer makes its filing and payment decision simultaneously.¹⁶ We model this decision as a function of the compliance costs, moral or psychic costs, the real interest rate, a measure of monitoring intensity and service delivery. We take reported income Y_i^G as given, but the taxpayer must decide whether to file and pay taxes in period one ($x=1$) or period two ($x=2$). Filing and payment decisions are made to maximize after tax income (Y_i^N) based on the following:

$$Y_i^N = \begin{cases} Y_i^G - T_i - C_i & \text{if } x = 1 \text{ and } Y_i^G - T_i - C_i \geq 0 \\ Y_i^G + (1 + r)T_i - M_i - \phi[F + (1 + \alpha)T_i] & \text{if } x = 2 \text{ or } Y_i^G - T_i - C_i < 0 \end{cases} \quad (1)$$

¹⁵ We take reported income as given and our model focuses solely on the decision to pay conditional on reporting.

¹⁶ TAJ confirms that taxpayers typically file and pay (at least some portion) taxes at the same time.

From (1), taxpayer (i) faces compliance cost ($C_i > 0$) in the first period but not in the second. This is a simplifying but rationalize-able assumption. For example it is plausible that compliance costs in period one are higher simply because taxpayers have to expend considerably more effort to complete filing and payment by a stipulated deadline.¹⁷ The compliance cost in period one is juxtaposed against the costs and benefits from delaying filing and payment until period two. Delaying payment (and filing) until period two means that the taxpayer can benefit from interest earned (r) on taxes not paid in period one. However the taxpayer also faces a penalty of α , that is proportional to the amount of tax owed and which takes values $[0, 1]$. The taxpayer also faces a fine for late filing which is set at some constant rate ($F > 0$). Following Almunia and Rodriguez (2014) we include a measure to capture the monitoring intensity of the tax administration ϕ , which can take values $[0, 1]$. We capture the discrete jump in taxpayer monitoring when firms are selected into the LTO with the following:

$$\phi_{lto} = \phi + \delta\phi * I(\text{sales} \geq \underline{\text{sales}})$$

where $\delta > 0$ and I is an indicator for whether gross receipts are above the stipulated threshold. Lastly, we assume that non-compliance in period one is associated with a moral cost ($M_i > 0$) in period two which is induced by the provision of taxpayer services.

The taxpayer will pay in period one if the value of doing so exceeds that of delaying until period two. The payment decision is therefore captured by the following condition:

¹⁷ Complexities in the tax law can impose huge compliance costs – in terms of time and money – as taxpayers struggle to accurately calculate their taxes in order to file and pay by the due date. The numerous requests for filing extensions received by the TAJ may be an indication of the relatively large compliance costs incurred when trying to comply with the stipulated filing deadline. In the second period compliance costs are arguably lower since there is no longer an effective time deadline by which comply in order to avoid penalties. Further where the taxpayer is having difficulty calculating taxes the tax administration can through audit provide the taxpayer with the correct calculation of the tax liability in the second period.

$$Y_i^G - T_i - C_i > Y_i^G + (1 + r)T_i - M_i - \phi_{lto}[F + (1 + \alpha)T_i] \quad \dots\dots\dots (2)$$

From equation (2), the compliance effects of the LTO come through several channels. The first is through lower compliance costs. If taxpayer services that clarify complex or ambiguous tax laws and that facilitate speedy and convenient registration, filing and payment of taxes can significantly reduce compliance costs (pecuniary and non-pecuniary) in period one, taxpayers may be encouraged to file and pay on time. The second is through a behavioral channel. In addition to the services provided, closer interaction between the tax administration and taxpayers within a customer centric context can improve taxpayers' perception of the tax administration. This can increase the moral or psychic costs of delaying payment – crowd in tax morale – and induce higher levels of (voluntary) compliance (Feld and Frey, 2002).

The third is through more intensive monitoring. This can affect compliance in a couple of ways. First, CRM's need to keep close watch over clients' accounts – be aware of impending deadlines and account balances. This is central to a CRM's ability to carry out her duties, for example sending filing and payment reminders, facilitating payments and account settlement, all of which are expected to improve compliance. Another way that monitoring can influence compliance is by raising the effective penalty rates for late filing and payment. If more intensive monitoring increases the non-compliance detection rates this can improve compliance. However the compliance outcomes we examine are already very easily observed by TAJ, thus more intensive monitoring is unlikely to significantly increase detection of late filing and payment.

Notwithstanding the predictions of the theoretical model, the impact on compliance is an open empirical question, particularly for large taxpayers who have received relatively scant attention in the literature. As posited by Slemrod (2004), the factors that drive tax compliance for large corporate taxpayers can be very different from those that motivate individuals and smaller

firms. The predictions become even more uncertain when examined within a developing country context with limited policing capacity, relatively weak legal framework and where large taxpayers wield significant political influence.

4 Literature Review

In exploring the potential causes of low tax compliance in developing and transition economies, Alm and Martinez – Vazquez (2003) attribute much of the effects to weak fiscal institutions. They stress that the role of tax administration surpasses merely securing revenues for the state and must also include ensuring taxpayer satisfaction, equity and social welfare. Similar views were advanced 13 years prior by Alm, Bahl and Murray (1990), who argued that mammoth reforms to boost tax enforcement for the personal income tax in Jamaica was likely to have only marginal effects on compliance because of poor fiscal institutions. These arguments are in line with more recent views that highlight the need for a balance between enforcement and more facilitatory approaches, grounded in a commitment to an implicit ‘psychological’ contract between the taxpayer and the tax administration (Feld and Frey, 2002; Kirchler et al. 2008).¹⁸

This research relates to a growing body of work that examines the effect of enforcement and tax morale factors on tax compliance using experimental or quasi-experimental methods. Several studies have examined the role of taxpayer information service provision on tax compliance using lab experiments. Alm et al. (2011) find that uncertainty reduces both filing and reporting compliance, but that the provision of taxpayer information services is able to offset these

¹⁸ Kirchler (2007) argues that the cops and robbers approach to tax administration fuels distrust and adversarial tendencies between the tax administration and the taxpayer, but a service client approach can encourage greater cooperation and improve voluntary compliance.

effects.¹⁹ Vossler and Mckee (2013) in a similar experimental setting report positive compliance effects even when the services provided are less than perfect – suggesting that the extensive margin of service delivery has relatively large effects. Mckee et al (2011) extends the analysis in a dynamic setting and find that post audit, subjects tend to demand less information assistance and are more likely to evade. These results are interesting since they provide evidence of limits on the expected impact of taxpayer information services, and hint at the importance of taxpayer – tax administration interaction in influencing tax compliance behavior.

There is also emergent evidence on the role of taxpayer information services on compliance from field experiments. Kosonen and Ropponen (2013) examine the role of information services on tax compliance for the value added tax (VAT) for firms in Finland. They examine compliance effects for different sectors of the economy, each with varying degrees of complexity with regards to the application of the VAT. They find that taxpayer information services improved VAT reporting compliance for relatively simple scenarios but has no effect in more complex scenarios.²⁰ Other interesting field experiments test the importance of taxpayer – tax administration interaction in explaining compliance behavior. In a field experiment with small firms in Slovenia Doerrenberg and Schmitz (2015) varied the mode of delivery of communication from the tax office between letters sent through regular post and letters hand delivered by tax officials.²¹ They find that the hand delivered letters had a larger compliance effect than letters that were mailed.²² In a similar

¹⁹ Alm et al. (2011) argue that the provision of information by the tax administration in the lab can simulate a ‘kinder’ and ‘friendlier’ approach to tax administration. However the interactions in the lab were conducted in a double blind setting and thus any effects detected may just be due purely to the information or the clarification treatment.

²⁰ Information was provided to address three separate issues with the existing VAT. The first was relatively simple – informing firms of the re-imposition of the standard VAT rate. The second was a complex reverse VAT framework for the construction industry and the third explained the dual VAT that applied to restaurant industry.

²¹ Letters conveyed information about the audit probability and why it is important to pay taxes (public goods messages).

²² The effects of the various modes of delivery were not statistically significant, due most likely to the small sample size. Though not significant the direction of the effect provides reasonably compelling evidence that the interaction between tax administration and taxpayers play a role in the compliance decision.

experimental setting with 20,000 tax delinquents in Columbia, Ortega and Scartascini (2015) find that personal visits by tax officials are more effective than relatively more impersonal communication media such as a physical letter or an email. Together these provide suggestive evidence that closer or more personal interaction between the taxpayer and tax administration can improve compliance.

New evidence on the effects of LTO's come from quasi-experimental methods. Almunia and Rodriguez (2014) extend previous research on taxpayer's behavioral responses to tax notches and kinks (Kleven and Waseem, 2012; Saez, 2010), this time using 'enforcement notches' in Spain. They exploit the discrete increase in the enforcement intensity for firms selected into the LTO at an arbitrary revenue threshold of €6 million. They find evidence of significant bunching just left of the threshold and attributed this to firms who otherwise would have located marginally above the threshold. Interestingly they find that bunching was strongest for firms that sold mainly intermediate inputs. These results complement Pomeranz (2013) who finds that the VAT paper trail and firms own audit probability are substitutes in a field experiment involving Chilean firms.

5 Data

We use micro level confidential tax return and payment data for the CIT and the GCT for 2009-2012 obtained from TAJ.²³ Because we are interested in the behavior of large taxpayers we restrict our baseline sample to those with reported gross receipts of between J\$100 million (US\$ 1.1 million) and J\$1 billion (US\$11.4 million).²⁴ Further, since we are interested in examining taxpayers filing and payment decisions, conditional on their reporting decision, we focus on

²³ This research examines compliance for taxpayers (firms) that file the "company income tax final return" on form ITO2. We do not consider corporate tax returns filed on forms ITO3 and ITO4 which are the designated forms for "unincorporated bodies other than life assurance companies" and "life assurance companies" respectively. For the GCT we focus on the standard GCT returns and do not include the quick return or returns for special tourism activities.

²⁴ We do this in order to mitigate potential bias from firms located in the tails of gross receipts distribution.

taxpayers with positive reported tax liability, reducing our sample to 2,432 for the CIT and 34,764 observations for the GCT.²⁵

From the tax returns we collect data on the filing date, reported income or gross receipts and reported tax liabilities. From the payments data we collect information on the payment date and the amount paid. Using these data we construct several outcome measures for filing and payment compliance. For filing compliance we examine two outcomes. The first is captured by a dichotomous variable set equal to 1 if a taxpayer filed late and 0 if filed on time.²⁶ The second is the number of days a return is late. Essentially these measures together capture filing compliance effects along an extensive margin – whether a taxpayer filed late or not; and an intensive margin – how late was the taxpayer in filing.

For payment compliance we examine two sets outcomes - in total four outcome variables. The first two capture the timeliness of payments and are measured the same way we measured filing compliance above. In the second set we examine two additional payment outcomes - the amount of taxes paid on time and the share of reported taxes paid on time. Because the payment data gives aggregate amounts received from taxpayers, we are unable to identify specific payment components, i.e. whether amounts paid are solely taxes or a combination of taxes and other charges and penalties. By restricting the analysis to payments made on or before the due date – we are better able to capture taxpayers ‘real’ compliance response since payments made after the due date with respect to a particular filing period are more likely to include amounts for penalties, interest and audit assessments. As such the amount of taxes paid on time and the share of reported taxes

²⁵ Including those that report zero or negative tax liability could potentially bias our estimates since they are likely to have very different incentives to file (and pay) taxes compared to those who report positive amounts.

²⁶ For the CIT taxpayers are required to file their final or annual return by March 15 following the year of assessment. If this date fell on a weekend, we record as late if the taxpayer filed after the first business day of the following week. This is consistent with the practice of the tax administration.

paid on time are arguably better measures of taxpayers' response to the LTO in relation to their contemporaneous tax liabilities.

LTO clients are identified using the client listing provided by TAJ. Treatment is indicated using a dichotomous variable set equal to 1 if the firm appears on the client list and 0 otherwise.²⁷ Because the assignment rule is not deterministic at the gross receipts threshold we create a second indicator variable set equal to 1 if reported gross receipts are greater than the threshold and 0 otherwise, which we use to model the probability of treatment in the first stage of the RDD model below.²⁸ Other data on firm characteristic and financial data such as age, number of employees and economic sector are from the tax returns and the tax registry databases.²⁹ Tables 1(a) and 1(b) provide summary statistics for the data used for the CIT and GCT analysis respectively.

6 Empirical Analysis

The empirical strategy adopts a regression discontinuity design (RDD) that exploits an exogenous jump in the intensity of taxpayer service delivery that occurs when a taxpayer reaches gross receipts of J \$500 million (US\$5.7 million) and is selected into the large taxpayer office (LTO). The sharp RDD identifies the causal effect by distinguishing a deterministic discontinuous treatment indicator $T_i (S_i \geq S_0)$ from the smoothing function $f(S_i)$ at some threshold (S_0):

²⁷ The client listing provided was for taxpayers in the LTO as at 2013. We were unable to get a list for each of the years 2009 – 2012 from TAJ and so we are not able to tell when a particular tax payer came onto the register. The analysis therefore assumes taxpayers listed on the client register in 2013 were in fact treated for each of the years used in the analyses. If the LTO was effective in encouraging compliance then this could potentially bias our estimates downward. We re-estimate the model using only those firms that are listed as LTO parent companies as our treatment group since it is most likely that the larger parent companies would have been on the client listing since its inception. The results are qualitatively similar with slightly larger coefficients.

²⁸ Because the GCT returns are monthly we aggregate the monthly reported total supplies to get an estimate of the annual amount.

²⁹ Data on the age of the taxpayer are from the tax registry data base and related to when the firm was actually registered for the particular tax. The number of employees are matched from merged data with PAYE tax filings. These data are more complete for the CIT sample.

$$T_i \begin{cases} 1 & \text{if } S_i \geq S_0 \\ 0 & \text{if } S_i < S_0 \end{cases}$$

where S_i and S_0 correspond with the actual gross receipts for firm (i) and the threshold level of gross receipts respectively.

As pointed out by Lee and Lemieux (2008) under the sharp RDD treated and untreated observations are located on separate sides of the threshold with no crossovers. In this case a sharp RDD would assume that all treated taxpayers are located to the right and all non-treated taxpayers to the left of the threshold. However as discussed above, the LTO selection process results in some taxpayers located below the threshold being assigned treatment and some above not receiving treatment. This lends itself to the application of a type II fuzzy RDD where the probability of treatment to left of the threshold is greater than zero and the probability of treatment to the right of the threshold is less than one. Thus treatment is not deterministic at the threshold but instead can be represented by:

$$P[T_i = 1 | S_i] \begin{cases} g_1(S_i) & \text{if } S_i \geq S_0 \\ g_0(S_i) & \text{if } S_i < S_0 \end{cases} \text{ where } g_1(S_i) \neq g_0(S_i) \quad (3)$$

The running variable S_i and the probability of treatment are related as follows:

$$P [T_i = 1 | S_i] = g_0(S_i) + [g_1(S_i) - g_0(S_i)]D_i \quad (4)$$

Where $D_i = 1(S_i \geq S_0)$

The estimation of the treatment effect in a fuzzy RDD can be modeled by a two stage approach (2SLS) as set out in the following model:

First Stage:

$$E [T_i = 1] = \alpha_0 + \alpha_1 D_{i,t} + \alpha_2 f(S_{i,t}) + \alpha_3 f(S_{i,t}) * D_i + \tau_t + \mu_{i,t} \quad (5)$$

Where $s_{i,t}$ is the gross receipts of taxpayer i at time t , centered at the threshold value.³⁰

Second Stage:

$$Y_{i,t} = \beta_0 + \beta_1 \widehat{T}_{i,t} + \beta_2 f(\widehat{s}_{i,t}) + \beta_3 f(\widehat{s}_{i,t}) * T_{i,t} + \tau_t + \varepsilon_{i,t} \quad (6)$$

The first stage regression estimates the probability of treatment using the firm's location relative to the gross receipts threshold $D_{i,t}$ as well as the interaction with gross receipt (s) as instruments. $f(\widehat{s}_{i,t})$ is a flexible polynomial function to account for possible nonlinearities in the relationship between the outcome variables and the running variable. Our baseline model adopts a linear specification. In the second stage we use the fitted values from the first stage to estimate the effects on the dependent variable $Y_{i,t}$ – which captures the various measures of tax compliance outlined above. Alternative specifications of the regression model test for robustness by including a vector of controls $X_{i,t}$ and year dummies τ_t . The local average treatment effect (LATE) is given by β_1 .

RDD Identification Validity

We start by first examining the validity of the RDD. Panels A and B in Figure 1 show regression discontinuity plots of the probability of treatment under the LTO for the CIT and GCT samples respectively.³¹ The plots fit local linear regressions on either side of the threshold with local sample averages of the outcome variable – in this case the probability of treatment, within

³⁰ We follow the literature and center gross receipts around the threshold level [$S_i = (S_i - \$500M)$]. Centering allows ensure that the treatment effect at the threshold can be read from the coefficient on the treatment indicator in models that include interaction terms.

³¹ The RD plots done using the 'rdplot' command in STATA. See Calonica, Cattaneo and Titiunik (2014a) for details.

bins of the running variable – in this case gross receipts (centered at J\$500 million). Both figures show a discontinuous increase in treatment probability at the gross receipts threshold.

Another key identifying assumption of the RDD is that taxpayers are not able to completely manipulate reported gross receipts around the threshold in order to avoid the attention of the LTO. We argue that because the gross receipts threshold is not the sole factor used in assigning taxpayers – the others being whether a taxpayer is related to an LTO client and if total taxes paid is greater than or equal to J\$50 million, then manipulation by underreporting of gross receipts become less viable. Moreover as suggested by (Almunia and Lopez-Rodriguez, 2014; Kleven and Waseem, 2013) taxpayers might face adjustment frictions or evasion costs that limit their ability to manipulate reported receipts or income. If taxpayers significantly manipulate reported gross receipts in order to avoid LTO treatment we expect to see bunching to the left of the threshold. In the absence of (perfect) manipulation, the density of taxpayers located around the threshold should be continuous. We test for structural breaks in the density of reported gross receipts by first examining simple histogram density plots for the CIT and GCT samples in Figure A.3 in the Appendix. More formally we adopt Mcrary (2008) density manipulation test for the respective samples. The results are presented in Figure A.4 and suggest no evidence of bunching or manipulation of the running variable.

Another potential concern, especially where the treatment does not strictly depend on an arbitrary cut off – is that any discontinuity identified at the threshold might be a chance outcome. We address this by examining the existence of discontinuities in treatment probability at logical points along the gross receipts distribution. TAJ segments taxpayers into categories ranging from micro to large. Micro taxpayers are those with gross receipts less than J\$10 million, small have gross receipts between J\$10 million and J\$100 million, lower medium from J\$100 million to J\$500

million, upper medium from J\$500 million to J\$1 billion and large have gross receipts in excess of J\$1 billion. Figure A.5 in the Appendix present the results for test for discontinuities at placebo thresholds at J\$100 million (US\$1.1 million) and J\$1 billion (US\$ 11.4 million). The RD plots indicate that treatment probability does not exhibit a discontinuity at either of the placebo thresholds. Further tests of the credibility of the RDD examine the transition of other covariates across the gross receipts threshold. This is to assuage concerns that other factors might also be changing discontinuously around the threshold that could impact the compliance outcomes we examine. Figures A.6 and A.7 in the Appendix present results from RD plots of key taxpayer characteristics for the CIT and GCT samples respectively. In general the plots show taxpayer characteristics transitioning smoothly across the threshold, except for an indicator for taxpayers in the financial sector. Only a relatively small proportion of the samples – 5 percent for the CIT and 7 percent for the GCT operate in the financial sector and should not significantly affect the results.³²

7 Results

7.1 Corporate Income Tax (CIT)

Filing Compliance for the CIT

RD plots presented in Figure 2 show reductions in both the probability of filing late and the number of days late that CIT returns are filed. Table 2 presents estimates of the local average treatment effects (LATE) from 2SLS regressions, using data within ranges of gross receipts that

³² We estimate the effects for financial and non-financial sector taxpayer for both the CIT and GCT samples to test for potential bias. The results for the sample excluding the financial sector taxpayers are similar to the baseline model. We report results for the GCT only.

correspond with the optimal bandwidth proposed by Imbens and Kalyanaraman (2009) (IK).³³ Results from the RD plots are supported by the LATE presented in Table 2. Panel A shows a reduction in the probability of late filing by about 90 percentage points (Column 1) and Panel B shows a reduction in the number of days late that returns are filed by 190 days (column 1). However the effects how are imprecisely estimated and in both cases are statistically insignificant. These results are robust to the inclusion of covariates and alternative bandwidth choices.³⁴

Payment Compliance for the CIT

We examine CIT payment compliance outcomes for tax years 2009 to 2011.³⁵ RD plots in Figure 3 shows a reduction in the probability of late payment but no effect for the number of days late that CIT is paid. LATE presented in Table 3 show these effects to be statistically insignificant. Figure 4 presents RD plots for the amount of CIT paid on time and the share of CIT paid on time; and shows a discontinuous increase in both outcomes at the gross receipts threshold. The directional effects from the RD plots are again re-enforced by the LATE estimates in Table 4, but as in the outcomes examined above, are statistically insignificant. The null effects hold for alternative bandwidth choices and model specifications. Interestingly the point estimates from 2SLS are large and may suggest significant economic gains in compliance associated with the LTO. However the lack of statistical significance does not allow for any clear determination of the effects of the LTO on CIT compliance outcomes examined.

³³ Baseline results from 2SLS regressions using the optimal IK bandwidth are reported for all compliance outcomes examined. Results for alternative bandwidths (half and twice the optimal bandwidth) are presented in the results tables for the respective outcomes as robustness checks.

³⁴ We also examine the filing response for a larger sample of taxpayers, which include those that filed a return but did not report positive tax liabilities and present these results in Table A.1. The results indicate no significant effects of filing for the larger sample.

³⁵ CIT payments data for tax year 2012 were not available.

7.2 General Consumption Tax (GCT)

Filing Compliance for the GCT

Figure 5 presents RD plots of the effect of the LTO on filing compliance outcomes for the GCT. The figure shows a discontinuous drop in both the probability that taxpayers file late and the number of days late that GCT returns are filed. Table 5 presents estimates of the LATE for both filing compliance outcomes. The results in Panel A indicate a 22 percentage point reduction (column 1) in the probability of late filing. The results in Panel B also suggests that taxpayers reduce the number of days late they file GCT returns by 14 days (column 1). Both findings are robust to the inclusion of controls and for larger but not smaller bandwidth choices. In general the results suggest that taxpayers respond along both the extensive margin – whether GCT returns are filed on time or not, and the intensive margin – how late GCT returns are filed.

Payment Compliance for the GCT

Results for the timeliness of GCT payments are presented in Figure 6 and show a discontinuous drop in both the probability that taxpayers pay GCT late and the number of days late that GCT is paid. LATE presented in Table 6 in Panel A (column 1) indicates a 17 percentage point reduction in the probability of late payment for the GCT. The results in Panel B (column 1) suggest that taxpayers reduce the number of days late they pay GCT by 247 days. Taxpayer's 'money response' is captured in Figure 7, and shows an increase in both the amount of GCT paid on time and the share of reported GCT paid on time at the gross receipts threshold. 2SLS estimates of the LATE presented in Table 7 confirm these results. The results in Panel A (column 1) show an increase in the amount of GCT paid on time by about J\$4 million and is robust for different bandwidths and inclusion of controls. For the share of reported GCT paid on time, in Panel B, we

find an increase of about 27 percent (column 1). Though robust to the inclusion of controls, this result is no longer statistically significant at alternative bandwidths.

In general, a contrast of the results for the CIT and GCT can offer insight into the potential for non-pecuniary factors more generally and taxpayer service in particular, to influence tax compliance in weak and stronger enforcement contexts. The null effects for the CIT and the positive compliance effects for the GCT provide suggestive evidence of a complementarity in the relationship between the strength of the legal enforcement context of the taxing regime and the provision of taxpayer service. To strengthen the case for comparability of compliance outcomes across the two tax types, we address confounding coming from possible heterogeneity in taxpayers that file CIT and GCT by restricting the analysis to only taxpayers who file both. We present results on filing and payment responses for this subsample in Table A.2 in the Appendix. The results are qualitatively similar to the baseline results using the optimal IK bandwidths – suggesting that the same taxpayer responds more positively to the provision of services for the GCT – which has the stronger enforcement.

Comparability of the compliance outcomes may still be confounded by important differences in the structure of the taxes themselves. However we argue that the margin of response examined – timeliness of filing and payment – may be less impacted when compared to other compliance outcomes typically studied such as reporting behavior. Still it can be argued, for example, that complexities of the CIT are more likely to cause delays in filing and payment compared to the GCT. But we show in Figure A.1 that the compliance patterns for measures of the timeliness of filing and payments hold for the share of reported taxes paid on time. Thus even taxpayers who file and pay on time still are more compliant with the GCT – pay a larger share of reported tax liability. This reinforces our argument that the observed compliance behavior across

taxes are likely driven primarily by differences in the enforcement context, and mitigates concerns about confounding from sample selection and heterogeneity across taxes.

7.3 Heterogeneous Effects

Next we test for heterogeneous effects for GCT compliance. We focus on the GCT since the lax enforcement framework of the CIT will tend to nullify the potentially positive compliance effects of the LTO.³⁶ The compliance effects of the LTO can be very different across economic sectors for a number of reasons.³⁷ Differences in the business and regulatory environment across economic sectors that impose varied compliance requirements on firms can differentially affect taxpayer's compliance behavior. For example firms in the financial sector that are already relatively heavily regulated to ensure they are 'fit and proper', and may not be significantly impacted by the LTO, compared to non-financial firms. A similar argument can be made for importing versus non-importing taxpayers, where the former require a tax compliance certification (TCC) in order to carry out its core business.³⁸ We examine differences in the compliance response to the LTO across financial and non-financial sector taxpayers as well as importing and non-importing firms.

Table 8 summarizes results for filing and payment compliance outcomes for financial and non-financial sector taxpayers. The results for financial sector taxpayers are reported in Panel A and indicate insignificant effects for all filing and payment compliance outcomes examined. The opposite is true for non-financial sector taxpayers, reported in Panel B, where we find significant improvements in all compliance outcomes examined. We find significant reductions in the

³⁶ Regressions using CIT data yielded null results for all compliance outcomes.

³⁷ Studies that examine reporting behavior for the VAT for example point out that firms that sell directly to end users or consumers may be more likely to evade than firms who sell to other firms (Almunia & Rodriguez 2014; Pomeranz, 2013).

³⁸ We loosely define importers as taxpayers for whom imports account for at least 20 percent of total supplies.

probability of filing late (-0.17); the number of days late that GCT returns are filed (-15) the probability of paying late (-0.145); and the number of days late that GCT is paid (-258). We also find significant gains in the amount of GCT paid on time (J\$2.4 million) and the share of reported GCT paid on time (16 percent). Comparing importing and non-importing taxpayers, we find a similar dynamic. The results presented in Table 9 suggest that the compliance behavior of importers is not significantly impacted by the LTO, but for non-importers there are significant improvements in all the compliance outcomes examined. Estimates of the LATE for non-importers are qualitatively similar to that of non-financial taxpayers presented in Table 8, but the size of the point estimates are slightly larger. These results suggest that (external) add-ins to the tax administration armament; example using regulatory and other oversight bodies to ensure compliance or requiring TCC's to conduct certain business activities are other options than can be considered to boost compliance.³⁹ In the context of this research, these add-ins appear to act as substitutes for the provision of taxpayer services.

8 Conclusion

This essay examined the effect taxpayer service delivery through the LTO, on filing and payment of CIT and GCT for large taxpayers in Jamaica. We find generally positive compliance effects on filing and payment for the GCT but no effect for the CIT. A contrast of the results provides suggestive evidence of a complementarity in the relationship between the (legal) enforcement framework and non-pecuniary or tax moral determinants of tax compliance such as provision of taxpayer services. We argue that the relatively lax legal enforcement framework of the CIT moderates the potentially positive compliance effects of the LTO. On the other hand, the

³⁹ The results presented in Tables 8 and 9 are from regressions using the optimal bandwidth (IK) only. The results are generally robust to adjustment in the bandwidth and the inclusion of controls.

stronger legal enforcement framework of the GCT complements the provision taxpayer services resulting in significant improvements in filing and payment. The null effects for the CIT raises doubts about the ability of tax morale factors and taxpayer services more specifically, by themselves, to significantly improve filing and payment compliance in developing countries.

We examined heterogeneous effects for key economic sectors and activities, and find improvements in filing and payment compliance for the GCT for taxpayers in the non-financial sector and for non-importers, but null effects for financial sector taxpayers and importers. Strict regulations of financial sector firms and TCC requirements for importers appear to be driving these results. This result highlights the substitutability between these ‘add-ins’ and the services provided by the LTO.

The results have important implications for tax policy and tax administration in developing countries. The first points to limitations in the adoption of softer approaches to tax administration that attempt to encourage tax compliance by leveraging tax moral factors in a context of major enforcement deficiencies - example weak legal framework and corruption. A lax enforcement framework may tend to negate the positive compliance effects of taxpayer services and other non-pecuniary factors. We argue that a strong legal enforcement framework is required if non pecuniary factors more generally, and taxpayer services in particular are to be effective in improving compliance. In the context of Jamaica, strengthening of the income tax law to remove or significantly limit opportunities for taxpayers to delay filing and payment of taxes could make the services provided by the LTO more valuable and could translate to improvements in compliance. Secondly, alternative compliance features, for example the use of strong regulatory or oversight sight bodies to ensure tax compliance of constituents; and requiring TCC’s to conduct key business activities, are important drivers of tax compliance and can potentially serve as substitutes

for other enforcement and non-pecuniary tax compliance programs carried on by the TAJ. Utilizing these 'compliance agents' could provide a low cost solution to the already resource strapped tax administration in many developing countries.

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Tables

Table 1A: Summary Statistics for the CIT

Variable	Observations	Mean	Std. Dev.
LTO (Treatment)	2,432	0.17	0.37
Gross receipts annual (J\$ Millions)	2,432	307.00	209.00
Filed late	2,394	0.37	0.48
No. days filed late	2,394	38.59	96.79
Paid late	1,800	0.54	0.50
No. days paid late	1,800	289.21	468.69
CIT Paid (J\$ millions)	1,800	3.57	13.90
Share CIT paid on time	1,800	0.45	0.53
Estimated CIT Paid (J\$ millions)	2,432	2.76	11.00
CIT Reported (J\$ millions)	2,432	3.26	8.26
Financial Sector	2,432	0.05	0.21
Number of Employees	2,124	48.34	90.51
Age	2,432	10.55	4.40

Note: Tax return data are for taxpayers with reported gross receipts between J\$100 million and J\$1 billion who report positive tax liabilities for tax years 2009 – 2012. Payments data are for tax years 2009 – 2011 as data for 2012 were unavailable.

Table 1B: Summary Statistics for the GCT

Variable	Obs	Mean	Std. Dev.
LTO (Treatment)	34,764	0.22	0.42
Gross receipts annual (J\$ Millions)	34,764	296	203
Filed late	34,739	0.06	0.23
No. days filed late	34,739	3.76	35.32
Paid late	34,764	0.10	0.30
No. days paid late	34,764	78.73	349.59
GCT Paid (J\$ Millions)	34,764	1.22588	2.73232
Share GCT paid on time	34,762	0.90	0.74
Tax Arrears (J\$ millions)	34,734	-0.009	0.775
Financial Sector	34,764	0.07	0.26
Age	33,951	8.72	1.98

Note: Tax return data are for taxpayers with reported gross receipts between J\$100 million and J\$1 billion who report positive tax liabilities between May 2009 and December 31, 2012. The start date suggests that we capture data roughly two months after the establishment of the LTO in April 2009.

Table 2: Effect of the LTO on Timely Filing of the CIT

	Filing Compliance					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Probability of Filing Late</i>						
LTO	-0.904 (1.241)	-0.315 (0.835)	-0.524 (0.334)	-0.419 (0.322)	-0.623 (3.264)	0.851 (1.641)
Bandwidth (J\$ Millions)	241	241	481	481	120	120
Observations	938	837	2,388	2,087	401	357
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Number of Days Filed Late</i>						
LTO	-190.2 (188.1)	-125.7 (137.0)	-72.98 (56.55)	-68.31 (51.89)	-154.6 (567.4)	74.95 (340.1)
Bandwidth (J\$ Millions)	286	286	572	572	143	143
Observations	1,179	1,063	2,394	2,092	480	429
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is an indicator equal 1 if the taxpayer filed late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that taxpayers file a CIT return. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 3: Effect of the LTO on Timely Payment of the CIT

	Payment Compliance (Timeliness)					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Probability of Filing Late</i>						
LTO	-0.805 (0.891)	-0.704 (0.767)	-0.387 (0.326)	-0.386 (0.323)	-2.462 (9.745)	-0.0777 (1.376)
Bandwidth (J\$ Millions)	289	289	578	578	144	144
Observations	874	797	1,800	1,609	358	322
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Number of Days Paid Late</i>						
LTO	-77.79 (305.7)	-127.3 (282.1)	-17.27 (245.9)	-18.71 (234.7)	-1,049 (1,303)	-880.4 (992.2)
Bandwidth (J\$ Millions)	477	477	947	947	237	237
Observations	1,793	1,603	1,800	1,609	668	601
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is an indicator equal 1 if the taxpayer paid late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that the taxpayer paid CIT. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 4: Effect of the LTO on the Amount of CIT Paid on Time

	Payment Compliance (Amount Paid)					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Amount of GCT Paid on Time</i>						
LTO	9.236 (13.97)	4.633 (5.272)	9.183 (11.65)	4.183 (4.816)	33.40 (40.82)	6.859 (11.83)
Bandwidth (J\$ Millions)	562	562	1125	1125	281	281
Observations	1,733	1,553	1,733	1,553	817	744
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Share of Reported GCT Paid on Time</i>						
LTO	1.007 (0.870)	0.621 (0.438)	0.608 (0.413)	0.543 (0.384)	0.845 (2.887)	1.018 (1.000)
Bandwidth (J\$ Millions)	336	336	674	674	168	168
Observations	1,064	1,609	1,609	1,609	398	769
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is the amount of CIT paid on time (in millions J\$). The dependent variable in Panel B captures the share of reported CIT paid on time. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the ‘age’ of the taxpayer, the amount of estimated CIT paid, reported CIT and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 5: Effect of the LTO on Timely Filing of the GCT

	Filing Compliance					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Probability of Filing Late</i>						
LTO	-0.222** (0.0883)	-0.252** (0.0980)	-0.153*** (0.0476)	-0.172*** (0.0499)	0.0146 (0.0781)	0.0226 (0.0871)
Bandwidth (J\$ Millions)	125	125	250	250	62.5	62.5
Observations	6,026	5,849	13,766	13,380	3,024	2,943
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Number of Days Late</i>						
LTO	-14.44** (5.629)	-15.23*** (5.730)	-9.900*** (3.340)	-10.26*** (3.602)	-13.39*** (5.117)	-14.14** (5.512)
Bandwidth (J\$ Millions)	235	235	470	470	118	118
Observations	12,790	12,433	34,571	33,732	5,662	5,491
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is an indicator equal 1 if the taxpayer filed late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that taxpayers file a GCT return. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 6: Effect of the LTO on Timely Payment of the GCT

	Payment Compliance (Timeliness)					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Probability of Paying Late</i>						
LTO	-0.174*	-0.152*	-0.168***	-0.186***	-0.0162	0.0240
	(0.0893)	(0.0832)	(0.0509)	(0.0535)	(0.111)	(0.128)
Bandwidth (J\$ Millions)	156	156	312	312	78	78
Observations	7,691	7,475	19,141	18,616	3,764	3,658
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Number of Days Late</i>						
LTO	-247.0***	-229.9***	-189.3***	-184.1***	-315.9***	-312.8***
	(49.23)	(49.01)	(33.11)	(35.63)	(96.30)	(96.46)
Bandwidth (J\$ Millions)	361	361	722	722	181	181
Observations	25,693	25,040	34,764	33,921	8,801	8,559
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is an indicator equal 1 if the taxpayer paid late and 0 otherwise. The dependent variable in Panel B captures the number of days after the due date that the taxpayer paid CIT. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 7: Effect of the LTO on the Amount of GCT Paid on Time

	Payment Compliance (Amount Paid)					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Amount of GCT Paid on Time</i>						
LTO	4.415*** (0.830)	3.571*** (0.702)	1.842*** (0.391)	1.563*** (0.380)	7.304*** (1.981)	6.211*** (1.734)
Bandwidth (J\$ Millions)	207	207	414	414	104	104
Observations	10,350	10,061	34,212	33,385	4,878	4,730
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes
<i>Panel B - Share of Reported GCT Paid on Time</i>						
LTO	0.266** (0.131)	0.200* (0.107)	0.0854 (0.105)	0.0697 (0.124)	-0.0795 (0.132)	-0.144 (0.136)
Bandwidth (J\$ Millions)	166	166	332	332	83	83
Observations	8,081	7,852	21,493	20,916	4,014	3,898
Year Dummy	no	yes	no	yes	no	yes
Controls	no	yes	no	yes	no	yes

Note: The dependent variable in Panel A is the amount of GCT paid on time (in millions J\$). The dependent variable in Panel B captures the share of reported GCT paid on time. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009), with and without controls respectively. Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Controls include the 'age' of the taxpayer, amount of GCT arrears / credits and a dummy that capture whether or not the taxpayer operates in the financial sector. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 8: GCT Filing and Payment Compliance for Financial and Non-Financial Sector

	Filing Compliance		Payment Compliance			
	Filed Late (1)	Days Late (2)	Paid Late (3)	Days Late (4)	Amt on Time (5)	Share on Time (6)
<i>Panel A - Financial Sector Taxpayers</i>						
LTO	0.0699 (0.0670)	42.06 (122.8)	0.0761 (0.105)	-136.8 (200.3)	-53.57 (61.00)	-1.100 (1.047)
Observations	712	1,176	814	1,888	1,014	835
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
<i>Panel B - Non Financial Sector Taxpayers</i>						
LTO	-0.172** (0.0694)	-15.34*** (5.748)	-0.145* (0.0758)	-258.1*** (51.48)	2.398*** (0.545)	0.157* (0.0908)
Observations	5,314	11,614	6,877	23,805	9,336	7,246
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Bandwidth (J\$ Millions)	125	235	156	361	207	166

Note: All results presented are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009). Taxpayers are linked to the financial and non-financial sectors using industry codes from the tax returns data. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 9: GCT Filing and Payment Compliance for Importers and Non Importers

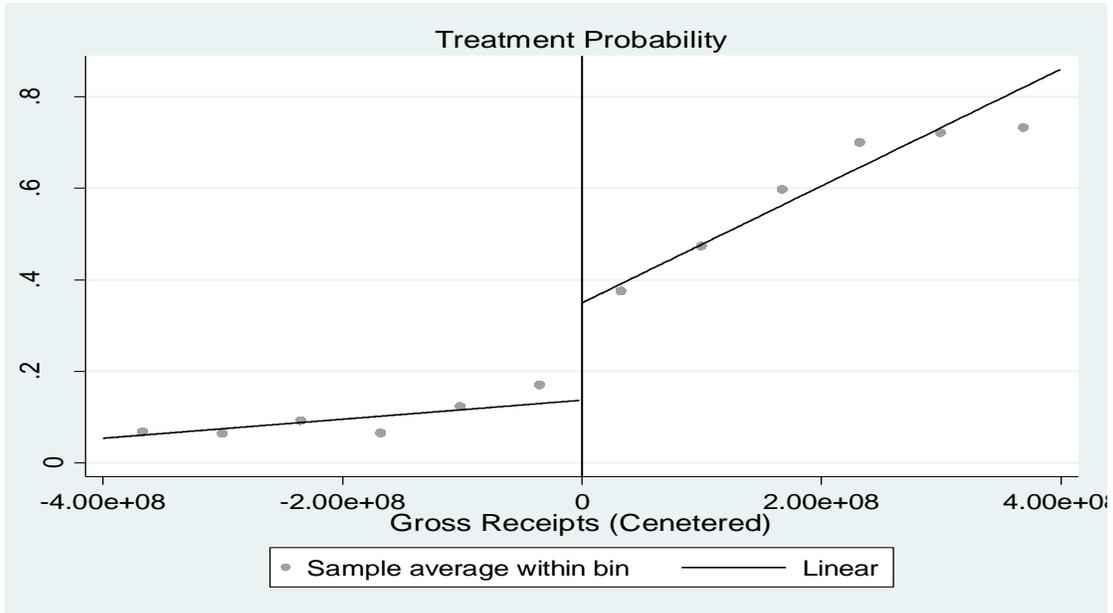
	Filing Compliance		Payment Compliance			
	Filed Late	Days Late	Paid Late	Days Late	Amt on Time	Share on Time
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - Importers</i>						
LTO	-0.227 (0.790)	-0.732 (1.535)	-0.102 (0.600)	106.4 (99.82)	3.897 (4.629)	-1.730 (4.162)
Observations	1,049	2,250	1,341	4,143	1,799	1,408
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
<i>Panel B - Non Importers</i>						
LTO	-0.228** (0.0900)	-14.50** (5.775)	-0.208*** (0.0718)	-274.7*** (52.14)	4.343*** (0.806)	0.312** (0.134)
Observations	4,977	10,540	6,347	21,550	8,551	6,673
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
Bandwidth (J\$ Millions)	125	235	156	361	207	166

Note: All results presented are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009). We classify importers as taxpayers if their imported input / output ratio is greater than or equal to 20 percent receipts and taxpayer with a ratio less than 20 percent as non-importers. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Figures

Figure 1

Panel (a): Discontinuity in Treatment Probability for the CIT (First Stage)



Panel (b): Discontinuity in Treatment Probability for the GCT (First Stage)

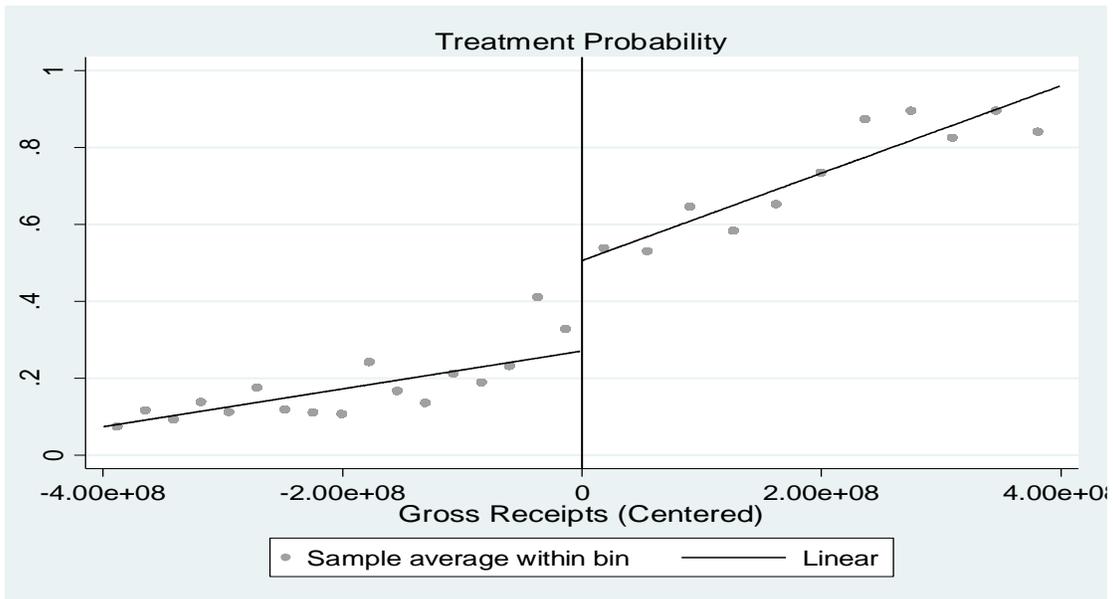
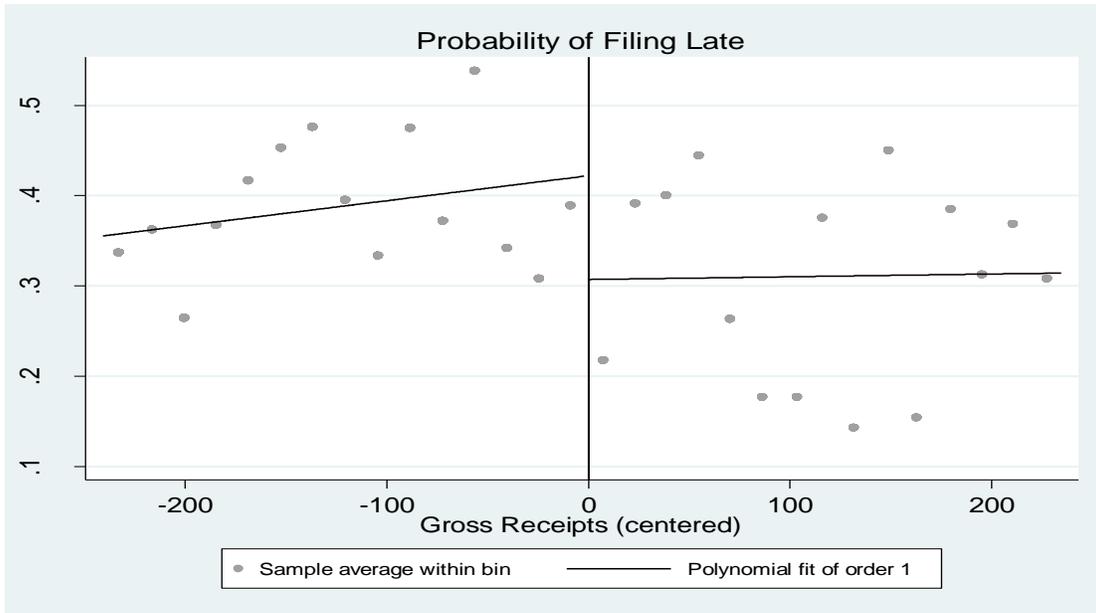
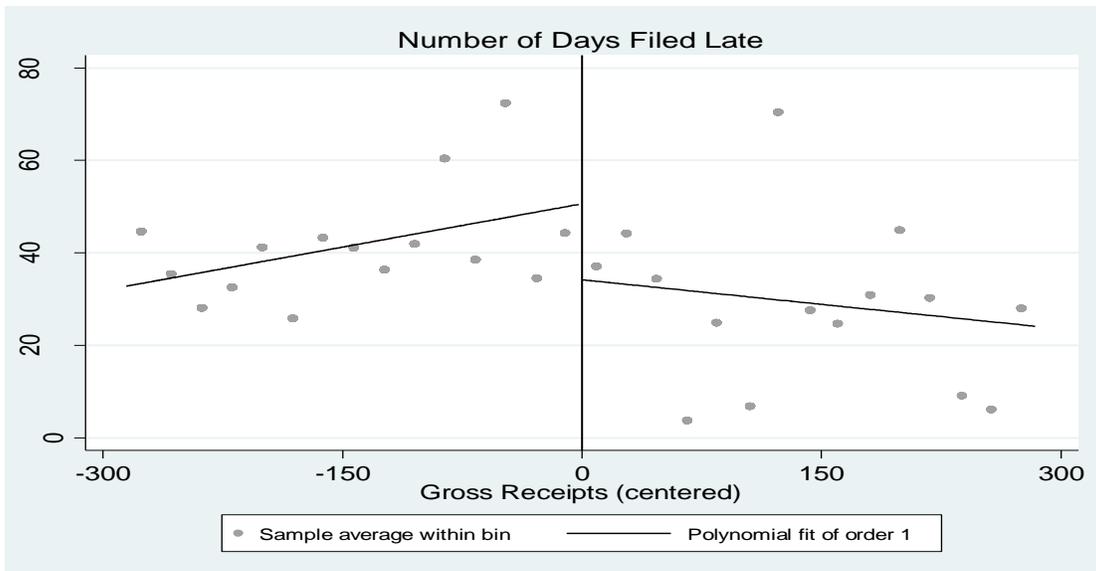


Figure 2

Panel A: Probability CIT Returns are Filed Late



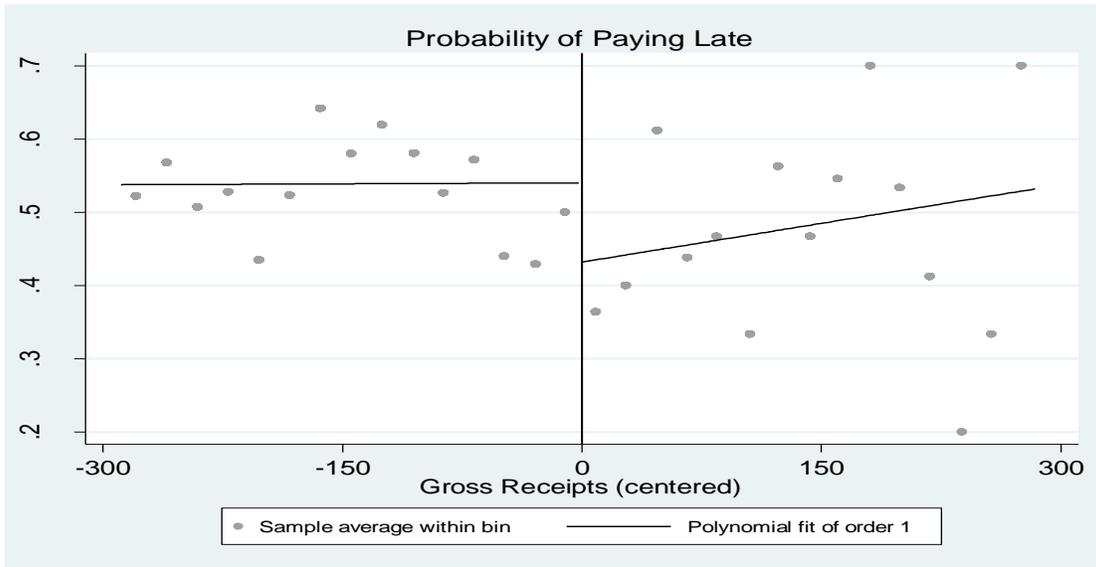
Panel B: Number of Days Filed Late CIT is Filed



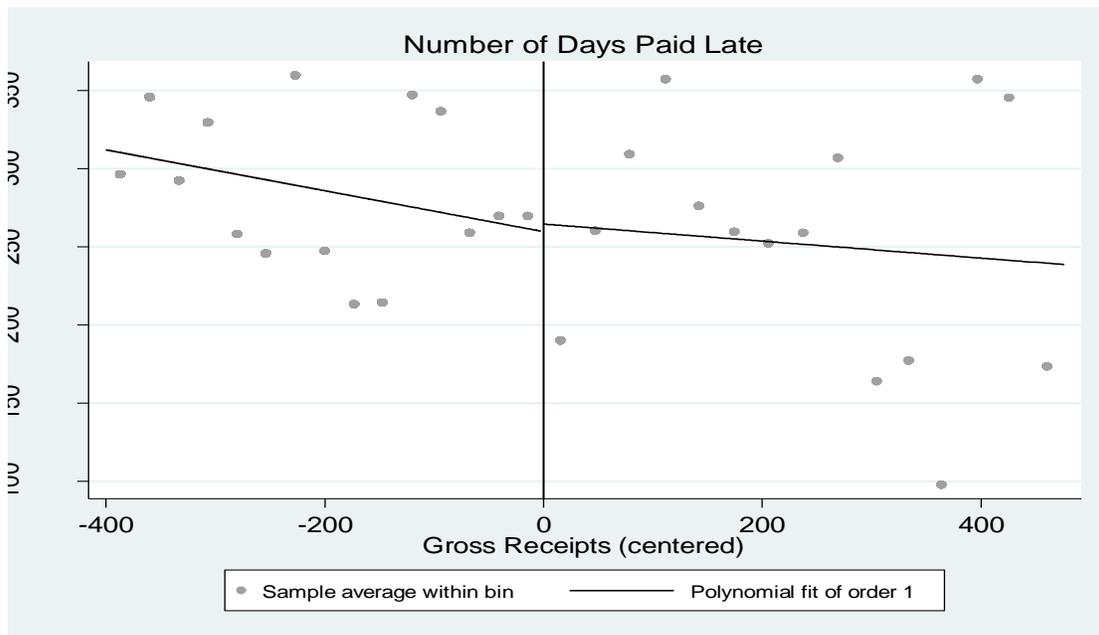
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using IMSE – evenly spaced (ES) method with spacing estimators proposed by Calonico et al. (2014b). The approach fits linear regressions that approximate the conditional mean of the outcome variables to the left and right of the cut off.

Figure 3

Panel A: Probability that CIT is Paid Late



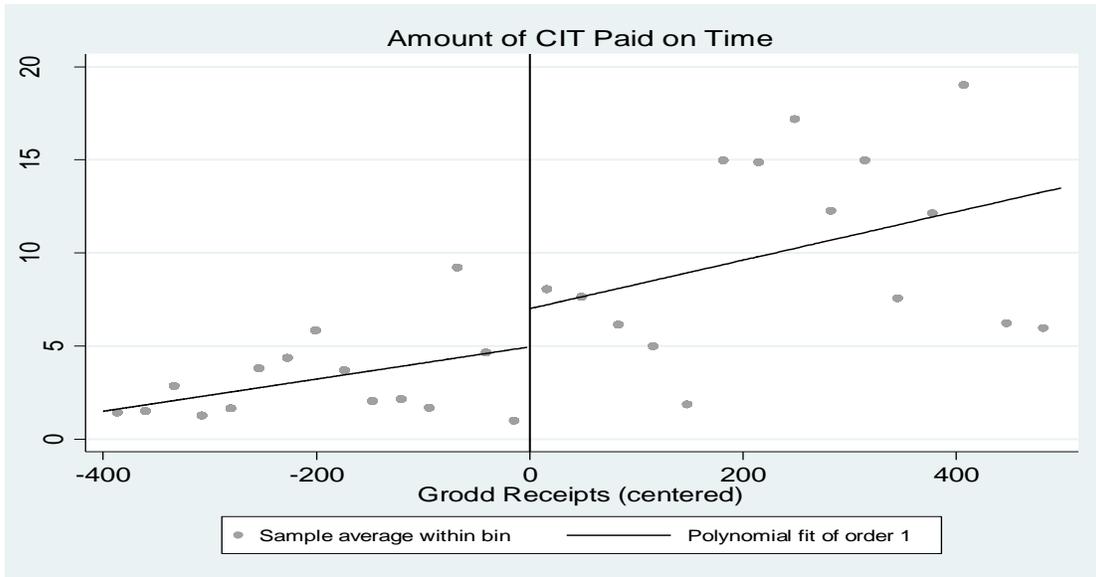
Panel B: Number of Days Late CIT is Paid



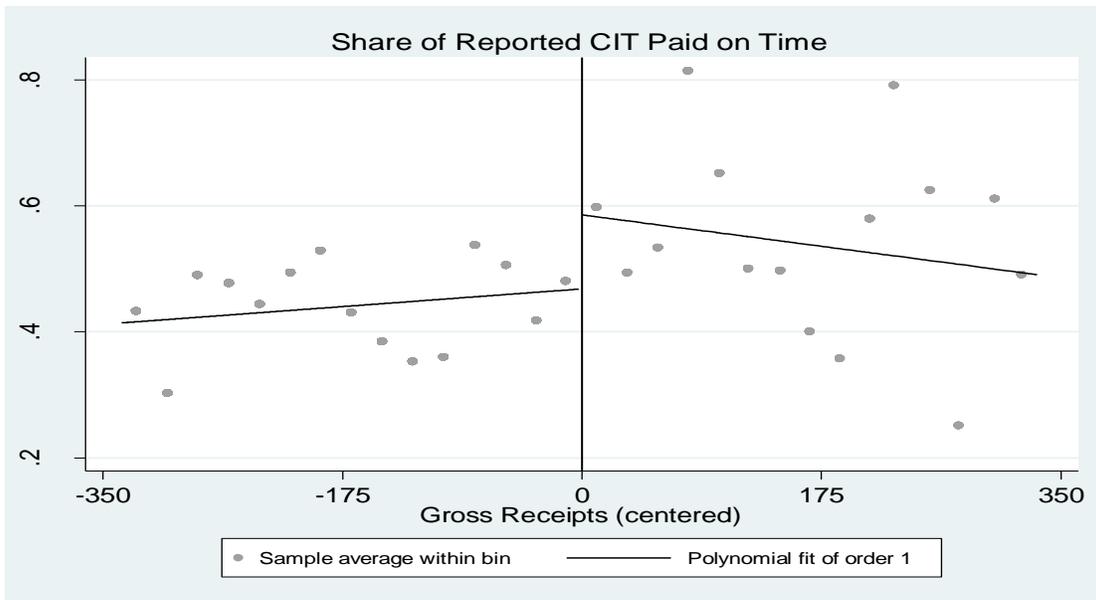
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using the default IMSE – evenly spaced (ES) method with spacing estimators Calonico et al. (2014b). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 4

Panel A: Amount of CIT Paid on Time



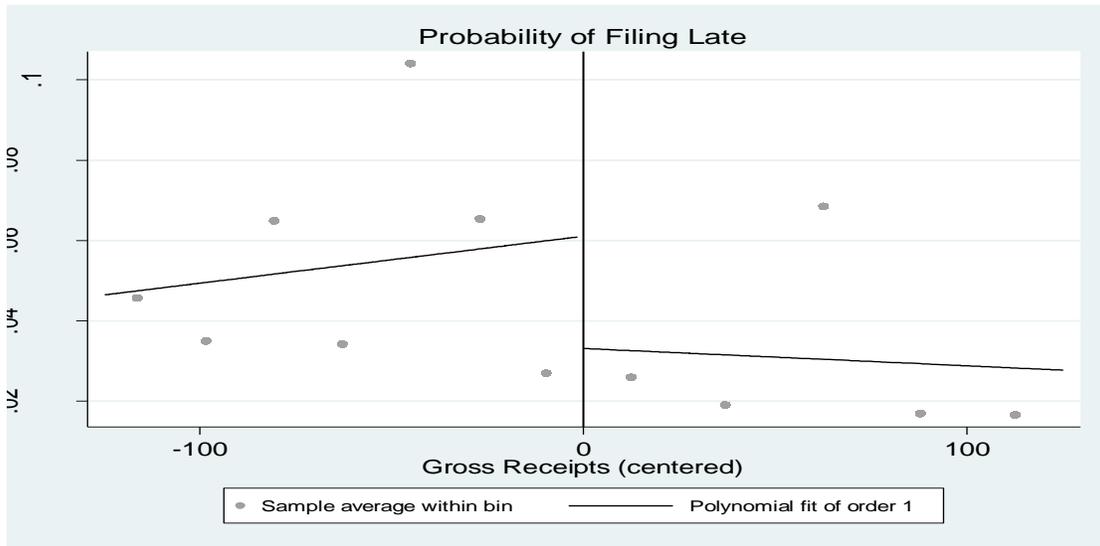
Panel B: Share of Reported CIT Paid on Time



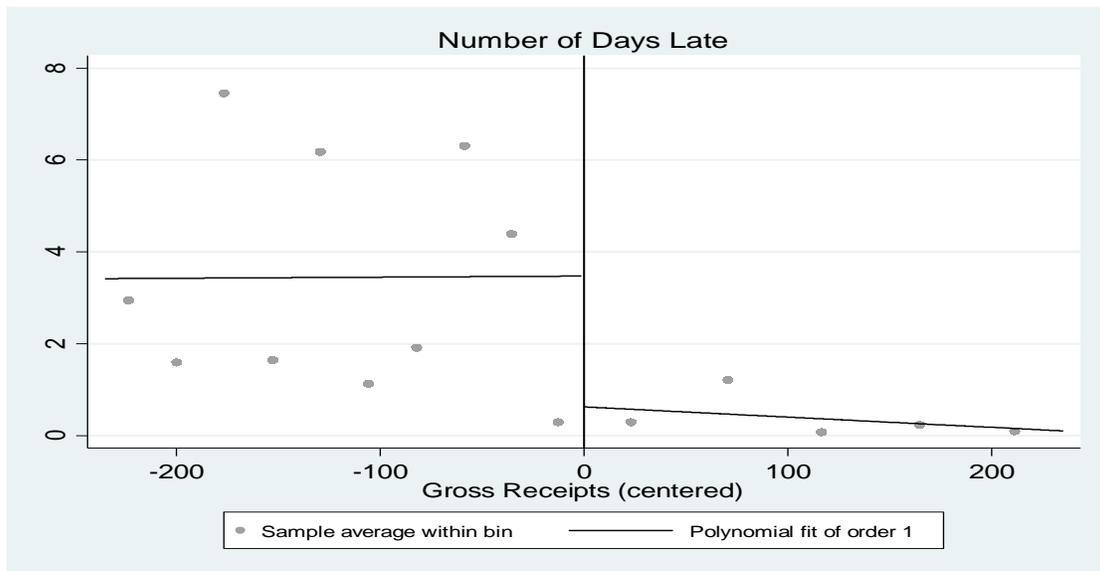
Note: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD Plots done using the default IMSE – evenly spaced (ES) method with spacing estimators Calonico et al. (2014b). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 5:

Panel A: Probability GCT is Filed Late



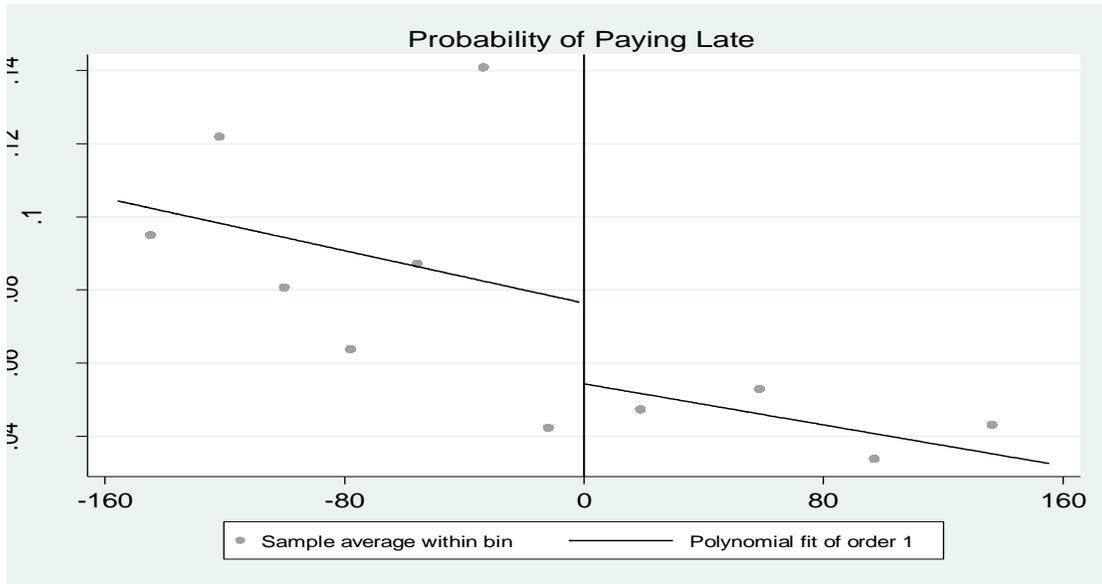
Panel B: Number of Days GCT is Filed Late



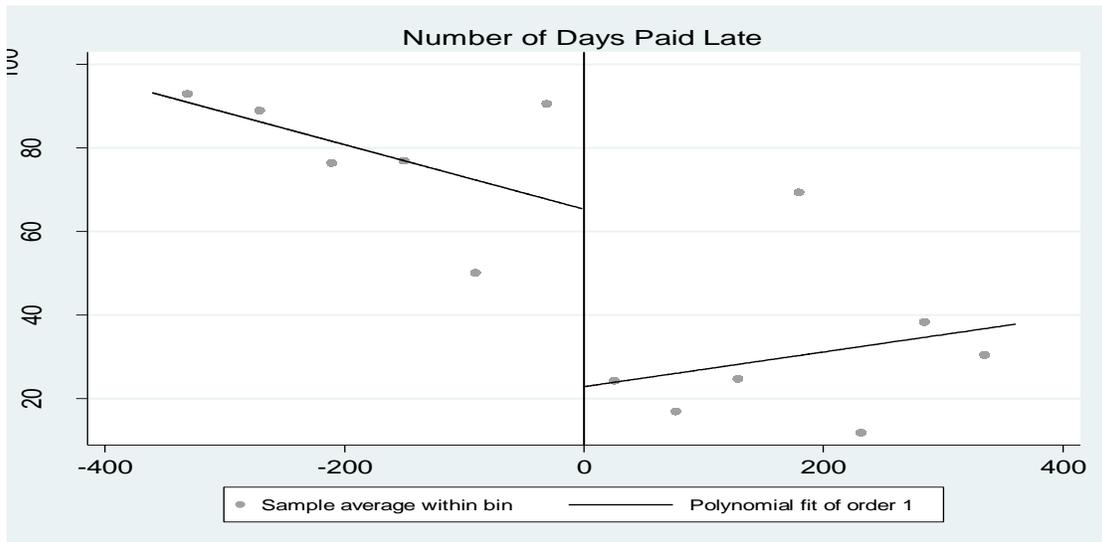
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE – evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 6

Panel A: Probability that GCT is Paid Late



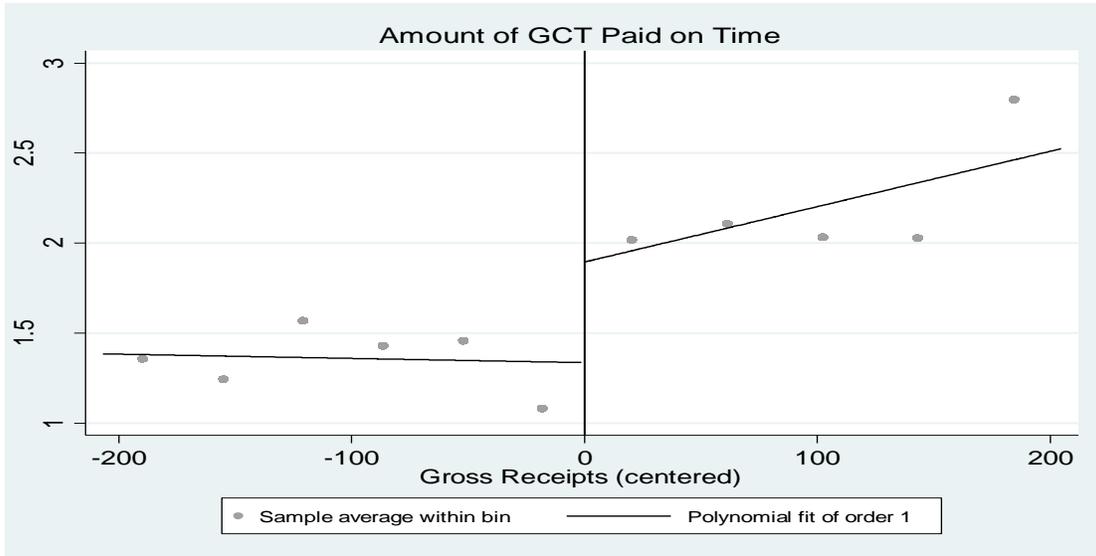
Panel B: Number of Days Late GCT is Paid



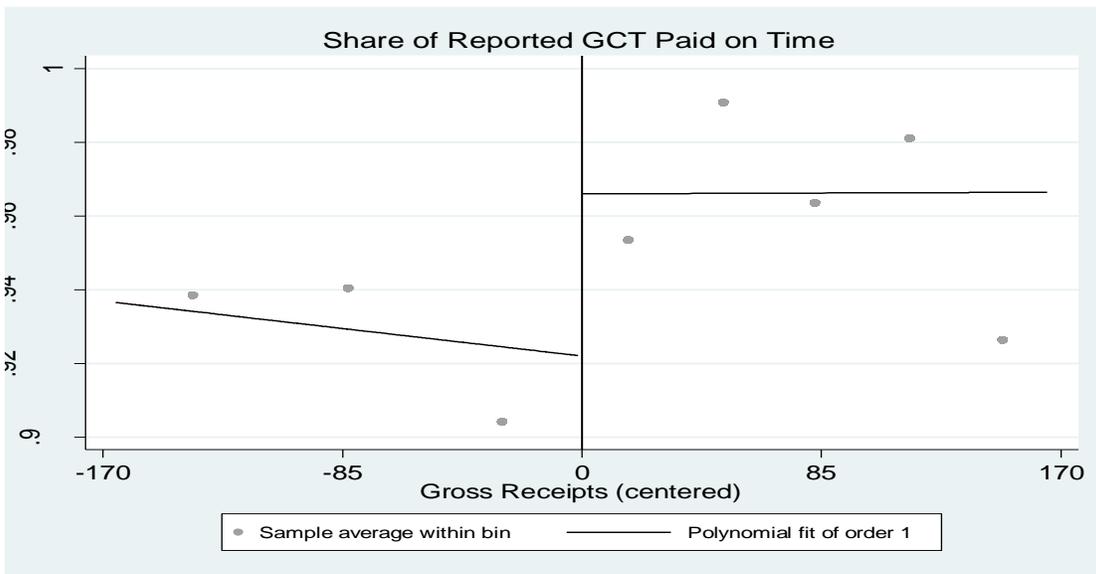
Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE –evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Figure 7

Panel A: Amount of GCT Paid on Time



Panel B: Share of Reported GCT Paid on Time



Notes: Bandwidths are chosen to approximate the optimal (IK) bandwidth for the respective outcomes. RD plots done using Calonico et al. (2014b) IMSE –evenly spaced (ES) method using spacing estimators (ES). The approach fits linear regression curves that approximate the conditional means of the outcome variable to the left and right of the cut off.

Appendix

Table A.1: Filing Compliance for All Taxpayers, Gross Receipts J\$1 million – J\$1 billion

	Probability of Filing Late			Days Filed Late		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A - CIT Compliance</i>						
LTO	0.472 (1.719)	0.0143 (0.297)	-0.426 (12.90)	5.904 (71.33)	1.128 (44.11)	232.7 (797.0)
Bandwidth (J\$ millions)	229	458	115	398	797	199
Observations	1,564	4,668	701	4,546	4,713	1,302
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
<i>Panel B - GCT Compliance</i>						
LTO	0.509 (0.486)	-0.0490 (0.0965)	0.264 (0.379)	8.343 (17.91)	-3.132 (8.272)	79.81 (70.07)
Bandwidth (J\$ millions)	101	202	51	246	493	123
Observations	7,666	16,538	3,809	21,844	57,124	9,562
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no

Notes: Results are for sample of taxpayers with reported gross receipts between J\$100 million and J\$1 billion. Compared to the baseline sample this sample includes taxpayer that reported non positive tax liabilities. The results presented in columns 1-2 are for the optimal bandwidth as proposed by Imbens and Kalyanaraman (2009). Columns 3-4 present results for a larger bandwidth (2 x IK) and columns 5-6 for a smaller bandwidth (1/2 x IK). Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table A.2: Filing and Payment Compliance for Taxpayers who file both CIT and GCT

	No. of Days		No. of Days		Amount	Share
	Filed Late (1)	Filed Late (2)	Paid Late (3)	Paid Late (4)	Paid on Time (5)	Paid on Time (6)
<i>Panel B - CIT Compliance</i>						
LTO	-2.882 (9.585)	-489.0 (773.0)	-2.010 (2.639)	-1,585 (1,990)	-3.287 (12.92)	1.543 (2.093)
IK Optimal Bandwidth (J\$ Millior	240	283	295	306	480	303
Observations	749	930	726	766	1,395	756
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no
<i>Panel A - GCT Compliance</i>						
LTO	-0.255*** (0.0588)	-3.124*** (1.120)	-0.231*** (0.0636)	-307.3*** (73.23)	3.845*** (0.995)	0.257*** (0.0726)
IK Optimal Bandwidth (J\$ Millior	130	320	152	196	122	196
Observations	4,389	13,602	5,236	6,935	4,046	6,918
Year Dummy	no	no	no	no	no	no
Controls	no	no	no	no	no	no

Notes: Results are for taxpayers that filed or paid both CIT and GCT for tax years 2009 – 2012. Filing and payment compliance outcomes presented are estimated using the IK optimal bandwidths. Regressions adopt a linear specification. Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Figure A1: Estimates of Penalty and Interest by Unpaid Tax Liability for CIT and GCT

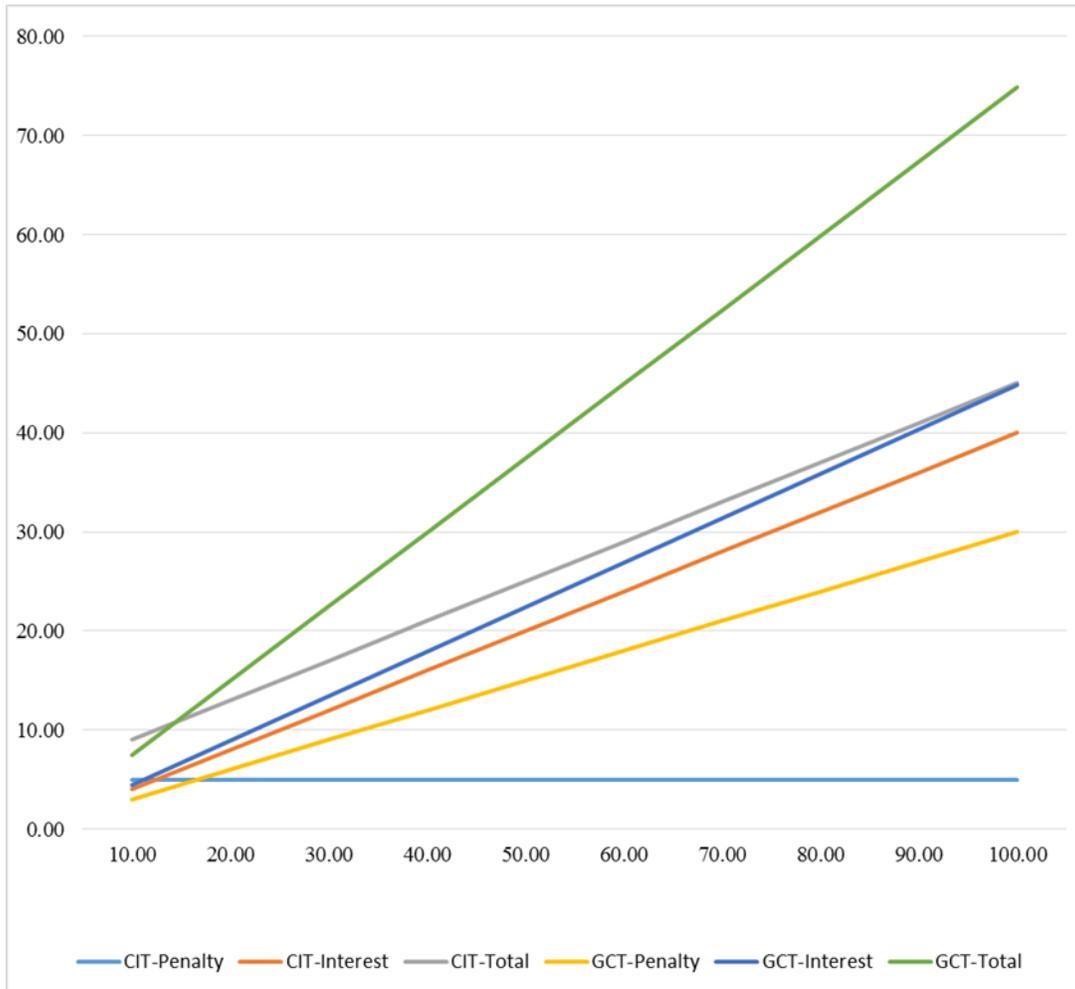
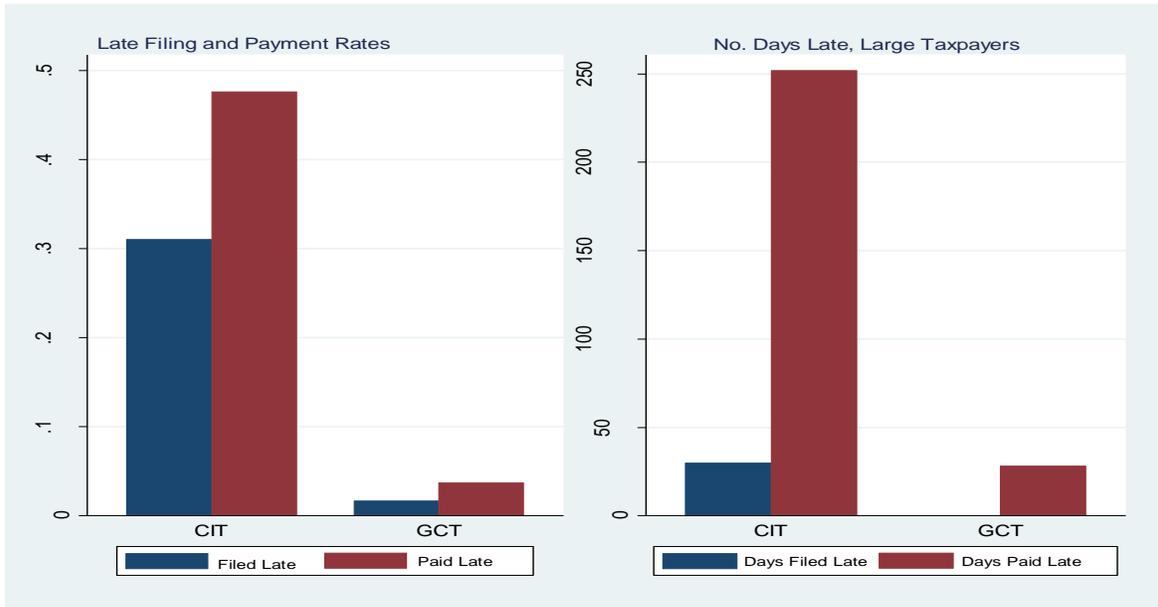


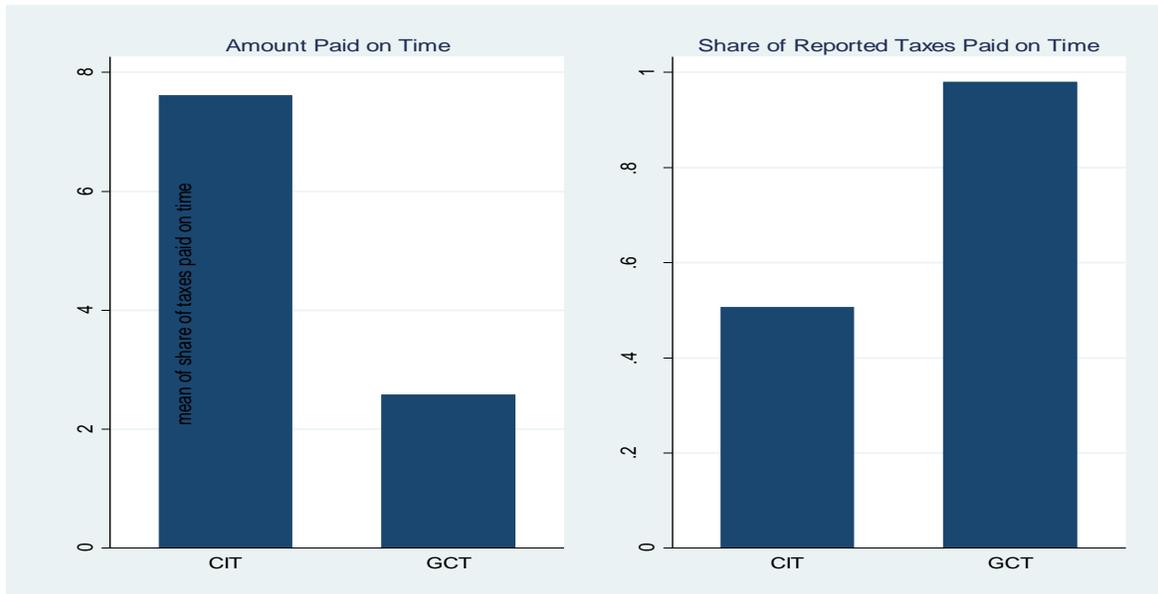
Figure A2

Panel A: CIT and GCT Filing and Payment Compliance Rates for Large Taxpayers



Note: Graphs are for taxpayers who filed both CIT and GCT with reported gross receipts between J\$500 million and J\$1 billion. Graph in the first column shows the rate of late filing and payment for the CIT and GCT. The graph in the second column shows the number of days late that CIT and GCT is paid.

Panel B: CIT and GCT 'Money' Payments, Large Taxpayers



Note: Graphs are for taxpayers who filed both CIT and GCT with reported gross receipts between J\$500 million and J\$1 billion. Graph in the first column shows the amount of CIT and GCT paid on time. The graph in the second column shows the share of reported CIT and GCT paid on time.

Figure A3: Density Plot Gross Receipts for Large Taxpayers

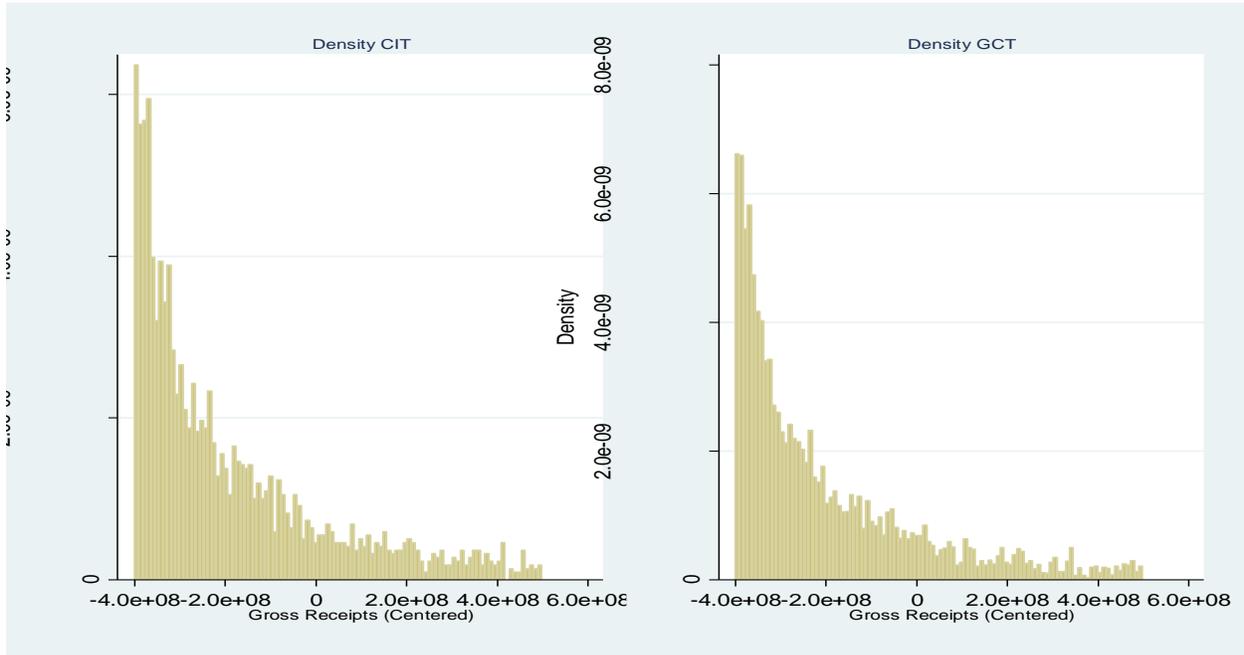


Figure A4: McCrary Test of Density Manipulation around the Threshold for the CIT and GCT

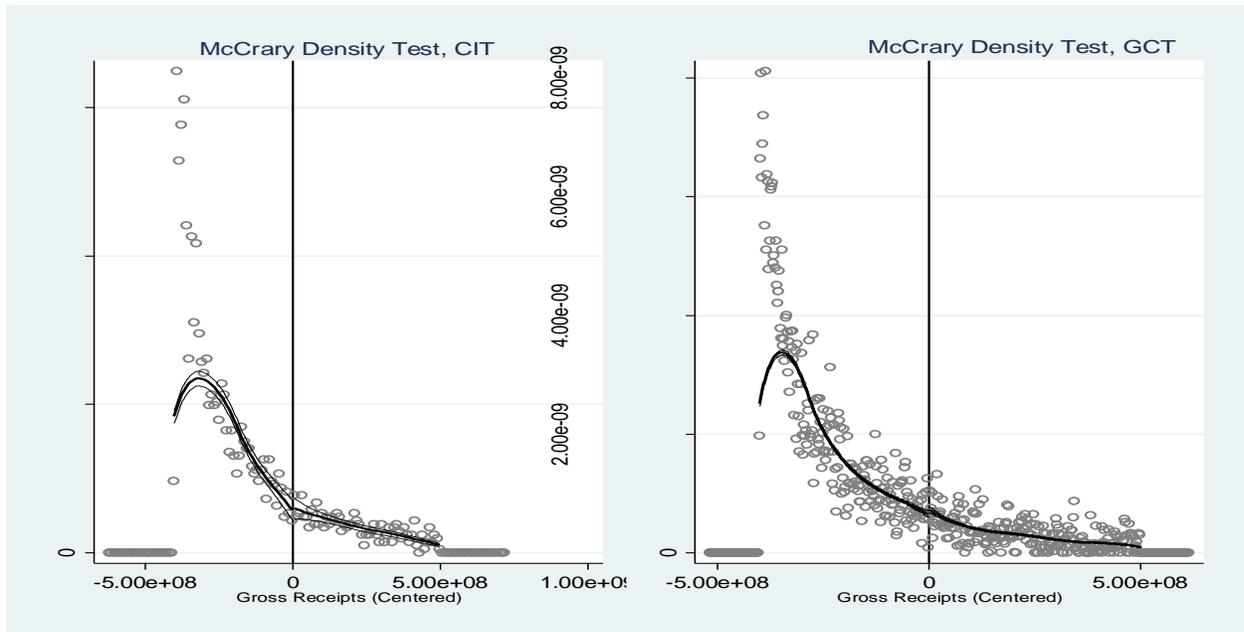
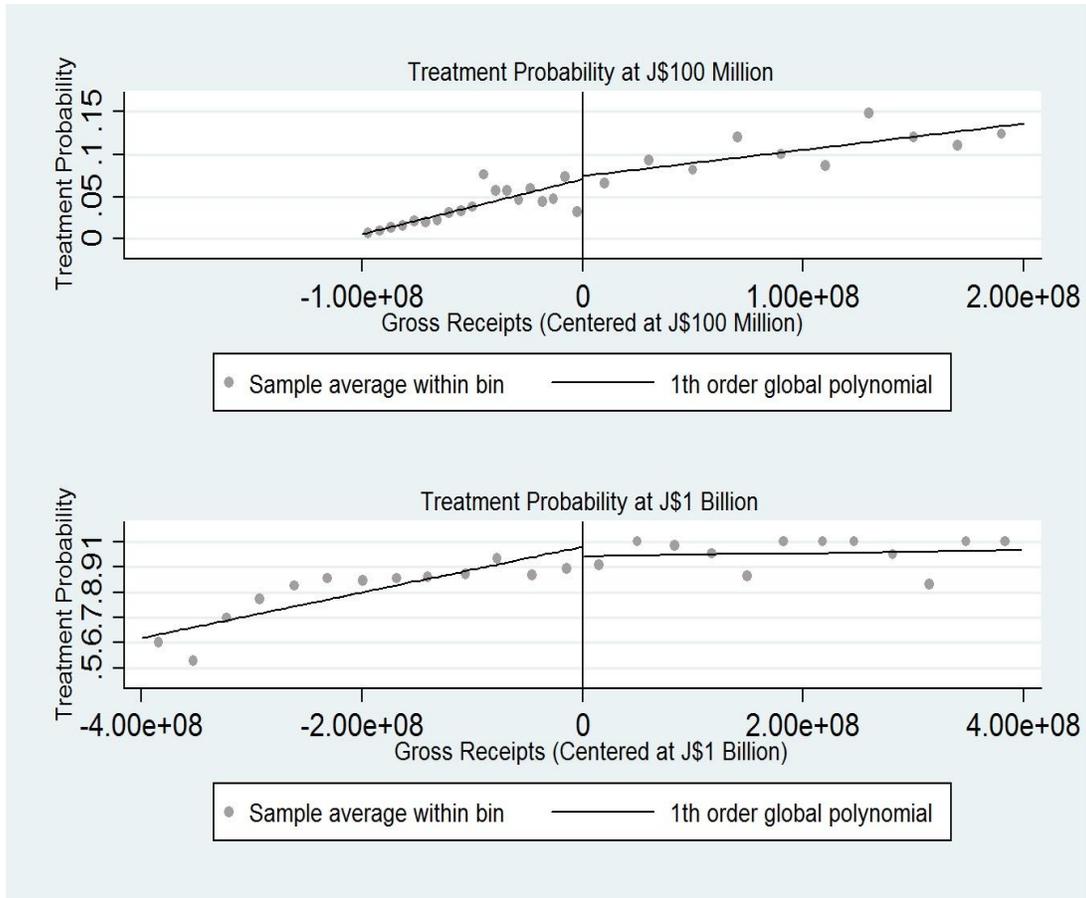
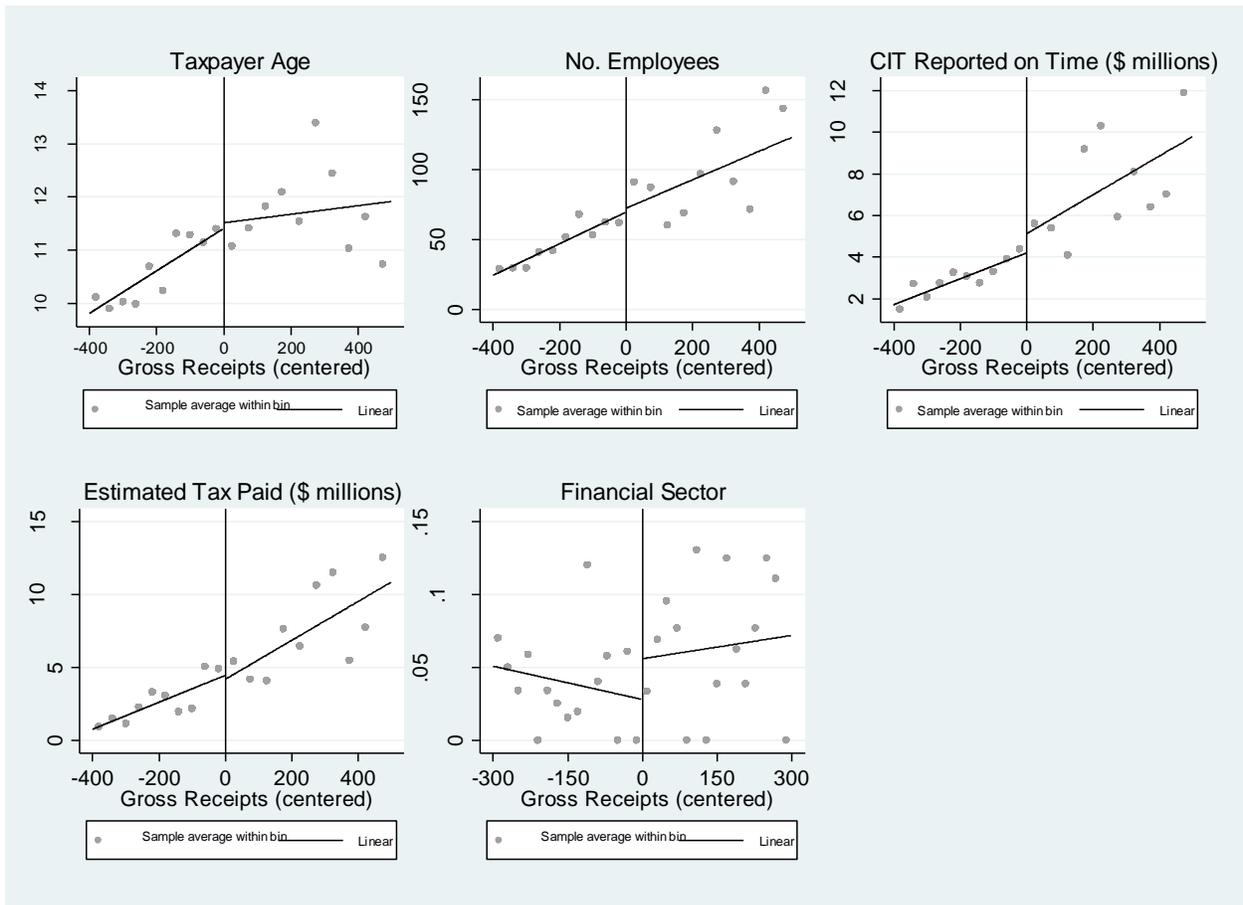


Figure A5: Test for Discontinuity in Treatment Probability of Treatment at the Placebo
 Thresholds of J\$100 Million and J\$1 Billion



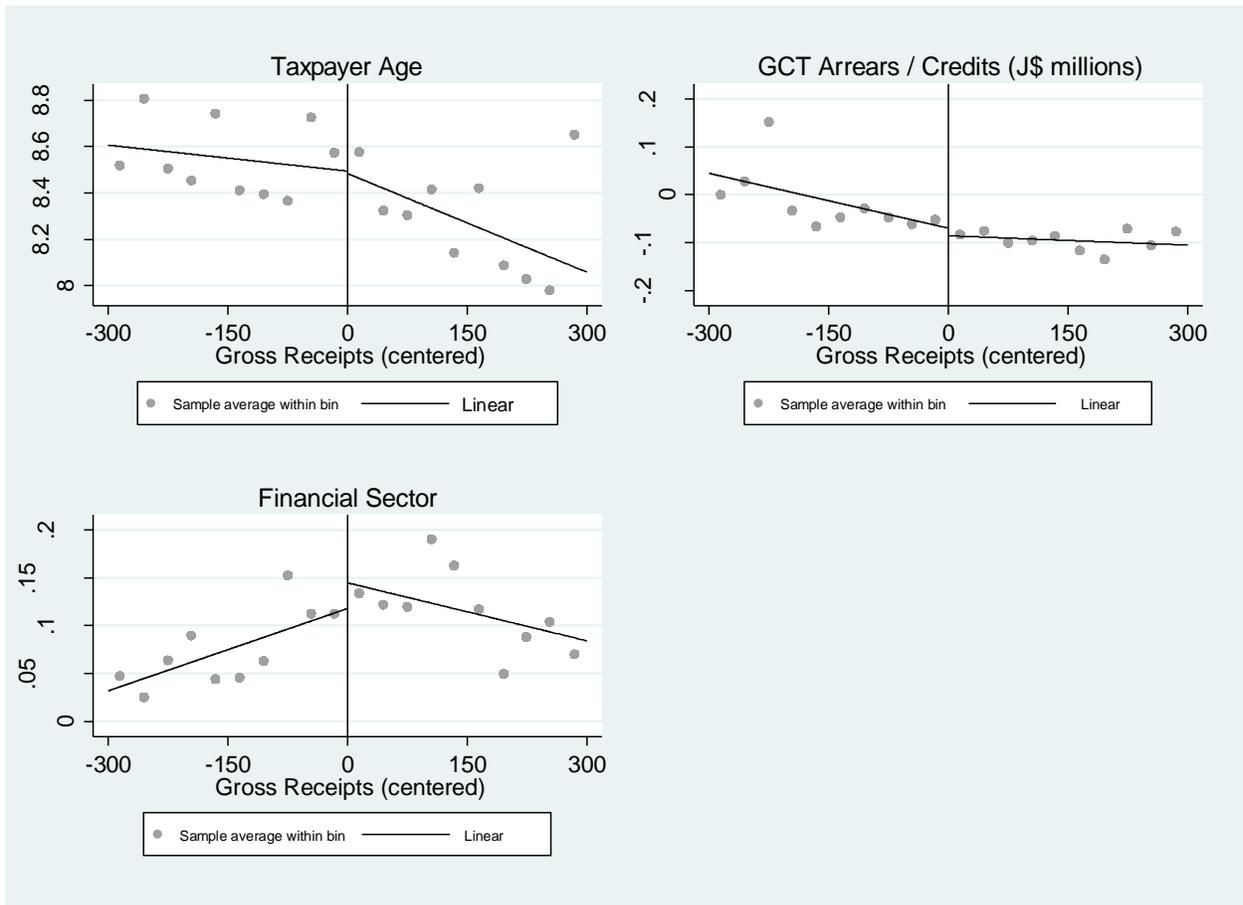
Notes: The placebo thresholds of J\$100 million and J\$1 billion were chosen to match with TAJ classification schedule for micro and 'large' taxpayers.

Figure A6: Treatment Probability for Key Economic Sector for the CIT



RD plots done using integrated mean squared-error (IMSE) – equally spaced (ES) method with spacing estimators (Calonico et al., 2014a). The approach fits linear regressions that approximate the conditional means of the outcome variable (firm characteristics) to the left and right of the cut off.

Figure A7: Tests for Discontinuity in Taxpayer Characteristics, GCT



Notes: RD plots done using integrated mean squared-error (IMSE) – evenly spaced (ES) method with spacing estimators (Calonico et al.; 2014a) The approach fits local linear regressions that approximate the conditional means of the outcome variable to the left and right of the cut off for age and GCT arrears, financial and non-financial sector.