Table 3: Heterogeneity of tax evasion by firm characteristics

	List 1		List 2	
	(1)	(2)	(3)	(4)
Full Sample	0.274***	0.268***	0.250***	0.248***
	(0.044)	(.043)	(.041)	(.040)
Exporters	0.174**	0.169**	0.215***	0.213***
	(0.085)	(0.084)	(0.079)	(0.079)
Non-exporters	0.307***	0.301***	0.261***	0.260***
	(0.051)	(0.050)	(0.047)	(0.047)
P-value difference	0.177	0.174	0.623	0.611
Tax administration obstacle	0.345***	0.319***	0.369***	0.381***
	(0.082)	(0.081)	(0.077)	(0.076)
Tax administration NOT an obstacle	0.243***	0.243***	0.207***	0.201***
	(0.051)	(0.050)	(0.048)	(0.047)
P-value difference	0.290	0.422	0.073	0.045
Informal Competition	0.354***	0.332***	0.285***	0.291***
	(0.068)	(0.068)	(0.064)	(0.064)
No informal competition	0.215***	0.225***	0.233***	0.219***
	(0.056)	(0.056)	(0.052)	(0.052)
P-value difference	0.117	0.224	0.529	0.382
Sample Size	2330	2330	2322	2322
Controls	No	Yes	No	Yes

Note: This table shows differences in the average number of items selected by respondents in the treatment and control groups in the first and second list experiments (with and without control variables). Specifically, the results of the list experiments are presented for subgroups of respondents based on market competition (competition from the informal sector or not), target market (exporter or not), and if respondents believe tax administration is an obstacle to their business.

Table 3 shows the three dimensions where substantial and consistent heterogeneity in reported tax evasion rates is most notable. Firstly, firms that do not export are more likely to report evading tax than those that export across both list experiments. The reported tax evasion rate varies from 26.0 to 30.7 percent for non-exporting firms compared to 16.9 to 21.5 percent for exporting firms. While the exact level varies, the order of magnitude of tax evasion is much higher for non-exporting firms. Secondly, firms which report that tax administration is a major obstacle to business activities are also found to have significantly higher levels of tax evasion. The tax evasion rate varies from 31.9 to 38.1 percent for firms that claim tax administration is a major obstacle compared to 20.1 to 24.3 percent for those

that do not. That equates to an evasion rate of up to 90 percent higher for firms where tax administration is considered a major obstacle to business activities. Thirdly, firms facing substantial competition from the informal sector were more likely to report evading taxes. The reported tax evasion rate varies from 28.5 to 35.4 percent for firms that face substantial competition from the informal sector compared to 21.5 to 23.3 percent for those that do not. While some of these differences are not statistically significant at traditional levels, partly due to sample size constraints, the differences are still economically meaningful.

The absence of substantial and consistent heterogeneity of reported tax evasion on other dimensions is striking. The survey covered a range of aspects of firm characteristics and beliefs, such as industry sector, whether firms had been visited by tax officials, firm size, ownership structure, and where they used an auditor. However, based on these characteristics, there was no significant and consistent variation in tax evasion across the two list experiments. For example, firms with an owner-manager reported a tax evasion rate of 24.4 to 28.9 percent compared to 20.4 to 23.6 percent for those that did not (these differences were not statistically significant).

6 Discussion and Conclusion

This study shows that a sizable share of registered firms in Indonesia admit to not paying all the tax they owe, and this is likely to substantially reduce the total amount of business income tax and VAT collected. The double list experiment provides rigorous, internally consistent results illustrating that around one-quarter of firms report evading taxes. This is the most common among firms that do not export, face substantial competition from the informal sector, and believe tax administration is a major obstacle to their business activities. This is based on self-reported tax evasion, so it likely represents a lower bound.

These findings provide policy makers with a much clearer picture of just how widespread tax evasion is by registered firms in Indonesia. To date, there have not been precise estimates

of the underlying level of tax evasion as only limited audit data exists, and surveys asking directly about tax compliance and/or tax morale can have substantial issues. Further, while analyses based on tax administrative data can provide valuable insights about the tax-paying behavior of firms, they do not necessarily shed light on intentional tax evasion in the same way that a double list experiment can. Arguably, the findings we present, which are based on nationally representative data and are internally consistent, provide among the best estimates of the levels of tax evasion by firms in Indonesia. Existing studies using single-list experiments to estimate tax evasion have typically focused on individuals as opposed to firms, and in these instances, reported tax evasion has been lower than what we observe (e.g., see Genest-Grégoire et al., 2022 and Iraman et al., 2022). At a minimum, our findings suggest substantial increases in tax revenue are feasible if the government could increase the compliance of registered firms.

The double list experiment also provides unique insights for policymakers into the types of firms that are more likely to be non-compliant,[11] by extensively exploring heterogeneity and identifying three key dimensions. Firstly, there are higher rates of tax evasion among firms that do not export. A potential explanation for this heterogeneity is that exporting firms are more likely to have a paper trail of their economic activity (e.g., from custom licenses), which means that the volumes of sales of these firms are easier to monitor. In contrast, firms that do not export may perceive that the revenue authority has less third-party information about their business activities. Consequently, they are more willing to evade taxes. Secondly, firms that find tax administration to be a major obstacle to their business activities are much more likely to admit to evading tax. This suggests efforts to minimize the complexity and, consequently, the tax system's burden on firms may also increase compliance. Thirdly, firms that face substantial competition from the informal sector are more likely to report higher levels of tax evasion. This is likely because formal firms in competition with informal firms

[11]The optimal targeting of enforcement activities would extend beyond just evasion rates, including the ease of detecting/proofing evasion, expected recovery rate on outstanding tax due, and deterrence value of enforcement.

have a disincentive to comply, as this will lower their competitiveness in the market (such as by lowering their profit margins). Interestingly, this result suggests that there may be a positive externality from registering informal firms if this leads to formal firms being more likely to comply. Notably, there were limited differences in tax evasion rates across other dimensions. As such, any efforts by tax collectors to reduce the rate of tax evasion by most types of firms are likely to raise revenue.

This study has also shown the value of embedding double-list experiments in large-scale surveys. While single-list experiments have grown popular over time, there has also been increasing recognition of some of their shortcomings, particularly regarding the possibility of specific non-sensitive items in a list influencing the likelihood of respondents also counting the sensitive item. Double-list experiments verify if this issue is present and can help illustrate the internal consistency of findings. Our examination of heterogeneity across 27 dimensions with a large sample size is also an important learning exercise as it shows the value of combining machine learning algorithms with indirect solicitation techniques. However, the double-list experiment approach also raises important questions about the best way to report heterogeneity in instances that are not substantial and/or consistent across both list experiments. At a minimum, our study shows how, at a low marginal cost, a double list experiment can provide much more credible insights about the prevalence of a sensitive behavior than a single list experiment and this approach can identify the dimensions of heterogeneity in the prevalence of a sensitive behavior.

Future research on this topic could take several directions. Firstly, additional research could be conducted measuring levels of tax evasion in Indonesia to validate our findings by analyzing tax administrative data with third-party information and/or survey data that directly captures tax evasion and tax morale. In addition, there may be value in exploring more subtle forms of tax evasion, such as when firms artificially lower their profits by exaggerating their expenditure. Secondly, this approach of using a double list experiment to measure tax evasion could be trialed in other countries to test the generalizability of this

methodology. Thirdly, while this study has provided valuable insights about "what" the levels of tax evasion are, far more analysis is required to capture "how" to stop firms from evading taxes in middle-income countries with relatively low revenue levels as a share of GDP.

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