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Reconciling differences between two surveys on tax compliance costs*

A decomposition analysis of Hungarian results

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Abstract

We investigate what methodological and sampling factors can lead to widely different results on Hungarian tax compliance costs between recent studies – 1.4 and 4.7% enterprise tax compliance cost to turnover ratios – based on standard cost models and representative firm level surveys. We validate the surveys' data on Hungarian administrative records and show that survey samples differ markedly from the total population of firms on key business indicators which could bias tax compliance estimates. Finally we adjust survey data to match administrative records and in a decomposition exercise we account for almost all of the gap between compliance cost ratios from the surveys studied. The exercise highlights some possible pitfalls in replications of previous cost estimates on newly collected data, it shows the importance of survey sample sizes, and suggests some possibilities for improving data collection using administrative data.

JEL codes: C80, H29, M48

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Several recent studies showed that complying with tax regulations can incur significant costs for firms. However, in case of Hungary, some of these studies lead to widely different results. In this paper we investigate what methodological and sampling factors can explain these differences between a few recent studies: two EU-wide studies, European Commission, DG GROW et al. (2018) (hereinafter EU14, after its coverage and reference year) which didn't cover Hungary, European Commission DG GROW et al. (2022) (hereinafter EU19) with a headline result of 1.4%, and a Hungarian study of Ernst & Young and Budapest Institute (2020) (hereinafter HU18) with an estimate of 4.7% that is broadly equivalent with the EU14 methodology. We compare Hungarian firm level data of the latter two with administrative records to check the representativeness of their samples. Results show that survey samples differ markedly from the total population of firms on key business indicators which could bias tax compliance levels. Finally, we decompose the gap between the enterprise tax compliance cost to turnover ratio (R1 indicator in EU19 parlance) of EU19 and HU18 by reconciling methodological differences and adjusting data to control for sampling differences.

1 Differences in survey samples

Firstly, and probably most importantly, we have to highlight the differences in sample sizes. EU19 surveyed 120 Hungarian firms, while HU18 surveyed 962. While these two numbers are not directly comparable due to different surveying methodologies (HU18 didn't record data on all taxes at all firms), HU18 had a much larger sample which must have helped to reduce any sampling bias and noise. The small sample size of EU19 is its main limitation but there could be other biases as well.

All surveys in our analysis use a stratified sample by firm size (European SME classification¹) and industry (NACE sectors with differing approaches, based on the intended coverage of the respective studies). This helped to ensure representativeness along these two dimensions. But the question arises, how representative are these samples regarding other firm characteristics that could influence compliance costs – as the numerator of the R1 indicator – and

¹Although our data has some inconsistencies. In the CIT data we have a self-reported SME classification that uses the most precise definition, by e.g. including information from the past as well. HU18 data is based on headcount only, while EU19 uses headcount, turnover and balance sheet data in the current year. These definitions typically lead to the same result, thus conclusions of our analysis should be largely unaffected.

turnover – as the denominator of the R1 indicator. Fortunately, the surveys asked firms about some business indicators which we can compare to administrative sources. We will not be able to disentangle bias coming from a small sample (“bad luck”) and other biases (e.g. sampling from various business registries, using different methods to contact firms, non-response issues and differences in data collection stemming from different questionnaires) but nevertheless, this exercise can shed some light on differences between the two samples.

1.1 Firms under simplified taxation

Simplified tax regimes play an important role for Hungarian SMEs. In 2019 of the roughly 1.7 million businesses in the country, around 350 thousand were subject to KATA, a simplified tax aimed at sole proprietors, and 40 thousand were subject to KIVA, a growth-friendly cash-flow taxation for SMEs which replaces CIT and employers’ social contributions. Of course, these numbers include businesses that were not covered by either study. KATA subjects are not likely to play an important role from the perspective of tax compliance studies, as most of them do not employ anyone other than the proprietor. However, a large share of the 40 thousand KIVA subjects operate in sectors covered by EU19, thus several of them should appear in the sample.

KIVA subjects are probably under-represented with these 3 firms (Table 1). As a back-of-envelope calculation, assume that all 40 thousand KIVA subjects are covered by the study. Based on the firm population of 415 thousand in the study there should be around 12 KIVA observations.²

Could this bias the results? We don’t have reliable data on whether firms under simplified taxation face lower compliance costs. The HU18 sample had a relatively large number of KIVA and even KATA firms (115 and 13 respectively of 962) but the data was too noisy to draw any conclusions (189 firms had unknown tax regime and the authors reported many issues around this question).³ Thus, we can interpret the results as if KIVA and traditional CIT firms face the same compliance costs. This assumption is likely to hold for VAT and employment taxes, as there are no difference between administrative obligations of simplified and regular firms. Any potential bias could come from

²Even this is an undercount, as the study overestimated firm population. Excluding firms with 0, or 1 employees results in 168 thousand firms instead of 415.

³Based on their characteristics, it is plausible that firms under simplified taxation in the EU19 sample are KIVA firms indeed.

Table 1: Sample sizes by industry, firms size, and taxation regime in the EU19 survey

	Micro	Small	Medium	Large	Total
CIT					
Manufacturing	7	2	7	6	22
Construction	4	15	5	1	25
Trade	10	5	9	1	25
Hospitality services	6	6	5	5	22
Professional services	4	12	5	2	23
Total	31	40	31	15	117
Simplified tax regime					
Manufacturing	0	0	0	0	0
Construction	0	0	0	0	0
Trade	0	0	0	0	0
Hospitality services	1	1	0	0	2
Professional services	1	0	0	0	1
Total	2	1	0	0	3

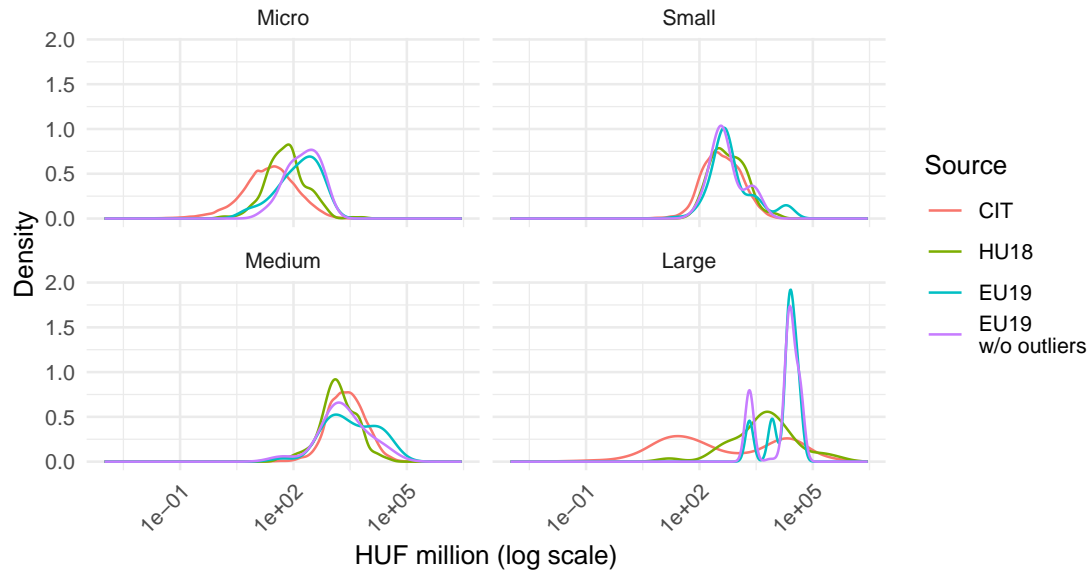
corporate taxes.⁴ Thus even if the assumption is wrong, the total bias would not be large.

1.2 Turnover

As we focus on the tax compliance costs over turnover indicator, not only do we need reliable data on compliance costs but also on turnover. HU18 used turnover data from administrative records, while EU14 and EU19 used self-reported turnover. This could be one source of difference, if firms systematically over, or underreport turnover in interviews relative to their official accounts, affecting the denominator. Another source of bias could affect both the numerator and denominator if a study's sample is biased towards firms with higher turnover. All the tax compliance studies we analyse found decreasing compliance costs over turnover in firm size. Thus if higher turnover firms are oversampled (e.g. because they are the more established, and easier to reach firms), the final tax compliance indicator could be biased even if both the reported costs and turnover are unbiased.

⁴KATA taxpayers have an option to file simplified local taxes but there are very few KATA firms with employees.

Figure 1: Comparing distributions of turnover in administrative and survey sources by size

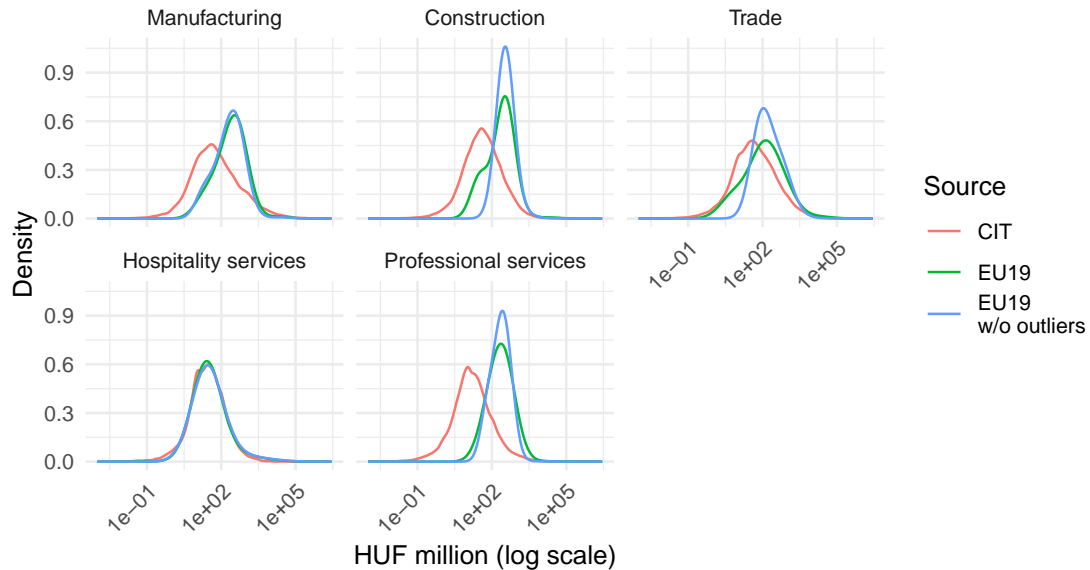


Figures 1 and 2 show differences in distributions between three data sources: 2019 CIT returns, and all firms subject to CIT from the HU18 (for calendar year 2018) and EU19 samples (for calendar year 2019). All sources exclude firms with less than one employee. We show two versions for the EU19 data, one covers all observations, the other only those, which were not trimmed based on the final indicators from the main analysis. HU18 aggregated industries to different levels, and the same grouping as in EU19 cannot be reproduced, thus they were omitted from the industry breakdown charts. Due to small samples, we cannot look at the joint size-industry distributions.

We see the largest differences for micro enterprises – which have the largest weight and thus influence the final results the most – where the EU19 sample has significantly higher turnover than all the CIT returns (Figure 1). Similar gaps can be observed across almost all sectors as well (Figure 2). However, for the purposes of comparing the results of the tax compliance studies, the crucial question is whether the samples of individual studies differs. And indeed, the HU18 sample is biased too but to a lesser extent. The gap is large, and cannot be explained by the different timing of the interviews.

Some of these differences can be due to random errors, which can be amplified by the small EU19 sample. But it can also come from different sampling due to the specific call centres contracted for the interviews. Some might have

Figure 2: Comparing distributions of turnover in administrative and survey sources by industry



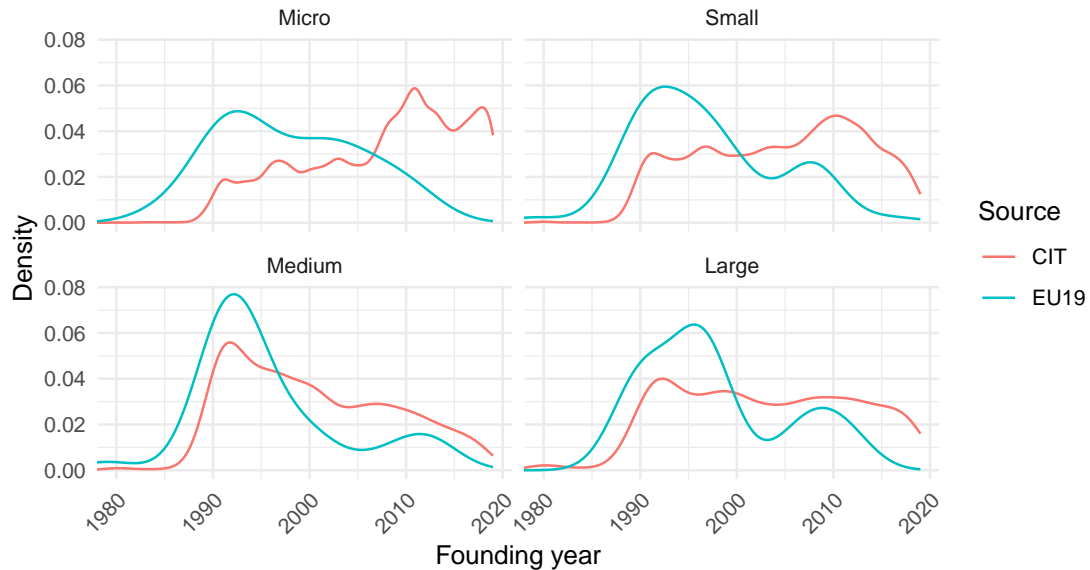
had less up-to-date contact information, better reach, or had more difficulty with follow-up interviews.

Based on these results, we will adjust turnover in the EU19 sample for our decomposition exercise in Section 3 by rescaling it so that size class specific average turnover for all CIT firms will be identical to the HU18 figures. Due to the lack of data we cannot use industry classification for adjustment but neither HU18, nor EU19 found significant between sector differences, thus we can safely assume such an adjustment wouldn't be required anyway.

1.3 Other accounting variables

From the perspective of tax compliance cost indicators, turnover is the most important accounting variable but we can look at other business metrics as well (Figures A.1–A.4). We see differences in profit rates and balance sheet totals within size and industry categories: firms in the EU19 sample are more profitable and micro enterprises in that sample have more assets. These results confirm the turnover-based findings, and further suggest that the sampling was not fully representative of the true population of firms and this biases compliance costs downwards.

Figure 3: Comparing distributions of founding year in administrative and survey sources by size



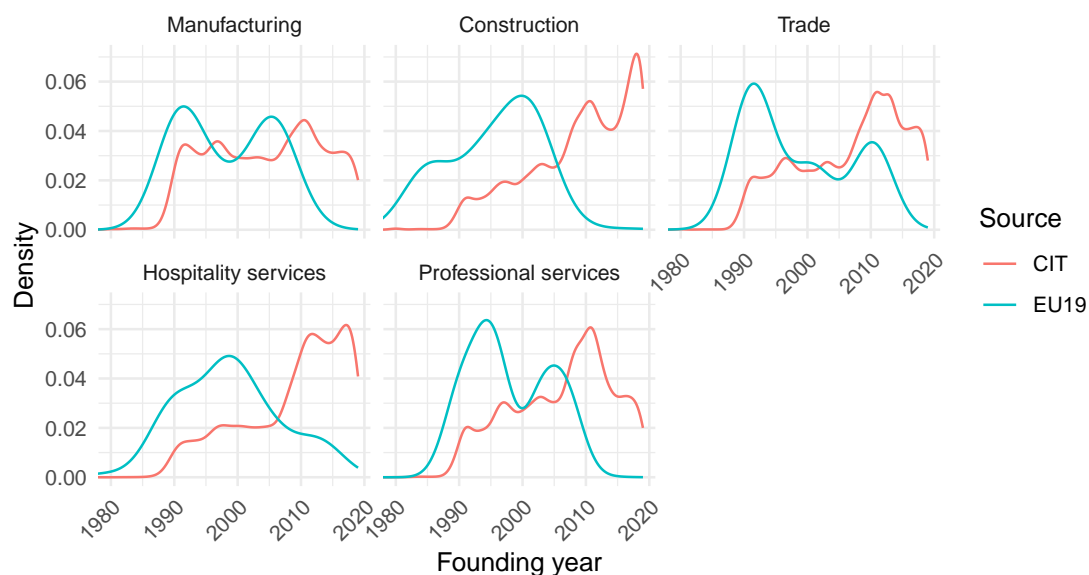
Note: Founding year was cut at 1980.

1.4 Firm age

The distribution of firm age also differs between CIT returns and the EU19 sample (we don't have data for HU18) and the survey reached significantly older firms while it reached few firms founded in the last decade (Figures 3 and 4).

This should be viewed as an illustrative example. As we don't have founding year in the HU18 data, we cannot know whether the data needs to be adjusted in any way when decomposing differences. But even if we did have the required data (or used the difference compared to CIT data) it isn't clear, what the direction of this bias would be. On one hand, firms in the EU19 sample could be those that survived past a particular point, which suggest they could be more profitable, better funded, or more productive firms, leading to possibly lower compliance costs. On the other hand, being more established could also lead to higher inertia in adopting newer technologies and processes, and thus having higher compliance costs compared to newer firms which start off with the latest and more efficient technologies. We also found some – although statistically uncertain – evidence that the relationship between year of founding

Figure 4: Comparing distributions of founding year in administrative and survey sources by industry



Note: Founding year was cut at 1980.

and turnover differs between the EU19 sample and CIT data. In a regression analysis, among micro enterprises turnover decreases with age in the CIT data, while in the EU19 data turnover is higher relative to the baseline of young firms in most age bins (Figure A.5).

1.5 Share of exporting firms

So far we have found that the EU19 sample is most biased for micro enterprises. However, this isn't true for the share of exporting firms,⁵ where it is close to the CIT figure, similarly to small enterprises (Figures 5–6). Meanwhile HU18 has a high share of exporting firms. The sectoral distribution in the EU19 data is broadly similar to CIT data in all sectors but professional services.

⁵In the CIT and HU18 we defined exporting firms as those where at least 1% of turnover comes from exporting. In the EU19 data we used Question 15, which asked whether the firm has "cross-border activities".

Figure 5: Share of exporting firms by size

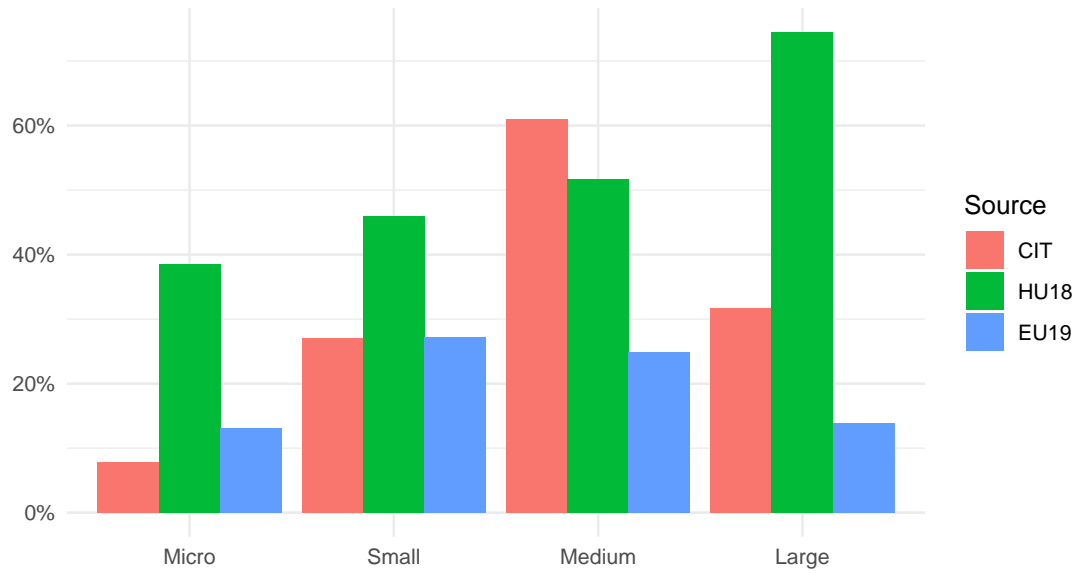
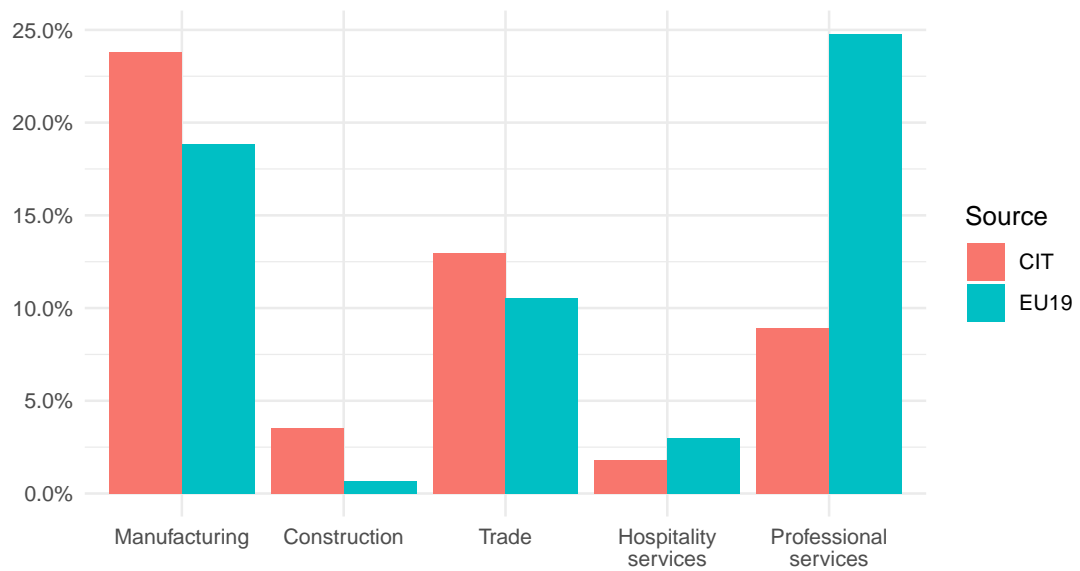


Figure 6: Share of exporting firms by industry



1.6 Standalone and non-standalone firms

The EU19 sample has a surprisingly high share of SMEs which claim to be a subsidiary, or parent of another company (Figure A.6). We don't have a good benchmark for affiliated groups. Hungarian firms can opt for group level taxation – which is shown on Figure A.6 – but this could significantly underestimate the true share of affiliates.

Again, it is not clear how this could bias compliance cost estimates. Members of groups can be more efficient businesses through a self-selection channel, leading to lower costs but their potentially more complex operations could increase costs.

2 Methodological differences

The main goal of HU18 was to establish a comprehensive benchmark for a tax compliance measure specifically tailored for the Hungarian context. This led to choices ranging from a questionnaire detailed at tax form level; interviewing executives, internal and external accountants via a snowball method; to calculating macro level costs using the median values of sub indicators. The study provided a measure that was broadly equivalent to the methodology of EU14 but with some important caveats. EU19 largely followed EU14 but it had a wider coverage of taxes and some methodological choices that limit the comparability to the earlier study. While these deviations from established methods can be justified, we need to account for each factor and calculate harmonized figures in order to decompose the differences in headline cost estimates.

2.1 Taxes covered

Along the three main taxes (corporate taxes, VAT, employment related taxes) EU19 covered local and property taxes and also other taxes. These could be specified by the interviewees and data provided to us does not contain more details. HU18 covered the three main taxes: CIT, VAT, and labour taxes. For the published EU14 equivalent it omitted employment related taxes but in our analysis we will use all three taxes for the harmonized estimate found in their background tables.

2.2 Dealing with outliers

All three studies suffered from impossibly large self-reported compliance costs even after follow-up interviews. The headline estimates for EU14 were based on mean values, and in order to limit the effect of outliers – especially on the right tail of the distribution – they used trimmed means by calculating R1 from unadjusted components and finally trimming 5% of the observations at both ends of the distribution.

HU18 used a slightly different approach. Data for the individual questions on hours and costs was winsorised (i.e. outliers below the 5th percentile were replaced with the value of the 5th percentile, and similarly outliers above the 95th percentile were replaced with values of the 95th percentile) and the mean total cost is the sum of mean components (because no every firm was interviewed on all taxes). These should not lead to large differences compared to EU14 and in the end they also used a 5-5% trimming.

Meanwhile EU19 increased trimming from 5-5% to 15-15%, which was explained by too many outliers.

2.3 Labour costs

HU18 used a highly detailed questionnaire, in which multiple people were interviewed at most companies on their roles in compliance related tasks. This resulted in data on hours spent on tax compliance for CEOs, CFOs, internal accountants (broken down by level of seniority within company) and external accountants.⁶ This uncovered high CEO involvement in day-to-day tax administration tasks. HU18 then use data on hours and role – and sector, and firm size – specific wage rates to arrive at effective costs from employers' social security filings. This is denoted as the effective wage rate in Table 2. The second line contains average wages of all workers in occupations which are relevant for the survey (CEOs, CFOs, accountants and other financial professionals) using the same source. The third row contains the wage cost covering the entire NACE N sector (Administrative and support service activities) as used by EU19. The last row is an estimate for the gross wage based on the third row, which we show, as HU18 used gross wages instead of labour costs. Despite this discrepancy we will use the EU19 and the HU18 hourly rates, as they were applied in the respective studies because our goal is to decompose differences between

⁶The latter was not used directly, as outsourcing costs in the final estimates come from direct spending.

Table 2: Wage rates used in tax compliance studies

Name	Hourly rate (HUF)
HU18 effective gross wages	5,461
HU18 average gross wages	2,697
EU19 Sectoral LCS labour cost	2,570
EU19 Sectoral LCS gross wage	2,142

the two studies. Although there's a difference if one year in the reference year of the two surveys, price levels didn't change significantly and we won't adjust them.

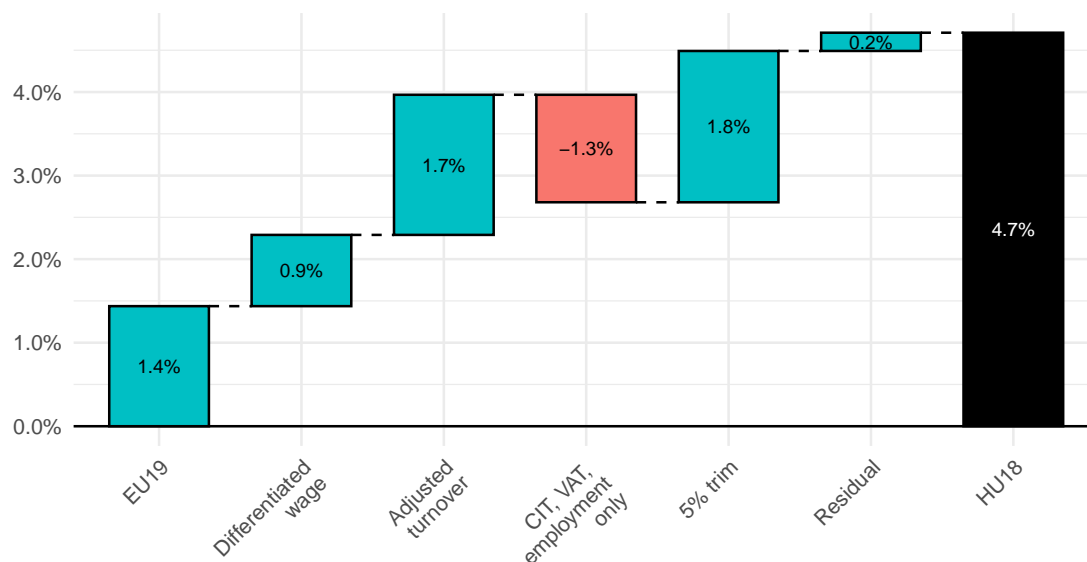
3 Decomposing differences

Figure 7 shows step by step how we arrive at an HU18 equivalent cost estimate from EU19 data by harmonizing the two methodologies and applying the adjustments previously discussed in Sections 1 and 2. The final estimate of 4.5% is quite close to the 4.7% that comes from the HU18 data (note that this number was not published, see Section 2.1). The different trimming method is the largest single factor in our decomposition but sampling biases are also sizeable. Thus, comparing results from the two data sources – and based on Hungarian data only – the choice of 15% trimming seems overly cautious and this method might have dropped too many genuinely high cost firms from the sample. In fact, dropping this many firms from Hungarian data brought mean and median estimates to essentially identical levels in the final EU19 results, which contradicts previous findings from EU14 and HU18. However, we have to highlight that data quality for other countries could be worse, requiring strong trimming.

Of course the exact size of each component depends on the ordering of adjustment steps.⁷ The ordering presented in Figure 7 seems quite natural but our conclusion on heavily trimming Hungarian data holds for other orderings as well (Table A.1).

⁷In our understanding based on microdata for the questionnaire answers and some variables calculated by the study's authors, median estimates in the EU19 method depend on the level of trimming. Although medians are by definition invariant to outliers (and can be interpreted as a 50% trimming), the study uses weighted means and medians – as the sample is stratified –, and weights are only calculated for observations not dropped after trimming.

Figure 7: Decomposing the differences in TETCC to turnover ratio between EU19 and the closest equivalent in HU18



4 Conclusions

We showed how the different headline Hungarian tax compliance costs estimates of the EU19 and HU18 studies can be reconciled by harmonizing sampling and methodological differences. Our final estimate for a tax compliance cost to turnover ratio based on HU18 methodology using EU19 data adjusted to correct for some biases stemming from sampling differences is only 0.2% point off of the HU18 estimate. Unfortunately in this paper we couldn't disentangle how much of the sampling differences can be attributed to noise due to the low sample sizes of the EU19 study, and how much to other factors. The exercise also suggests that, at least in case of Hungary, the more aggressive trimming of the EU19 survey likely omitted firms with truly high compliance costs – and thus biasing results downward – because estimates with the same trimming as used in previous studies lead to similar results as in HU18. This doesn't mean we shouldn't be concerned with small survey samples. Further research is needed for other countries and other data sources using decomposition exercises similar to this paper's approach to draw more general conclusions.

Nevertheless, results from this paper also offer some important considerations for future surveys on tax compliance costs.

All recent studies showed that tax compliance costs are a significant burden for firms – especially for small firms – in most European countries, thus policymakers’ focus on simplifying tax administration is warranted. However, in order to reliably track progress on reducing compliance costs, it is important to regularly conduct detailed surveys. The standard cost model approaches of the surveys studied in this paper are well suited for this purpose but it is crucial to have sufficiently large sample sizes. While the 3,500 firms surveyed across all the EU member states of the EU19 study is a sufficient sample size to draw reliable conclusions at a European level, it is too small for country-specific cost estimates. Considering that most of the policy levers to reduce compliance costs are at the national level, more resources need to be put into larger surveys, that take the local context in account and that allow answering more fine-grained, policy relevant questions.

Such surveys can be costly. However, the insights they offer in designing effective policies to reduce tax compliance costs can easily outweigh their costs. An approach pursued by many governments to reduce compliance burdens is increased digitalization in tax administration. Digitalization is likely to be necessary to reduce compliance costs significantly but by itself it is not sufficient (as pointed out in the EU14 study). Given that efforts to increase digitalization often entail large upfront development costs, more data on businesses’ true compliance costs can be highly beneficial before enacting new policies.

A comparison of administrative tax records and survey sources in this study also highlights how administrative data could improve data collection on compliance costs. Cross-checking survey samples and building on disaggregated data, like labour costs in HU18 is a feasible approach in many countries. Standard cost models require specialized data collection that is not available in administrative data, but some recent developments offer data sources, like transaction level VAT data that could complement surveys on outsourced tasks, which makes up a large share of small businesses compliance costs.

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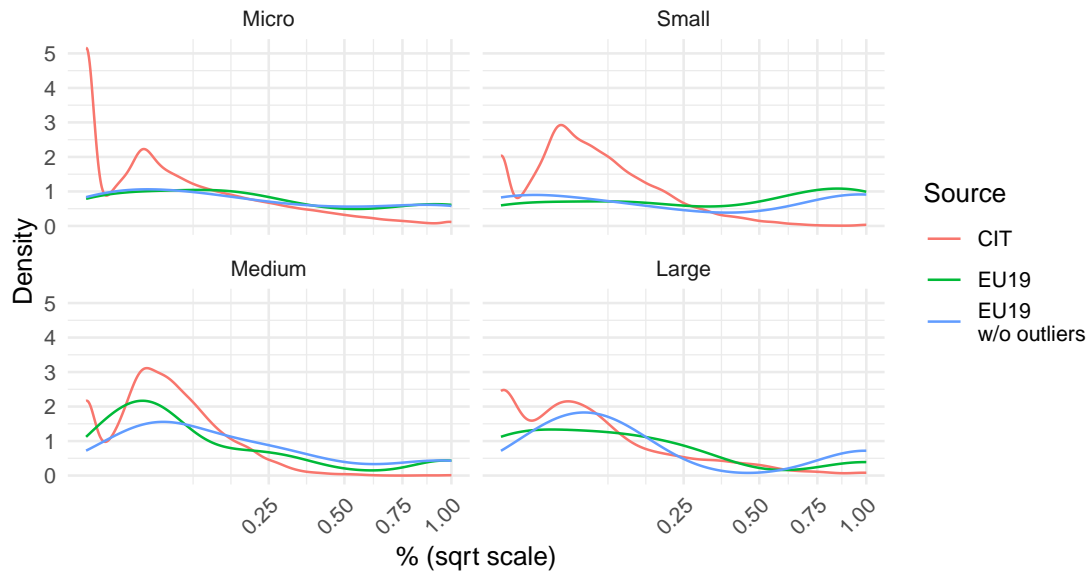
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A Additional figures and tables

Figure A.1: Comparing distributions of profit rate in administrative and survey sources by size



Note: Negative profits are handled as zeros

Figure A.2: Comparing distributions of balance sheet totals in administrative and survey sources by size

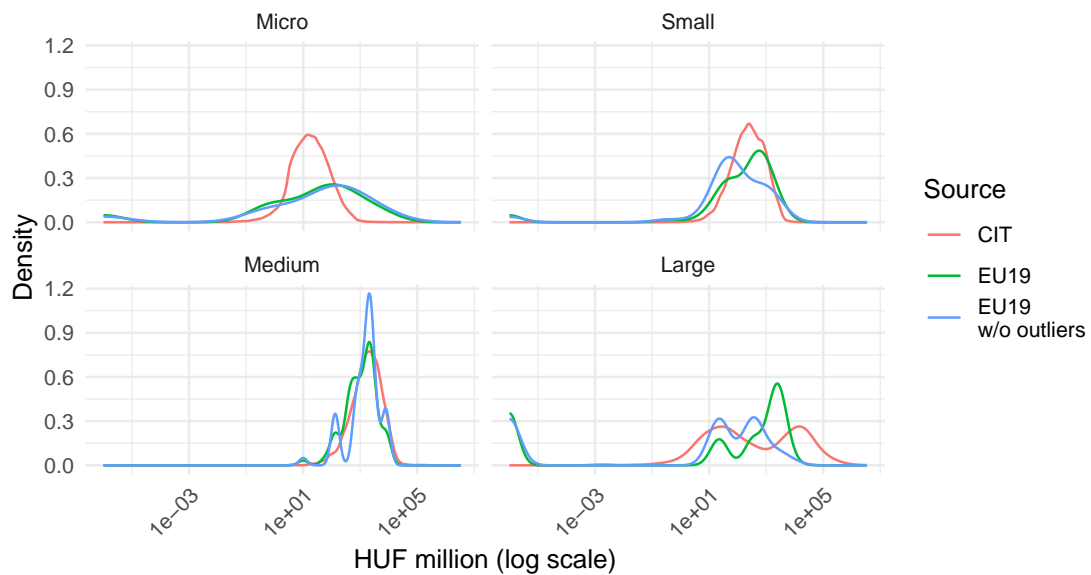
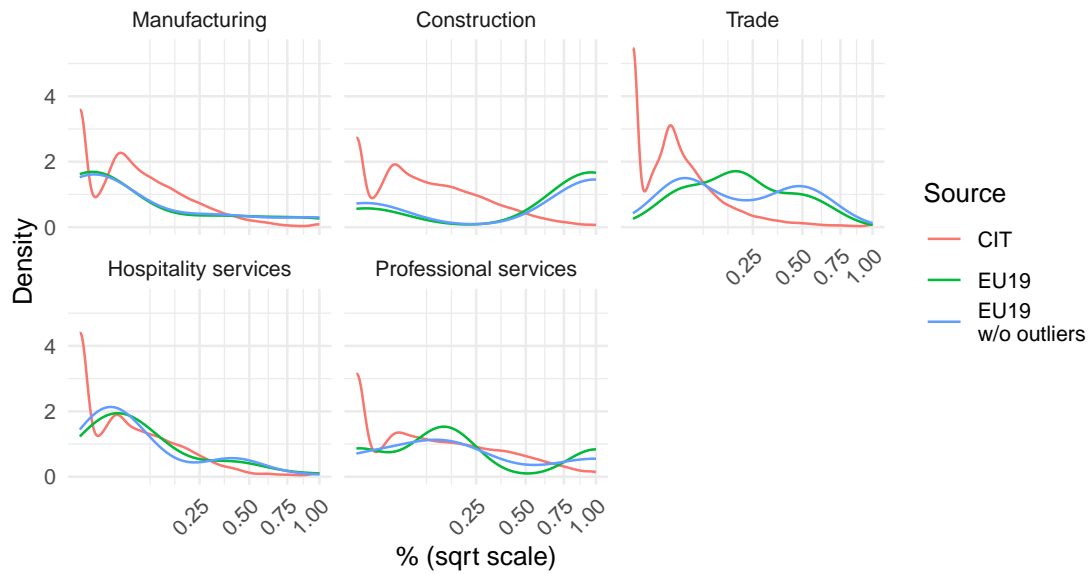


Figure A.3: Comparing distributions of profit rate in administrative and survey sources by industry



Note: Negative profits are handled as zeros

Figure A.4: Comparing distributions of balance sheet totals in administrative and survey sources by industry

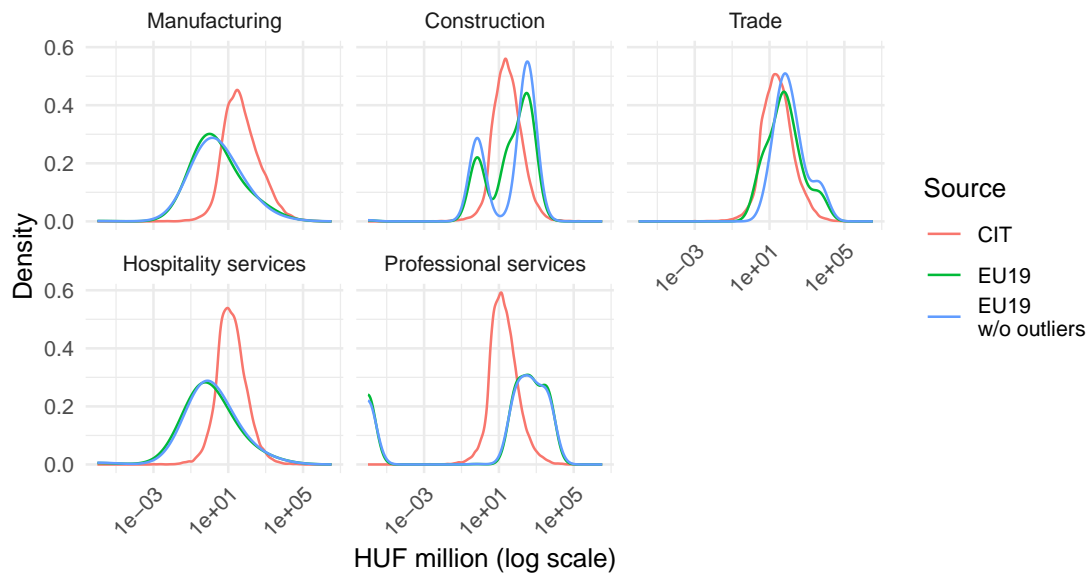
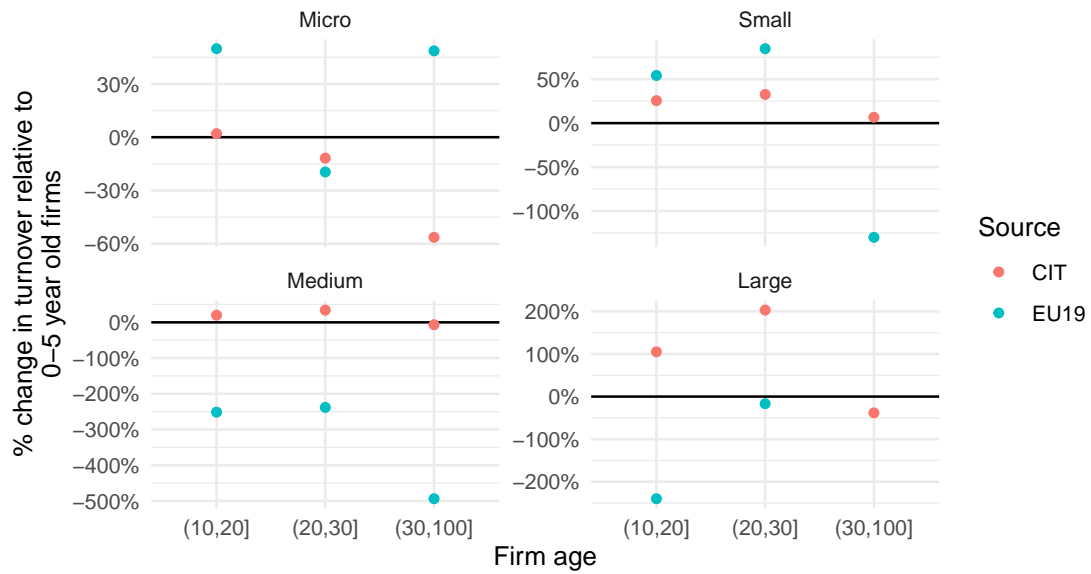
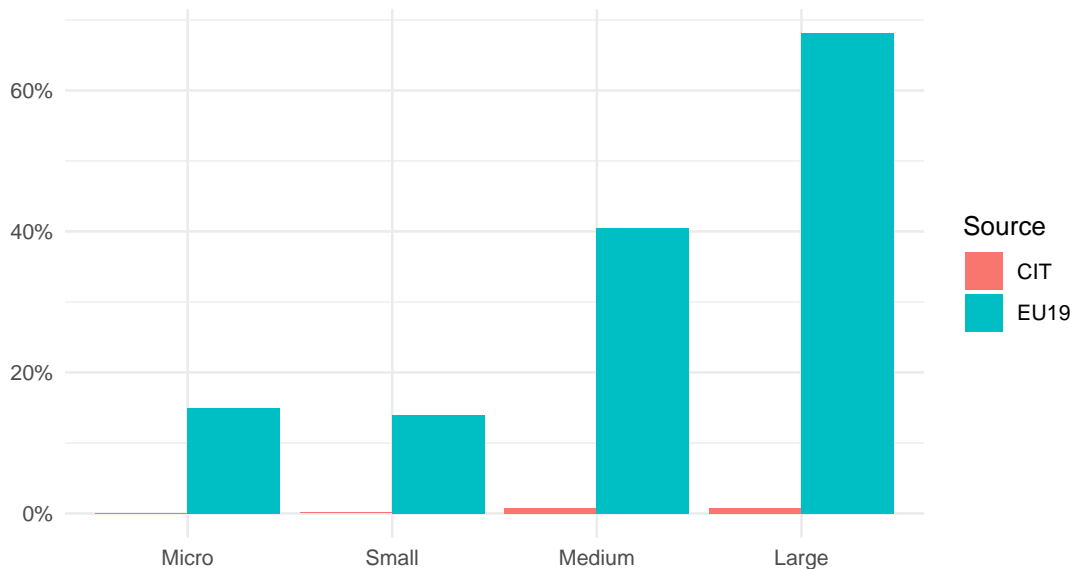


Figure A.5: Model estimates for the relationship between firm age and turnover



Note: In the graph we plotted the β coefficients estimated from $\ln turnover = \alpha + \sum \beta_j \cdot age_j + \gamma \cdot industry$ by data source and size class. Due to the small sample results from the data are highly uncertain (hence only three age bins, and we omitted confidence intervals because they are too wide and would obscure the entire plot).

Figure A.6: Share of non-standalone firms by size



Note: In CIT data non-standalone refers to firms under group taxation. In EU19 survey data it refers to a firm that is a subsidiary, or parent of another company (see Q3 of their questionnaire).

Table A.1: Mean and median TETCC to turnover ratios under various assumptions using EU19 data

Taxes	Wage	Trim	Turnover	Mean	Median
Corporate, VAT, employment, local, property, other	Uniform	15%	Original	1.4	1.3
Corporate, VAT, employment, local, property, other	Uniform	15%	Adjusted	2.5	2.2
Corporate, VAT, employment, local, property, other	Differentiated	15%	Original	2.3	1.6
Corporate, VAT, employment, local, property, other	Differentiated	15%	Adjusted	4.0	2.7
Corporate, VAT, employment	Uniform	15%	Original	1.0	0.7
Corporate, VAT, employment	Uniform	15%	Adjusted	1.7	1.1
Corporate, VAT, employment	Differentiated	15%	Original	1.5	0.8
Corporate, VAT, employment	Differentiated	15%	Adjusted	2.7	1.6
Corporate, VAT	Uniform	15%	Original	1.0	0.7
Corporate, VAT	Uniform	15%	Adjusted	1.6	1.1
Corporate, VAT	Differentiated	15%	Original	1.4	0.8
Corporate, VAT	Differentiated	15%	Adjusted	2.6	1.4
Corporate, VAT, employment, local, property, other	Uniform	5%	Original	2.9	1.7
Corporate, VAT, employment, local, property, other	Uniform	5%	Adjusted	4.3	2.5
Corporate, VAT, employment, local, property, other	Differentiated	5%	Original	4.3	2.4
Corporate, VAT, employment, local, property, other	Differentiated	5%	Adjusted	6.4	3.5
Corporate, VAT, employment	Uniform	5%	Original	2.1	1.4
Corporate, VAT, employment	Uniform	5%	Adjusted	3.1	2.1
Corporate, VAT, employment	Differentiated	5%	Original	3.1	2.0
Corporate, VAT, employment	Differentiated	5%	Adjusted	4.5	2.9
Corporate, VAT	Uniform	5%	Original	1.9	0.9
Corporate, VAT	Uniform	5%	Adjusted	2.8	1.3
Corporate, VAT	Differentiated	5%	Original	2.8	1.6
Corporate, VAT	Differentiated	5%	Adjusted	4.1	2.4

Note: All estimates are based on EU19 data. Estimates using the methodologies of the published EU14, HU18, and EU19 results are highlighted. For the explanation of which taxes were covered in which study, see Section 2.1. Uniform wage means the aggregate labour costs from EU19, differentiated means the role, sector, and firm size specific wage rates from HU18 (see Section 2.3). Original turnover means the turnover reported by survey participants, adjusted means applying the changes explained in Section 1.2.