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Compliance cost estimates:
Survey non-response and temporal framing effects

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Abstract – Due to empirical research, tax and accounting compliance costs are a considerable burden for private businesses. However, cost estimates may be biased due to survey non-response and questionnaire framing effects. This paper investigates the impact of both aspects on the estimated cost burden. I do not find significant evidence for a non-response bias. By contrast, my results indicate that framing effects regarding the temporal dimension of cost measurement (temporal framing effects) might alter cost estimates by up to 68 percent downwards (respectively 211 percent upwards). There is also evidence that temporal framing effects are more relevant for small self-employed businesses with limited information capacities and accounting obligations as well as for internal cost burdens.

Keywords – compliance cost measurement, measurement error, non-response bias, temporal framing effect

JEL Classification – H25, K34, M41, M42, M48

1. Introduction

Compliance with financial accounting, tax and corporate governance obligations is a relevant topic that has been widely discussed within the accounting literature (Ettredge, Johnstone, Stone, and Wang 2011; Mills, Robinson, and Sansing 2010). While research focuses primarily on auditing, and alternative strategies to enhance and enforce compliance (Hasseldine, Hite, James, and Toumi 2007; Gendron and Spira 2009; Chen and Zhang 2010), there is also a growing number of contributions considering the cost burden that results from accounting, corporate governance, and tax compliance activities (Shelley, Omer, and Atwood 1998; Raghunandan and Rama 2006; Hay, Knechel, and Wong 2006; Zhang 2007; Pilcher and Dean 2009; Iliev 2010; Mills et al. 2010; Kim, Liu, and Zheng 2012).

Compliance costs are an important issue for a number of reasons. First of all, they reduce the economic resources of businesses, thus affecting business productivity in general. Secondly, compliance costs are not evenly distributed among businesses. For example, they depend on the complexity of tax and accounting regulations and are more burdensome for small businesses (Hudson and Godwin 2000). Thus they will predictably have an impact on competition. Thirdly, compliance burdens might have an effect on business administration and decision-making processes (e.g. business investment, organization of accounting practices). Moreover, in tendency at least, they may well reduce business compliance with tax and accounting regulations (Erard and Ho 2003).

Taking into account the high (and potentially growing) complexity of accounting standards and tax regulations, it is to be expected that corresponding cost estimates are substantial (Krishnan, Rama, and Zhang 2008; Hansford and Hasseldine 2012). This is especially the case for small businesses with low information capacities and limited internal resources. According to Lignier and Evans 2012, the mean financial accounting and tax compliance cost of Australian businesses with a turnover of less than $A 1m can be calculated as 12.9 percent of turnover.[1] About 2/3 (1/3) of this burden is due to financial accounting (tax) compliance obligations.

As compliance costs are usually not disclosed by business annual reports, existing investigations rely typically on (more or less representative) business surveys.[2] This holds

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[1] These values are based on my own calculations. As the questionnaire of Lignier and Evans (2012) provides only information on turnover ranges (e.g. between $A 3m and 6m), I assume an even distribution of turnovers within each size class. This fits well with the overall distribution between different size classes in the survey sample of Lignier and Evans (2012).

[2] By contrast, studies on audit fees are typically based on disclosed accounting information (Hay et al. 2006;

especially for tax compliance costs (Sandford 1995; Evans 2003; Vaillancourt and Clemens 2008). While this method may be generally appropriate for obtaining a consistent cost estimate, it also involves a number of methodological challenges, including untrue statements of survey participants, retrospection bias, misallocation of cost components, and misevaluation of the monetary equivalent of the compliance time effort.

A specific problem results from the fact that, due to self-selection, survey samples may not be representative (Krishnan et al. 2008). Investigations on business compliance costs reveal considerable variations in survey response. Response rates in the 7 percent to 12 percent range have been reported by Slemrod and Venkatesh 2002 and Eichfelder and Schorn 2012. The response rate of Hansford and Hasseldine 2012 is even smaller and amounts to only about 1 percent. By contrast, OECD (2001) and European Communities (2004) report response rates ranging from 19 percent to 83 percent.

From a theoretical perspective, the impact of survey non-response on compliance cost estimates is not straightforward. On the one hand, there may be an incentive for businesses with high cost burdens to participate in a survey in order to put public pressure on standard-setters and governments to reduce tax and accounting complexity. On the other hand, businesses with a low degree of cost-efficiency and a high compliance burden might be unwilling to participate in compliance cost surveys because they do not want to waste their resources on additional bureaucratic effort (Sandford 1995). This second argument is underlined by evidence of low survey response rates from small businesses for which the cost burden would be relatively high (e.g. Allers 1994, 113).

In spite of the comprehensive literature measuring compliance costs and audit fees (see Evans 2003; Hay et al. 2006; Krishnan et al. 2008 and Vaillancourt and Clemens 2008, with further references), empirical evidence of the impact of survey non-response is scarce. Wicks (1965) reports anecdotal evidence for overestimation of cost burdens in view of low response rates. Allers (1994) supplemented the survey questionnaire with an additional postcard asking the simple question if the business had a high or low burden compared with others. Using information on businesses that answered the postcard but not the regular questionnaire, Allers (1994, 112) provides evidence for cost-underestimation due to survey non-response. Using a similar method, Collard, Green, Godwin, and Maskell (1998) and Rametse and Pope (2002) find no empirical support for a biased estimate.

Kim et al. 2012). This also holds for Krishnan et al. (2008), who analyze SOX 404 compliance costs. However, it is questionable if this approach generally results in representative cost estimates.

A shortcoming of the existing literature lies in its contradictory results and in the limited validity of the research methods applied. One has to consider that the majority of non-respondents are also unwilling to answer the postcard question. In the study of Collard et al. 1998, 30.2 percent of the original sample answered the full questionnaire and 13.6 percent the postcard, leaving 56.2 percent as strict non-respondents. This aspect would be much more relevant in the case of samples with very low response rates (like the 1 percent reported by Hansford and Hasseldine 2012). Furthermore, it is questionable if qualitative statements on postcards provide sufficient information to identify biased cost estimates. For example, Allers' 1994 question if business taxpayers had a relatively high or low burden compared to other businesses ignored his respondents' limited knowledge of their competitors' compliance costs. Thus qualitative statements may well be a proxy for the "felt" rather than the "real" burden.

An additional problem of cost measurement emanates from the potential framing of survey questionnaires. Since the pioneering contribution of Tversky and Kahnemann 1974 it is well known that framing has an impact on the perception of risks and costs. Thus the wording of survey questions might very well affect compliance cost estimates (Sandford 1995). Klein-Blenkers (1980) asked German enterprises for an aggregate cost estimate, as well as for an itemization of cost components (bookkeeping costs, costs of tax law changes, etc.). He found that the sum of cost components was almost twice as high as the aggregate estimate. Somewhat similar results are reported by Rametse and Pope 2002 and Chittenden, Kauser, and Poutziouris 2005. However, these investigations should be interpreted with caution, as the aggregate estimate is measured by a maximum willingness to pay for getting rid of all tax compliance obligations.

In this paper I will use a unique data set of Belgian businesses to address the question whether survey non-response is related to compliance cost estimates. A major advantage of the data is that it includes eight different random samples for two groups of business taxpayers and for four years with different response rates. This enables me to empirically test the correlation between non-response and compliance cost estimates. Furthermore, there is a change in the wording of the survey instrument being related to the temporal dimension of cost measurement. While costs are initially calculated on a monthly basis, the 2006 questionnaire asks for cost estimates per year. As the Belgian tax law remained almost stable over time, the data may also be used to obtain a better understanding of the potential bias of temporal framing effects on cost estimates. Apart from the rather anecdotal evidence already mentioned (e.g. Klein-Blenkers 1980; Allers 1994), I am not aware of any similar investigation in the

field. Moreover, to my knowledge this is the first paper analyzing the impact of temporal framing effects on compliance cost estimates and cost measurement in general.

From an accounting perspective, the present analysis should be interesting for three reasons. 1) As already mentioned, tax compliance costs are a relevant part of the overall burden resulting from financial accounting and tax obligations. 2) Methodological problems regarding the measurement of tax, financial accounting, and corporate governance compliance costs are similar. The results should also be useful for non-tax-compliance costs. 3) Problems of cost measurement are relevant for other areas of accounting research. This holds for example for the methods of activity-based costing and time-driven activity-based costing, which have been widely discussed in the literature and are strongly affected by measurement errors (Cooper and Kaplan 1992; Bjørnenak and Mitchel 2002; Kaplan and Anderson 2004; Cardinaels and Labro 2008; Labro and Vanhouncke 2008; Maiga and Jacobs 2008; Hoozée, Vermeire, and Bruggemann 2012).

In addition to the analysis of cost measurement, this paper reports descriptive statistics and cost drivers of tax compliance costs of Belgian businesses from 2000 to 2006. The paper is organized as follows: Section 2 presents the data, Section 3 the hypotheses and methods, and Section 4 the results. Section 5 draws the principal conclusions from the analysis. Appendix A contains relevant questions from the survey instrument, while Appendix B reports additional regression results.

2. Data

The data presented here comprises four cross sections of surveys of Belgian businesses conducted by the Bureau Fédéral du Plan (Federal Planning Bureau) in Brussels on behalf of the Belgian government. It contains compliance cost estimates of business taxes (including business income tax, VAT, and other taxes like customs and property taxes) from 1,590 observations. The data does not constitute a panel; nevertheless, some of the businesses approached participated in more than one year. For each year, there are two sub-samples (incorporated enterprises and independent self-employed businesses). Sample sizes, the number of usable responses, and response rates are reported in Table 1. Response rates vary considerably, a fact that can be used to investigate the impact of survey non-response.

[Table 1 about here]

Cost measurement is structured on a similar basis to that used in previous studies on tax compliance costs (e.g. Rametse and Pope 2002; European Communities 2004; Lignier and

Evans 2012). Thus overall compliance costs are calculated as the sum of internal compliance costs (including the time effort of employees, managers and directors) and external compliance costs (including expenses for tax advisers and tax accountants). The value of the compliance burden per working hour is self-assessed by survey respondents.

In contrast to other investigations (e.g. Lignier and Evans 2012), no itemization of the compliance burden into different compliance activities (bookkeeping, tax calculation, tax planning) or taxes (corporate income tax, VAT) has been undertaken. This might result in an underestimation of the cost burden if specific compliance activities have been overlooked by survey participants. As already mentioned, Klein-Blenkers (1980) reports evidence that aggregate compliance cost estimates of German businesses were significantly lower than the sum of estimated cost-elements. However, a higher degree of aggregation may also reduce measurement error under certain conditions (Datar and Gupta, 1994; Cardinaels and Labro 2008). For example, if costs are itemized, working hours might be considered more than once if they are relevant for more than one compliance activity.

The cost measurement procedure is generally unchanged, with two exceptions. In 2000 and 2002 the questionnaire inquired not only about internal time effort and external adviser fees, but also about monetary expenses for computer hardware and software. To ensure a consistent cost definition over the whole period, I generally calculate the total burden as the sum of internal time effort (internal costs) and adviser costs (external costs). In addition, I investigate not only the total burden, but also cost categories and alternative proxy variables.

Furthermore, the wording of the questions on compliance cost measurement was changed in the 2006 questionnaire. Up to 2006 survey participants had been asked to consider the best possible estimate of the monthly compliance effort, taking into account the months with a considerably higher or lower effort. By contrast, the 2006 questionnaire asked simply about the cost of hours and adviser fees spent on tax compliance activities per year. The exact wording of these questions is given in Appendix A. The potential implications of this change in cost measurement are discussed in greater detail in Section 3.

For further analysis, I have excluded all observations with missing information on (1) total compliance costs (435 observations), (2) business turnovers (77 observations) and (3) other relevant control variables like industries (88 observations). Table 2 documents real turnovers (in thousand €) as well as absolute and relative[3] compliance cost estimates for the remaining

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[3] A small number of businesses report very low turnovers (probably start-ups). As this might bias the relative cost estimate, I assume a maximum ratio of compliance costs to turnover of 100%. This accounts for the limited ability of businesses to bear higher cost burdens in the long run.

990 observations. Prices are adjusted to the general inflation index of Statistics Belgium (http://statbel.fgov.be/en/statistics/figures/economy/consumer_price_index/inflation/). In line with the European Communities' Recommendation K (2003) 1422 of the 6th May 2003, small (medium) enterprises are defined by a price-adjusted turnover of less than €10 m (€50 m). With few exceptions, self-employed businesses are very small with a mean (median) turnover of €1.7 m (€53,000).

[Table 2 about here]

Reflecting the findings of the literature (Krishnan et al. 2008; Lignier and Evans 2012), absolute compliance costs increase with business size, while relative cost estimates are especially high for the smaller size classes. The mean fraction of compliance costs to turnover is 13.77 percent for self-employed businesses and 0.10 percent for large enterprises. This substantial difference underlines the strong economies of scale within the tax compliance process of Belgian businesses.

In addition to compliance costs and turnovers, the data presented here includes information on industries, regions, the number of employees and Likert scale ratings for tax legislation and tax administration. For a limited number of years data is also provided on business age, the number of establishments in Belgium, the use of different information technology tools for tax and other purposes, and proposals to simplify the overall tax system.[4] De Vil and Kegels (2002), Joos and Kegels (2004), Janssen, Kegels, and Verschueren (2006), and Kegels (2008) provide a more detailed description of the data.

3. Hypotheses and empirical specification

The variation in survey response rates between the different subsamples is used here to analyze the correlation between non-response and cost estimates. As mentioned in Section 1, the direction of a potential bias is not clear from a theoretical perspective, and empirical evidence is mixed. One target of the analysis, therefore, is to find out if there is a significant relationship between response rates and cost estimates.

HYPOTHESIS 1: *Survey non-response has either a positive or a negative effect on the compliance burden.*

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[4] Business age is available for 2000 and 2002. For enterprises, this also holds for the legal form and number of establishments in Belgium. The questionnaires of 2002, 2004 and 2006 include information on the use of information technology tools and tax simplification proposals.

It is also evident that cost estimates might have been affected by the temporal dimension of cost measurement (monthly cost estimate versus yearly cost estimate). Such temporal framing effects have already been identified for other areas of business research. Gourville (1999, 2003) provides evidence that a "pennies-a-day" pricing strategy of reframing a large aggregate payment of money as a small daily expense may help to reduce the perceived costs to customers and, therefore, to increase sales. Corresponding strategies have been used for car leasing contracts, sales strategies for furniture, and even donations for charitable organizations ("donate only 27 cents a day").

A theoretical foundation is provided by studies that analyze temporal framing effects on judgments of health risk (Chandran and Menon 2004; Gerend and Cullen 2008). According to this literature, a shorter time period in the questionnaire may reduce the perceived temporal distance between the reference point of the survey respondent (typically today) and the point of occurrence of the event under consideration. Corresponding to construal level theory (Trope and Libermann 2003), temporal distance changes peoples' responses to future events by changing the way they represent those events in their minds. Furthermore, temporal framing effects are not limited to the perception of the future, but may also affect recognition of the past. As reported by Ross and Wilson 2003 and Haynes, Sorrentino, Olson, Szeto, Wirkki, and O´Conner 2007, temporal framing of questions may reduce or increase the psychological distance of survey respondents.

Combining both arguments, the wording of a survey instrument should have an effect on the way compliance costs and past compliance activities are mentally represented by the survey participants. If the questionnaire includes a request on the average monthly burden, respondents might have been framed to think of shorter and more recent reference periods (e.g. last month) to calculate the compliance cost estimate. Thus, even if the Bureau Fédéral du Plan asked in the pre-2006 questionnaires for the average monthly burden accounting for months with an especially high or low effort, survey respondents might have been focused on compliance activities within the last month (or a recent month) instead of on the average costs over the entire period.

Taking into account the limited ability of respondents to capture the real cost burden (Klein-Blenkers 1980; Cardinaels and Labro 2008), and the impact of the passage of time and more recent activities on memory processes (Donkin and Nosofsky 2012), compliance activities in the remoter past might have been "forgotten". This could result in an underestimation of estimates derived on a yearly basis. In addition, cost estimates driven by recent experience

(for example last month) are not necessarily representative of the whole year. Since the compliance cost surveys of the Bureau Fédéral du Plan were conducted between May and the first week in September, some interference might have taken place with the general deadline for income tax declarations in Belgium at the end of June. It should be noted that the preparation of the tax return comprises a significant fraction of the overall tax compliance burden (Slemrod and Venkatesh 2002). Thus there might as well be an upward bias of cost burdens derived on a monthly basis (pre-2006 questionnaire) resulting from the recent filing experiences of the survey respondent. As both arguments imply a lower annual cost estimate, I conclude that:

HYPOTHESIS 2: *Cost estimates derived on a yearly basis are lower than cost estimates derived on a monthly basis.*

Cost measurement will predictably be more complex for internal compliance costs than for external adviser costs. In the latter case, problems of measurement emanate especially from the allocation of the well-documented aggregate sum of adviser costs to different components (tax compliance, financial accounting compliance, compliance with other legal obligations, etc.). In the former case, even the aggregate sum of internal resources spent on compliance activities may be uncertain or have been "forgotten" (Allers 1994, 48). This holds especially if reporting activities have typically not been executed by a tax department (as in the case of small businesses). Considering these aspects, the 2006 questionnaire can be expected to have a stronger framing effect on the internal cost component.

HYPOTHESIS 3: *The effect of cost measurement per year (2006 questionnaire) is stronger for internal compliance costs.*

In addition, one should expect an especially strong framing effect on cost measurement in the case of businesses with a weak accounting system. As documented in Table 1, the data presented here includes not only incorporated enterprises but also self-employed businesses with limited information processing capacities. In line with the Belgian Accounting Law of July 17, 1975, there are no formal disclosure requirements for small sole proprietorships. In addition, small businesses are allowed to keep a simplified set of books under certain conditions (for a more detailed description of Belgian GAAP see European Commission 2008, Annex 1.B; PriceWaterhouseCoopers 2010). The 2006 survey instrument can, therefore, be expected to have a stronger framing effect on self-employed businesses.

HYPOTHESIS 4: *The effect of cost measurement per year (2006 questionnaire) is stronger for small self-employed businesses.*

The empirical specification is based on previous research (e.g. Hudson and Godwin 2000; Slemrod and Venkatesh 2002; Krishnan et al. 2008; Eichfelder and Schorn 2012). As economies of scale imply a non-linear relationship between costs and business size, I use the natural logarithm of compliance costs in real terms as dependent variable. To account for the fact that the impact of survey response may be related to specific cost categories, I consider not only the total costs, but also the logarithm of external costs and internal costs of the observations *i* as dependent variables. In order to test hypothesis 4, regressions have also been calculated on subsamples. The model is described by

$$
\begin{aligned}
Cost_i = {} & \beta_0 + \beta_1 \cdot Response_i + \beta_2 \cdot Questionnaire_i + \beta_3 \cdot Trend_i \\
& + \beta_4 \cdot Repeated\ Observation_i + \beta_5 \cdot Advice_i + \beta_6 \cdot Complexity_i \qquad (1) \\
& + \beta_7 \cdot Size_i + \beta_8 \cdot Enterprise_i + \sum_{m=1}^{4} \beta_{m+8} \cdot Industry_{i,m} + \sum_{n=1}^{2} \beta_{n+12} \cdot Region_{i,n} + u_i
\end{aligned}
$$

and estimated by pooled OLS. It should be noted that both main variables of interest (*Response* and *Questionnaire*) are related to the survey period and that most businesses participated in only one year. Therefore, I abstain from including firm fixed effects and year fixed effects.

As documented in Table 1, the survey response rate is correlated to other important aspects like the survey sample (self-employed businesses, enterprises). This might result in multi-collinear regression results. To overcome this technical problem, I define *Response* as the difference between the response rate of the current year and the mean response rate of the corresponding sampling group (self-employed businesses and enterprises) over all periods. The framing effect of the 2006 questionnaire is accounted for by the *Questionnaire* dummy that takes a value of 1 if compliance costs are derived on a yearly basis.

Furthermore, I have included variables controlling for other important aspects affecting the compliance burden. Due to the correlations of *Questionnaire* and *Response* with survey samples and periods (see Table 1), no time dummies can be accounted for. So I have included a linear *Trend* which increases by one for each period (1 in 2000, 2 in 2002, etc.). This approach can be justified by the fact that the impact of year dummies is limited if a control dummy for the questionnaire effect of 2006 is included (Appendix B: Table 6, model 1 to 3). As previously mentioned, the data does not constitute a panel. However, some of the requested businesses participated in more than one year. To account for the fact that second and third observations of the same business may be structurally different, the dummy *Repeated Observation* is included, with a value of 1 in these cases.

A problem of the *Questionnaire* dummy lies in the fact that it cannot separate the questionnaire effect as such from other putative changes to the Belgian tax system in 2005 and 2006 (including tax legislation, litigation and administration). Therefore, I consider two variables to control for the complexity of that system. As documented by empirical research, the demand for external tax advice is strongly affected by tax complexity (Frischmann and Frees 1999; Jackson, Shoemaker, Barick, and Burton 2005). So I include the dummy *Advice* that takes a value of 1 in case of external support as a proxy for complex tax situations.

Furthermore, the data includes qualitative statements on the legislative and administrative complexity of the tax system in the form of 5-point Likert scales (e.g. the understandability of tax regulations or the information content of administrative answers, see Appendix A). This information is used to define a second *Complexity* variable, which is defined as the unweighted average of all 14 items on legislative and administrative complexity (for an alternative specification using a weighted average, see Appendix B: Table 8). In view of the strong correlations between these different items, I refrain from defining two distinct variables on administrative and legislative complexity (for an analysis of the separate effects of tax administration and legislation on compliance costs see Eichfelder and Kegels 2012).

Moreover, I control for business *Size* (measured by the logarithm of turnover) and survey sample (*Enterprise*), as well as for different industries and regions. In detail, the model includes a dummy for self-employed businesses in the primary sector (*Primary*), the industrial sector (*Industrial*), and the construction sector (*Construction*). Other self-employed businesses are typically active in the service sector. Due to limited information, incorporated enterprises only have a dummy for the industrial sector (*Industrial enterprise*). Dummies are also included for the Belgian regions of *Brussels* and *Flanders*, with Wallonia as point of reference. I abstain from including additional control variables that are only available for a limited number of observations and periods (for example the number of establishments in Belgium is exclusively available for enterprises in 2000 and 2002). Nevertheless, the controls of equation (1) fit well with the existing literature (e.g. Hudson and Godwin 2000; Slemrod and Venkatesh 2002; Eichfelder and Schorn 2012).

As already mentioned, compliance cost estimates can be affected by measurement error. For that reason, I exclude observations with an unusually high or low burden as outliers. As identification criterion I have used a regression on total compliance costs including all control variables of equation (1). Observations are defined as outliers if the residual of this regression exceeds twice its standard deviation. Table 3 presents the descriptive statistics of the

remaining sample, excluding 49 outliers (941 observations). Compared to the original data, mean cost estimates and corresponding standard deviations are lower. This holds especially for medium-sized enterprises and implies a limited number of businesses with very high cost estimates. Self-employed businesses also reveal a strong reduction in mean turnover. Predictably, median values are almost unaffected by the exclusion of outliers.

[Table 3 about here]

4.   Results

Using the whole data set except outliers, I estimate a full set-up (including all controls) and a simplified model (excluding *Trend* and *Repeated Observation*). The main reason for excluding these variables is to test the robustness of the results with regard to multi-collinearity (as both parameters are correlated to *Response* and *Questionnaire*). Furthermore, both variables are typically not significant, and their impact on the outcome is limited. Within the regressions on external costs, *Advice* is excluded because of collinearity concerns.

Regression results are calculated by pooled OLS and presented in Table 4. I use the so-called Huber/Young/Sandwich estimator to control for heteroscedasticity. I also test for the normality of standard errors by a Kolmogorov-Smirnov test, for non-linearities by a RESET test (Wooldridge 2010, 137), and for multi-collinearity by the calculation of variance inflation factors (vif). These test statistics do not provide evidence of a biased estimate. The mean vif varies between 1.62 and 2.16, the *Response* vif between 1.06 and 1.61, and the *Questionnaire* vif between 1.51 and 5.13 (with a higher vif in the models including *Trend* and *Repeated Observation*). The R^2 is relatively high and ranges from 55.1 percent to 66.7 percent.

[Table 4 about here]

Hypothesis 1 is not confirmed. While the sign of *Response* is generally positive, there is no significant effect. This implies a potentially positive, but nevertheless limited effect of survey response rates on compliance cost estimates. In other words, I cannot provide evidence that non-response of survey participants has a significant effect on the estimated cost burden. That holds for total costs, external costs and internal costs.

By contrast, the results strongly support hypothesis 2. The *Questionnaire* dummy is negative and significant for all cost categories. From a quantitative perspective, the corresponding impact is huge. The results imply that estimates of total costs in 2006 are lower by some 39 percent to 42 percent (with a smaller effect if *Trend* and *Repeated Observation* are included). These absolute effects are somewhat different from the (marginal) regression coefficients of

the *Questionnaire* dummy.[5] Regarding internal compliance costs, the maximum negative effect (model 6) is even higher (54 percent). This implies a strong framing effect that results from the calculation of the compliance burden per year instead of the average burden per month.

As already indicated, the *Questionnaire* dummy is in effect collinear to a year dummy for 2006. Thus it may not be able to isolate the questionnaire effect as such if compliance costs are affected by changes in the Belgian tax system that are not fully considered by the control variables (especially *Trend*, *Complexity* and *Advice*). Corresponding results should, therefore, be interpreted carefully. However, a number of theoretical as well as empirical arguments suggest that the estimated coefficient will be due to the changed wording of the survey instrument.

(1) Taking into account the literature on tax compliance burdens (see Allers 1994; Evans 2003; Vaillancourt and Clemens 2008, with further references), it seems extremely unlikely that the average tax compliance costs of Belgian businesses could have been reduced by approximately 40 percent (!) within two years by tax simplification measures. No major tax reform took place in Belgium during the years 2005 and 2006. Apart from a few legal changes that cannot generally be regarded as simplifications, the system remained relatively stable for businesses over time.[6]

(2) A major reduction in tax compliance costs over a short period of time should result in a reduction in alternative proxies for tax complexity. So additional regressions have been estimated with the dependent variables *Complexity* and *Advice* as cross-checks (Appendix B: Table 6, models 4 and 5, and Table 8, model 7). Both measures are closely correlated to the cost burden (see Table 4) and should therefore act as good proxies for tax complexity. Nevertheless, no significant coefficient for *Questionnaire* is apparent in these additional

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[5] It has to be considered that regression coefficients of a logarithmic model can be interpreted as marginal effects that are not very meaningful for dummy variables. The absolute effect can be approximately calculated as $EXP\left(\hat{a} - \frac{1}{2} \cdot Var\left(\hat{a}\right)\right) - 1$, with $\hat{a}$ denoting the estimated coefficient and $Var\left(\hat{a}\right)$ the estimated variance of $\hat{a}$ (Kennedy 1981).

[6] As might be expected, a number of revisions were made in Belgian business tax law in 2005 and 2006. These include, for example, changes of depreciations occurring over the course of the year (Loi modifiant les articles 196, § 2, et 216, 2°, b), du Code des impôts sur les revenus 1992, Moniteur Belge 2004-08-03), and the introduction of tax-relevant accruals for business claims in the event of insolvency (Loi modifiant l'arrêté royal n° 4 du 29 décembre 1969 relatif aux restitutions en matière de taxe sur la valeur ajoutée, la loi du 8 août 1997 sur les faillites et le Code des impôts sur les revenus 1992, en vue d'assurer un traitement fiscal plus équitable aux créanciers dans le cadre d'un concordat judiciaire ou d'une faillite, Moniteur Belge 2005-04-20). However, there was no major reform that could be responsible for a massive reduction in tax compliance costs. I am grateful to Francis Adyns and André Franssen of the 'Service Public Federal Finance' for their kind support as well as for the provision of information on the major changes to Belgian tax law in 2005 and 2006.

regressions. Hence, apart from compliance costs, I find no significant change of tax complexity proxies in 2006.

(3) A potential reason for recent compliance cost reductions might be e-government features like the information platform FISCONET or the electronic submission of tax declarations by the Tax-on-Web system. However, the data implies that some of these tools were already widely used in 2004. For example, 138 of 270 available observations of the 2004 original survey stated use of Tax-on-Web. Furthermore, cross-checks including dummy variables for businesses using e-government procedures for specific survey periods (this information is not available for the whole period and therefore not included in the basic regression model) do not reveal a significant effect of e-government features on the cost burden.[7]

Partial support for hypothesis 3 can be found in the baseline regression, which indicates a stronger impact of *Questionnaire* on internal than on external compliance costs. While both estimators show a similar pattern in models 2 and 3 (with a slightly higher coefficient for external costs), models 5 and 6 reveal a much higher coefficient for internal costs. This is due to the fact that *Trend* is positive in model 2, but negative in model 3. An alternative analysis including year dummies for 2002 and 2004 instead of *Trend* (see Appendix B: Table 6, models 2 and 3) leads to a similar outcome.

I do not obtain significant results for *Trend* and *Repeated Observation* but, as expected, the control variables for complexity (*Advice* and *Complexity*) have a positive and significant sign. The other control variables confirm previous research. If business *Size* (measured by the logarithm of turnover) increases by 1 percent, compliance costs increase by about 0.29 percent. This underlines the significant economies of scale within the compliance process and the disproportionately high burden on small businesses (Hudson and Godwin 2000; Slemrod and Venkatesh 2002; Krishnan et al. 2008).

A higher burden is also evident for enterprises. This can be ascribed to the more complex tax obligations (e.g. tax-relevant treaties between associates and the firm) and accounting standards of corporations. Cost estimates of enterprises in the industrial sector are higher,

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[7] In detail, I tested the impact of the use of the following e-government features on compliance costs by the inclusion of dummy variables: FISCONET (online database, available for the 2002 sample), Portail fédéral (online portal, available for 2002), FINFORM (online tax form, available for 2002), electronic VAT declaration (available for 2002 and 2004), provision of electronic tax bills (available for 2004) and Tax-on-web (electronic submission system for taxes on income, available for 2004). Apart from the inclusion of additional variables, the specification of these models is the same as in equation (1). However, I only consider observations with full information on all variables including e-government features. I abstain from reporting these extensive additional results, which are very close to my original outcomes. I did not find any significant relationship between the use of e-government features and price-adjusted compliance costs.

while self-employed businesses in the primary sector bear a lower burden. The second effect will be mainly driven by simplified tax schemes for Belgian farmers, including an option for lump-sum taxation and cash-based tax accounting. In addition, cost burdens in the Belgian regions of Brussels and Flanders seem higher than in Wallonia. This may be driven by a higher price level within these regions, as there is no significant impact on the number of compliance hours (see Appendix B: Table 6, model 6).

Table 5 presents separate regression results for both survey samples (self-employed businesses and enterprises). Again, there is no evidence for a significant impact of the response rate on cost estimates (hypothesis 1). All other hypotheses are confirmed. The coefficient of *Questionnaire* is generally negative (hypothesis 2). The effect is stronger for internal costs (hypothesis 3, see models 2 and 3) and for self-employed businesses (hypothesis 4). For the enterprises, I do not find a significant coefficient for *Questionnaire*. However, this result depends on the specification. In a cross-check (Appendix B: Table 7), I obtain a significant coefficient if *Trend* and *Repeated Observation* are excluded. This specification also confirms a stronger effect for internal costs (hypothesis 3) and self-employed businesses (hypothesis 4). For the internal costs of self-employed businesses, the regression results imply a reduction of the cost estimate by about 68 percent. Corresponding monthly estimates are thus about 211 percent higher than annual estimates.

Empirical support for hypotheses 3 and 4 from the models on survey samples (Table 5) provides an additional argument for the interpretation that the negative coefficient of *Questionnaire* is driven by questionnaire framing effects. If corresponding cost effects were "real" instead of "framed", it would seem hard to explain why they should be focused on internal compliance costs (taking into account the endogeneity of outsourcing compliance obligations to external advisers) and even more on small self-employed businesses.

The results for the control variables are similar to the aggregate data set. However, the enterprise sample reveals significant coefficients for both *Trend* and *Repeated Observation*. Hence, especially in the models on internal costs, there is stronger justification to control for these variables. The negative coefficient for *Trend* provides some evidence that the price-adjusted internal compliance burden on Belgian enterprises has decreased since the early 2000s. However, taking into account the positive sign of *Trend* for external costs and its insignificant effect on total costs, this outcome should be interpreted with caution.

[Table 5 about here]

In addition to the results presented here, a number of cross-checks were performed. First of all, I redefined *Response* as the untreated survey response rate (in percentage points), to increase the variation of this variable. To prevent a multi-collinear estimate, *Trend* was excluded in these models. Secondly, I calculated standard errors accounting for the fact that the data consists of eight different samples of a business survey instead of a single random draw (for a description of this method see O'Donnell, van Doorslaer, Wagstaff, and Lindelow 2008). Thirdly, a series of regression models was drawn up including interaction terms between *Response, Questionnaire* and the control variables to identify potential interdependencies affecting the impact of both parameters. Fourthly, I tested the effect of outlier correction by the inclusion of outliers and by the use of a median regression estimator (see Wooldridge 2010, 404).

The outcomes of these cross-checks are very close to my original specification. They do not reveal a significant impact of *Response* on the compliance cost estimate, while the effect of *Questionnaire* remains negative and significant. So I abstain from reporting these results. In a further step I calculated regressions on alternative dependent variables as proxies for complexity (*Complexity* and *Advice*) and compliance costs (compliance hours) (Appendix B: Table 6, model 4 to 6). In addition, I tested for an alternative specification of the models for different survey samples excluding *Trend* and *Repeated Observation* (Appendix B: Table 7), and for models including a weighted version of the *Complexity* proxy (Appendix B: Table 8). These models underline my previous results and my interpretation.

5.   Conclusion

In this paper I have investigated the impact of survey non-response and temporal framing effects on compliance cost estimates. This is a relevant topic, as compliance cost estimates derived from business surveys may suffer from measurement error and consequently may be inconsistent. To address these issues I have used a series of repeated cross sections of Belgian businesses with varying response rates and survey questions.

While the sign of the regression coefficient for survey non-response is positive in most specifications (see Table 4 and Table 5), there is no significant evidence for a biased estimate. This holds for all cost categories (total costs, internal costs, external costs) and all survey samples (self-employed businesses, enterprises). Survey non-response does not, therefore, seem to be one of the major problems of compliance cost measurement. This can be taken as good news, as response rates of business surveys are typically low and could therefore induce severe bias.

However, my results suggest that the design of the survey instrument may have a major impact. While the pre-2006 questionnaire required the calculation of an average monthly burden (accounting for months with especially high and low costs, see Appendix A), the 2006 questionnaire asked for the aggregate compliance burden per year. Controlling for tax complexity and other relevant variables, I observe a considerably lower cost estimate in 2006. Thus the temporal framing of the survey instrument seems to have affected cost measurement. It follows that compliance cost estimates derived on a monthly basis should be higher compared to cost estimates derived on a yearly basis.

Nevertheless, it is not certain that the monthly estimate can be taken as more "realistic. On the one hand, if the monthly estimate is more closely related to recent experience, there could be a smaller bias due to the neglect of "forgotten" cost components. On the other hand, a shorter cost estimation period may induce measurement error if the recent experience of the respondent (e.g. the previous month) is not representative of the whole year.

I should make reference to potential limitations of my research. First of all, the survey data might be biased by additional sources of measurement error (e.g. incorrect answers by survey respondents). I have tested for a number of specifications and made cross-checks to account for this aspect. Secondly, because response rates and survey questions are connected to the different survey samples, the analysis is restricted to cross-sectional evidence. This problem, which is due to data restrictions, is well known in compliance cost research.

Thirdly, the coefficient of the *Questionnaire* dummy might be driven not only by temporal framing effects of the survey instrument but also by changes in compliance cost trends and tax complexity that have not been caught by my control variables.[8] However, there are strong theoretical and empirical arguments confirming my interpretation. During 2005 and 2006 there was no major tax simplification of the Belgian tax system that could explain a massive cost reduction. In addition, I do not find significant effects with regard to the use of e-government features or alternative proxies for tax complexity (*Complexity* and *Advice*). Moreover, if the estimated cost "reduction" were "real", it would be hard to explain its strong focus on internal compliance costs and small self-employed businesses.

The strong evidence on temporal framing effects has important implications for compliance cost estimates and cost measurement in general. (1) Survey-based compliance cost estimates should be interpreted with caution, as even small differences in survey questions might have a

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[8] Nevertheless, it should be noted that the *Questionnaire* dummy is not endogenous. As the dummy accounts for all relevant effects in 2006, there should be no correlation with the error term. Thus the issue is rather a question of identification than of consistency.

substantial effect on the outcome. For this reason, comparisons of compliance burdens between countries or different business groups generally require identical survey instruments. The timing of a survey might also have a strong impact on its outcome if there is a variation in the monthly burden over time and temporal framing effects are relevant. A possible solution for this problem might be repeated surveys, or a spread of surveys over the whole period under consideration.

(2) The framing effect of the 2006 survey instrument seems to be stronger for internal compliance costs (especially in the models for different survey samples, see Table 5 and Appendix B: Table 7) and small self-employed businesses with potentially weak accounting systems. This suggests a stronger bias of cost estimates in these cases. It might, then, be necessary to improve accounting accuracy with a specific focus on both aspects. However, increased accuracy naturally implies higher compliance cost burdens. Due to economies of scale, these cost burdens would be especially burdensome for small businesses.

3) As recently highlighted by Christensen (2010), accounting errors are one of the major topics in accounting literature. This is especially true of errors in costing systems like activity-based costing (ABC) and time-driven activity-based costing (TDABC), which have been addressed in numerous theoretical and empirical investigations (see Datar and Gupta 1994; Major and Hopper 2005; Labro and Vanhoucke 2007; Cardinaels and Labro 2008; Labro and Vanhoucke 2008; Hoozée et al. 2012, with further references). Experimental evidence provided by Cardinaels and Labro (2008) indicates that the measurement error of costing is reduced by the level of aggregation in costing systems, as well as by task coherency and prospective forms of cost measurement, while time-driven estimates are affected by overestimation bias. In practice, ABC and TDABC estimates rely typically on employee surveys, informed managers' estimates and personal interviews with experts. In addition, cost measurement requires generally a time dimension (e.g. costs per week or per month). If temporal framing effects are relevant for cost measurement and cost allocation, corresponding estimates might be biased. That holds likewise not only for survey-based cost estimates, but also for personal interviews or even self-reflection processes of managers. In all these cases it seems possible that cost estimates are based on a sort of "reference period", which is not necessarily representative for the whole period under consideration. Thus the analysis of temporal framing effects in other areas of cost measurement should be a relevant and interesting question for further research.

To conclude, tax compliance costs of Belgian businesses seem to be a considerable burden, especially for the smallest business size classes. For self-employed businesses (and excluding outliers) the estimated mean compliance burden per turnover is 12.6 percent and the median compliance burden is 4.4 percent. It should be noted that these figures do not include the compliance costs of financial accounting and corporate governance obligations, which may be even higher (Lignier and Evans 2012). However, my results also suggest that cost estimates could be severely biased by measurement error. From this perspective, further research on compliance cost measurement and potential methods of cost reduction promises to be a rewarding task.

Appendices

Appendix A: Selected survey questions

The original survey questions on compliance cost measurement were presented in French and Flemish.[9] Here they are given in English. As well as the survey questions, the questionnaire included instructions on the general definition of tax compliance costs, which remained unchanged from 2000 to 2006. The survey questions on cost measurement are as follows:

1. How many staff and management hours are spent on average per month in your enterprise in order to comply administratively with tax regulations? (Consider the best possible estimate for the average monthly time effort, taking into account months with a markedly high or low effort.)

   Number of hours per month:

2. What is the monthly cost in Euros of these hours spent by staff and management of your enterprise to comply administratively with tax regulations?

   Monthly cost:

3. How much does your enterprise spend on average per month for the purchase of external services to account for administrative dispositions regarding tax regulations? (Consider the best possible estimate for average monthly expenses. Take into account within your estimate all payments for external support, such as fees for auditors, lawyers or consultants as well as payments for information material necessary to comply with tax regulations.)

   Monthly average expenses:

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[9] In the 2000 survey, these questions were formulated in Belgian Francs. The surveys in 2000 and 2002 included an additional question on expenses for computer hardware and software: "What is the monthly cost of amortization of information processing hardware and software necessary to comply administratively with the tax regulations?" In the interest of consistent cost definition for the whole period, these additional cost elements are not considered here.

In survey year 2006 the wording of these questions was changed. The main difference was that costs were now estimated on a yearly basis:

1. How many staff and management hours were spent in your enterprise in 2006 in order to comply administratively with tax regulations?

   Number of hours:

2. What is the yearly cost in Euros of these hours spent by staff and management of your enterprise to comply administratively with tax regulations?

   Cost in Euros:

3. How much did your enterprise spend in 2006 for the purchase of external services to account for administrative dispositions regarding tax regulations? (Take into account in your estimate all payments for external support, such as fees for auditors, lawyers or consultants as well as payments for information material necessary to comply with tax regulations.)

   Expenses in Euros:

The data includes seven statements on tax administration and tax legislation, which are answered on a 5-point Likert scale. These items are used to construct the proxy for tax *Complexity*. Statements on tax administration are as follows.

1. It is easy to know which tax agency should be applied to.
2. It is easy to contact the correct tax agency.
3. The tax administration gives precise answers.
4. Administrative decisions are clearly motivated.
5. The administration gives an answer within the expected period.
6. The answer is the same regardless of the service personnel contacted.
7. The information obtained meets your needs.

Statements on tax legislation are as follows:

1. Regulations are brought to your knowledge in advance of their application.
2. They are easy to understand.
3. Their objectives are clear.
4. They are sufficiently adapted to all situations.
5. They are brought to your knowledge in reasonable time for you to comply.
6. They are coherent with each other.
7. They contain sufficient and relevant information.

In addition, the survey instruments include questions on business size (measured by turnover and the number of employees), industry, region and qualitative statements on changes of the

cost burden. Furthermore, there were additional questions that varied over time. I abstain from reporting the exact wording of these questions, as it should not be important for my analysis. A more detailed documentation is given by De Vil and Kegels 2002, Joos and Kegels 2004, Verschueren et al. 2006 and Kegels 2008.

Appendix B: Additional regression results

Table 6 contains additional regression estimates for the aggregate data set. In the first three models I include dummies for 2002 and 2004 instead of the *Trend* variable (a "2006" dummy would be identical to the *Questionnaire* dummy). I exclude *Response* from these models to prevent multi-collinearity. The results of these models suggest that the replacement of the year dummies (2002 and 2004) with *Trend* in the baseline regressions (see Table 4) is unproblematic. Both year dummies are not significant for total costs or internal costs. In addition, while there is some (weak) evidence for a positive cost trend for external costs, this can be approximated by *Trend*. In addition, the data shows a stronger coefficient of *Questionnaire* for internal than external costs. This corresponds to hypothesis 3 of my analysis.

Within models 4 to 6, I report regression results for alternative proxies of tax complexity as dependent variables. In addition to the tax complexity proxies *Complexity* and *Advice*, the logarithm of internal compliance hours (*Hours*) is investigated. The analysis is limited to businesses with information on total compliance costs, in order to obtain a similar data set as in the basic model. The estimate for the binary variable *Advice* is calculated by Logit, while the other models rely on OLS. There is no significant evidence for *Response*. The *Questionnaire* effect is only significant for *Hours*. This fits well with the interpretation that this coefficient is driven by a framing of the survey instrument (measurement of yearly hours instead of monthly hours, see Appendix A) and not by changes in the Belgian tax system, which would not only affect cost estimates but also other complexity proxies.

Regarding the control variables, I obtain similar results as in the basic regression, with some exceptions. 1) The number of significant control variables for *Complexity* and *Advice* is limited. 2) There is no evidence in the data for a lower time effort in Wallonia (*Hours*) than in other Belgian regions, so corresponding results for the cost burden might be driven by the price level. In addition, business statements (*Complexity*) in this region are even more negative than in Flanders and Brussels.

[Table 6 about here]

Table 7 documents additional regression results for the different survey samples (self-employed businesses and incorporated enterprises). The same specification is used as in Table 5, but without the variables *Trend* and *Repeated Observation*. Under these conditions, the coefficient of *Questionnaire* is significant for both samples. In line with hypotheses 3 and 4, the effect is much stronger for self-employed businesses and for internal compliance costs compared to external costs.

[Table 7 about here]

Controlling for the complexity of Belgian tax regulations appears important in order to identify the effects of *Questionnaire* and *Response*. An alternative specification is, therefore, presented, using a weighted version of the *Complexity* variable. As weights, I rely on coefficients of a first-stage regression of all 14 items of administrative and legislative complexity (see Appendix A) on the total cost burden. Apart from including these 14 items instead of *Complexity*, the specification of this regression conforms to equation (1). However, I do not consider observations in 2006 to account for temporal framing effects that might bias the complexity proxy. In the case of items with negative regression coefficients, the applied weight is zero.

The resulting weighted version of *Complexity* should be better suited to explain the cost burden. Table 8 documents the results. As expected, a find a stronger coefficient for *Complexity* suggesting a higher explanatory power of this variable. Apart from that aspect, I do not find significant deviations from my primary analysis. While *Response* is not significant, I observe a negative and significant coefficient for *Questionnaire*. As in Table 6, model 5, using *Complexity* as dependent variable does not result in a significant coefficient for *Questionnaire.*

[Table 8 about here]

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Tables

TABLE 1:
Survey information

Group	Self-employed			Enterprises		
Survey year	Sample size	Usable response	Response rate	Sample size	Usable response	Response rate
2000	2,128	165	7.8%	884	149	16.9%
2002	2,247	304	13.5%	921	206	22.4%
2004	1,725	189	11.0%	903	187	20.7%
2006	2,169	217	10.0%	907	173	19.1%

Sample sizes, usable survey response, and response rates by sampling group. Response rates have been calculated by the ratio of usable response to sample size.

TABLE 2:
Descriptive statistics

Business class	Turnover (T€)			Costs per business (€)			Costs per turnover (%)			Observations
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	Mean	Median	Standard deviation	
Self-employed	1,720	53	30,894	7,364	2,520	35,852	13.77	4.55	23.43	466
Small enterprises	2,561	1,567	2,558	41,916	10,632	128,711	5.95	0.90	18.12	280
Medium enterprises	22,497	19,742	10,769	174,618	24,933	1,035,489	1.22	0.13	8.51	123
Large enterprises	323,125	170,228	403,152	195,938	64,513	364,242	0.10	0.03	0.21	121

Descriptive statistics for observations with full information on total compliance costs. Small (medium) enterprises are defined by a price-adjusted turnover of less than €10 m (€50 m). Costs per turnover are limited to a maximum value of 100%.

TABLE 3:
Descriptive statistics (outliers excluded)

Business class	Turnover (T€)			Costs per business (€)			Costs per turnover (%)			Observations
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	Mean	Median	Standard deviation	
Self-employed	277	52	1,629	4,223	2,463	5,381	12.83	4.49	21.77	454
Small enterprises	2,575	1,562	2,561	21,797	10,085	38,710	3.25	0.88	10.96	263
Medium enterprises	22,377	18,686	10,975	45,978	24,551	65,934	0.25	0.13	0.46	112
Large enterprises	328,404	163,195	416,294	120,213	58,459	160,526	0.06	0.03	0.12	112

Descriptive statistics for observations with full information on total compliance costs excluding outliers. Small (medium) enterprises are defined by a price-adjusted turnover of less than €10 m (€50 m). Costs per turnover are limited to a maximum value of 100%.

TABLE 4:
Baseline regression results

Model	1	2	3	4	5	6
Dependent variable	TotalC	ExternalC	InternalC	TotalC	ExternalC	InternalC
Response	1.461	0.654	1.622	1.806	2.561	0.535
	(1.902)	(2.250)	(2.274)	(1.524)	(1.779)	(1.819)
Questionnaire	-0.484***	-0.540**	-0.492**	-0.535***	-0.357***	-0.761***
	(0.185)	(0.213)	(0.221)	(0.0936)	(0.114)	(0.118)
Trend	-0.0133	0.0864	-0.106	--	--	--
	(0.0659)	(0.0759)	(0.0782)	--	--	--
Repeated Observation	0.111	0.0446	0.173	--	--	--
	(0.0977)	(0.118)	(0.113)	--	--	--
Advice	1.023***	--	0.236*	1.011***	--	0.222*
	(0.118)	--	(0.122)	(0.118)	--	(0.123)
Complexity	0.304***	0.205***	0.355***	0.304***	0.201***	0.358***
	(0.0425)	(0.0501)	(0.0537)	(0.0424)	(0.0498)	(0.0536)
Size	0.290***	0.273***	0.299***	0.291***	0.274***	0.298***
	(0.0179)	(0.0210)	(0.0215)	(0.0179)	(0.0210)	(0.0214)
Enterprise	0.228**	0.502***	-0.0399	0.226*	0.494***	-0.0341
	(0.116)	(0.132)	(0.144)	(0.116)	(0.132)	(0.144)
Industrial (Enterprise)	0.188*	-0.0489	0.355***	0.193**	-0.0497	0.362***
	(0.0961)	(0.118)	(0.116)	(0.0960)	(0.118)	(0.117)
Industrial (Self-employed)	0.189	0.385	0.0342	0.204	0.386	0.0580
	(0.214)	(0.276)	(0.207)	(0.215)	(0.281)	(0.205)
Construction (Self-employed)	-0.0302	0.0571	-0.157	-0.0290	0.0472	-0.145
	(0.108)	(0.122)	(0.141)	(0.107)	(0.122)	(0.139)
Primary (Self-employed)	-0.906***	-0.765***	-1.073***	-0.907***	-0.767***	-1.073***
	(0.107)	(0.123)	(0.127)	(0.107)	(0.122)	(0.127)
Flanders	0.227***	0.218**	0.147	0.229***	0.211**	0.157*
	(0.0773)	(0.0919)	(0.0906)	(0.0772)	(0.0913)	(0.0902)
Brussels	0.267**	0.210	0.241*	0.266**	0.202	0.247*
	(0.110)	(0.132)	(0.137)	(0.110)	(0.132)	(0.137)
Constant	2.909***	3.196***	3.059***	2.914***	3.375***	2.892***
	(0.289)	(0.336)	(0.350)	(0.268)	(0.311)	(0.323)
Observations	941	855	928	941	855	928
R²	0.667	0.552	0.567	0.667	0.551	0.565

Dependent variables: logarithm of total compliance costs (TotalC), external costs (ExternalC) and internal costs (InternalC). Estimates are calculated by pooled OLS. Heteroscedasticity-robust standard errors (Huber/Young/Sandwich estimator) are in parentheses; *** / ** / * indicate statistical significance on the 1% / 5% / 10% level.

TABLE 5:
Results for survey samples

Model	1	2	3	4	5	6
Sample	Self-employed	Self-employed	Self-employed	Enterprise	Enterprise	Enterprise
Dependent variable	TotalC	ExternalC	InternalC	TotalC	ExternalC	InternalC
Response	2.100	0.960	1.055	0.0137	-0.180	1.776
	(2.367)	(2.636)	(2.954)	(2.906)	(3.815)	(3.416)
Questionnaire	-0.860***	-0.820***	-1.093***	-0.246	-0.401	0.00560
	(0.249)	(0.273)	(0.292)	(0.266)	(0.331)	(0.322)
Trend	0.0226	0.0541	0.0198	-0.0378	0.134	-0.229**
	(0.0828)	(0.0896)	(0.0992)	(0.0983)	(0.124)	(0.116)
Repeated Observation	-0.114	-0.220	-0.108	0.249*	0.244	0.348**
	(0.131)	(0.148)	(0.156)	(0.135)	(0.174)	(0.156)
Advice	0.706***	--	-0.0751	1.671***	--	0.866***
	(0.137)	--	(0.145)	(0.182)	--	(0.187)
Complexity	0.335***	0.241***	0.379***	0.314***	0.181**	0.379***
	(0.0499)	(0.0576)	(0.0624)	(0.0730)	(0.0875)	(0.0937)
Size	0.217***	0.209***	0.223***	0.332***	0.294***	0.341***
	(0.0293)	(0.0334)	(0.0340)	(0.0218)	(0.0268)	(0.0267)
Industrial (Enterprise)	--	--	--	0.0981	-0.0953	0.270**
	--	--	--	(0.0957)	(0.120)	(0.117)
Industrial (Self-employed)	0.230	0.483*	0.0887	--	--	--
	(0.200)	(0.283)	(0.197)	--	--	--
Construction (Self-employed)	-0.0280	0.0530	-0.139	--	--	--
	(0.108)	(0.122)	(0.140)	--	--	--
Primary (Self-employed)	-0.883***	-0.709***	-1.051***	--	--	--
	(0.106)	(0.125)	(0.124)	--	--	--
Flanders	0.287***	0.251**	0.253**	0.160	0.218	0.0385
	(0.101)	(0.117)	(0.117)	(0.113)	(0.141)	(0.138)
Brussels	0.313*	0.462**	0.167	0.199	0.0407	0.236
	(0.174)	(0.184)	(0.219)	(0.144)	(0.181)	(0.176)
Constant	3.865***	3.878***	3.881***	1.911***	3.320***	1.920***
	(0.389)	(0.458)	(0.462)	(0.496)	(0.570)	(0.628)
Observations	454	398	449	487	457	479
R^2	0.451	0.298	0.376	0.466	0.280	0.377

Dependent variables: logarithm of total compliance costs (TotalC), external costs (ExternalC) and internal costs (InternalC). Estimates are calculated by pooled OLS. Heteroscedasticity-robust standard errors (Huber/Young/Sandwich estimator) are in parentheses; *** / ** / * indicate statistical significance on the 1% / 5% / 10% level.

TABLE 6:
Additional regression results (aggregate data)

Model	1	2	3	4	5	6
Estimation method	OLS	OLS	OLS	Logit	OLS	OLS
Dependent variable	TotalC	ExternalC	InternalC	Advice	Complexity	Hours
2002	0.0694	0.114	-0.00253	--	--	--
	(0.0880)	(0.104)	(0.107)	--	--	--
2004	0.0253	0.196	-0.154	--	--	--
	(0.108)	(0.123)	(0.130)	--	--	--
Response	--	--	--	4.280	-1.216	-0.622
	--	--	--	(7.182)	(1.461)	(2.229)
Questionnaire (2006)	-0.492***	-0.271**	-0.769***	-0.630	0.00732	-0.769***
	(0.106)	(0.129)	(0.131)	(0.617)	(0.132)	(0.216)
Trend	--	--	--	0.143	-0.0728	-0.0331
	--	--	--	(0.216)	(0.0476)	(0.0763)
Repeated Observation	0.110	0.0449	0.172	-0.781**	0.0167	0.0338
	(0.0976)	(0.118)	(0.113)	(0.324)	(0.0661)	(0.109)
Advice	1.023***	--	0.236*	--	0.212***	0.211*
	(0.118)	--	(0.122)	--	(0.0796)	(0.122)
Complexity	0.304***	0.205***	0.355***	0.388***	--	0.285***
	(0.0425)	(0.0501)	(0.0537)	(0.145)	--	(0.0536)
Size	0.290***	0.273***	0.299***	0.117**	-0.0102	0.241***
	(0.0179)	(0.0210)	(0.0215)	(0.0588)	(0.0111)	(0.0201)
Enterprise	0.228*	0.502***	-0.0407	-0.187	0.0597	-0.0264
	(0.116)	(0.132)	(0.144)	(0.379)	(0.0926)	(0.140)
Industrial (Enterprise)	0.188*	-0.0491	0.356***	0.634	-0.0810	0.307***
	(0.0961)	(0.118)	(0.116)	(0.423)	(0.0631)	(0.116)
Industrial (Self-employed)	0.190	0.388	0.0326	-0.266	0.190	0.274
	(0.214)	(0.276)	(0.207)	(0.827)	(0.172)	(0.345)
Construction (Self-employed)	-0.0297	0.0576	-0.157	-0.209	-0.140	0.0452
	(0.108)	(0.122)	(0.141)	(0.375)	(0.101)	(0.130)
Primary (Self-employed)	-0.905***	-0.765***	-1.073***	-0.256	-0.0613	-0.352***
	(0.107)	(0.123)	(0.127)	(0.340)	(0.0844)	(0.125)
Flanders	0.227***	0.219**	0.147	0.0699	-0.140**	0.0462
	(0.0773)	(0.0919)	(0.0906)	(0.293)	(0.0594)	(0.0930)
Brussels	0.267**	0.211	0.241*	-0.138	-0.154*	0.0728
	(0.110)	(0.132)	(0.137)	(0.434)	(0.0797)	(0.135)
Constant	2.853***	3.267***	2.902***	-0.417	3.559***	0.608*
	(0.273)	(0.322)	(0.328)	(0.931)	(0.169)	(0.332)
Observations	941	855	928	941	941	928
(Pseudo) R^2	0.667	0.552	0.567	0.057	0.036	0.428

Dependent variables: logarithm of total compliance costs (TotalC), external costs (ExternalC) and internal costs (InternalC), dummy variable for tax advice (Advice), unweighted average statements on complexity (Complexity) and logarithm of internal compliance hours (Hours). Estimates are calculated by pooled OLS and Logit. Heteroscedasticity-robust standard errors (Huber/Young/Sandwich estimator) are in parentheses; *** / ** / * indicate statistical significance on the 1% / 5% / 10% level.

TABLE 7:
Additional regression results (survey samples)

Model	1	2	3	4	5	6
Sample	Self-employed	Self-employed	Self-employed	Enterprise	Enterprise	Enterprise
Dependent variable	TotalC	ExternalC	InternalC	TotalC	ExternalC	InternalC
Response	2.007	0.998	0.929	0.864	4.314	-0.855
	(1.908)	(2.189)	(2.372)	(2.320)	(2.790)	(2.726)
Questionnaire	-0.787***	-0.661***	-1.026***	-0.376***	-0.146	-0.575***
	(0.142)	(0.168)	(0.169)	(0.126)	(0.153)	(0.164)
Advice	0.717***	--	-0.0652	1.652***	--	0.841***
	(0.137)	--	(0.144)	(0.180)	--	(0.185)
Complexity	0.334***	0.239***	0.378***	0.313***	0.171**	0.386***
	(0.0498)	(0.0576)	(0.0623)	(0.0727)	(0.0868)	(0.0934)
Size	0.219***	0.212***	0.225***	0.336***	0.301***	0.342***
	(0.0293)	(0.0337)	(0.0339)	(0.0217)	(0.0261)	(0.0268)
Industrial (Enterprise)	--	--	--	0.106	-0.0942	0.282**
	--	--	--	(0.0955)	(0.119)	(0.118)
Industrial (Self-employed)	0.213	0.432	0.0731	--	--	--
	(0.198)	(0.273)	(0.198)	--	--	--
Construction (Self-employed)	-0.0306	0.0444	-0.141	--	--	--
	(0.107)	(0.122)	(0.139)	--	--	--
Primary (Self-employed)	-0.883***	-0.710***	-1.051***	--	--	--
	(0.106)	(0.125)	(0.124)	--	--	--
Flanders	0.286***	0.246**	0.252**	0.170	0.223	0.0612
	(0.101)	(0.116)	(0.116)	(0.113)	(0.140)	(0.137)
Brussels	0.317*	0.469**	0.170	0.202	0.0374	0.256
	(0.173)	(0.182)	(0.219)	(0.144)	(0.183)	(0.175)
Constant	3.854***	3.910***	3.867***	1.853***	3.544***	1.531**
	(0.357)	(0.417)	(0.422)	(0.476)	(0.542)	(0.598)
Observations	454	398	449	487	457	479
R²	0.450	0.294	0.375	0.462	0.271	0.368

Dependent variables: logarithm of total compliance costs (TotalC), external costs (ExternalC) and internal costs (InternalC). Estimates are calculated by pooled OLS. Heteroscedasticity-robust standard errors (Huber/Young/Sandwich estimator) are in parentheses; *** / ** / * indicate statistical significance on the 1% / 5% / 10% level.

TABLE 8:
Additional regression results (weighted complexity proxies)

Model	1	2	3	4	5	6	7
Dependent variable	TotalC	ExternalC	InternalC	TotalC	ExternalC	InternalC	Complexity
Response	1.231	0.508	1.375	1.771	2.574	0.509	-0.418
	(1.879)	(2.233)	(2.251)	(1.499)	(1.757)	(1.795)	(1.520)
Questionnaire	-0.501***	-0.555***	-0.512**	-0.529***	-0.354***	-0.753***	0.0574
	(0.184)	(0.213)	(0.220)	(0.0929)	(0.113)	(0.117)	(0.137)
Trend	-0.00269	0.0945	-0.0938	--	--	--	-0.0978**
	(0.0657)	(0.0761)	(0.0778)	--	--	--	(0.0491)
Repeated Observation	0.109	0.0453	0.169	--	--	--	0.0210
	(0.0973)	(0.118)	(0.112)	--	--	--	(0.0699)
Advice	1.014***	--	0.228*	1.003***	--	0.214*	0.217***
	(0.116)	--	(0.120)	(0.116)	--	(0.121)	(0.0815)
Complexity	0.335***	0.235***	0.388***	0.335***	0.230***	0.391***	--
	(0.0396)	(0.0479)	(0.0498)	(0.0394)	(0.0474)	(0.0497)	--
Size	0.290***	0.272***	0.297***	0.290***	0.274***	0.297***	-0.00673
	(0.0176)	(0.0209)	(0.0211)	(0.0176)	(0.0208)	(0.0211)	(0.0115)
Enterprise	0.236**	0.508***	-0.0283	0.233**	0.499***	-0.0234	0.0320
	(0.115)	(0.132)	(0.143)	(0.115)	(0.132)	(0.143)	(0.0961)
Industrial (Enterprise)	0.199**	-0.0424	0.367***	0.204**	-0.0435	0.373***	-0.106
	(0.0952)	(0.118)	(0.115)	(0.0951)	(0.118)	(0.116)	(0.0676)
Industrial (Self-employed)	0.201	0.401	0.0493	0.215	0.401	0.0724	0.136
	(0.218)	(0.282)	(0.203)	(0.219)	(0.286)	(0.200)	(0.206)
Construction (Self-employed)	-0.0115	0.0689	-0.135	-0.0117	0.0578	-0.124	-0.183*
	(0.107)	(0.121)	(0.140)	(0.106)	(0.121)	(0.139)	(0.104)
Primary (Self-employed)	-0.919***	-0.773***	-1.088***	-0.921***	-0.775***	-1.088***	-0.0157
	(0.106)	(0.122)	(0.126)	(0.105)	(0.121)	(0.126)	(0.0857)
Flanders	0.226***	0.216**	0.145	0.227***	0.207**	0.154*	-0.124**
	(0.0767)	(0.0913)	(0.0901)	(0.0766)	(0.0908)	(0.0896)	(0.0612)
Brussels	0.280**	0.218*	0.254*	0.277**	0.209	0.259*	-0.177**
	(0.109)	(0.132)	(0.136)	(0.109)	(0.132)	(0.136)	(0.0844)
Constant	2.803***	3.093***	2.951***	2.831***	3.292***	2.806***	3.543***
	(0.281)	(0.328)	(0.337)	(0.258)	(0.299)	(0.310)	(0.177)
Observations	941	855	928	941	855	928	941
R²	0.673	0.555	0.573	0.672	0.554	0.572	0.038

Dependent variables: logarithm of total compliance costs (TotalC), external costs (ExternalC), internal costs (InternalC) and weighted average statements on complexity (Complexity). Estimates are calculated by pooled OLS. Heteroscedasticity-robust standard errors (Huber/Young/Sandwich estimator) are in parentheses; *** / ** / * indicate statistical significance on the 1% / 5% / 10% level.