Under-Reporting of Firm Size Around Size-Dependent Regulation Thresholds: Evidence from France

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Abstract

The existence of a peak at 49 employees in the firm size distribution in France, followed by a permanent decrease in the number of firms has been the starting point of political discourses and academic studies on the cost of size-dependent regulations at 50-employee. These features of the distribution are visible when firm size is declared by employers in fiscal data but not when it is reconstructed from individual-level social security data. This working paper explores these differences both from statistical and institutional viewpoints. It provides evidence showing that a large proportion of employers manipulate the firm size they declare in their fiscal documents. This manipulation generates the particular shape of the size distribution in the fiscal data. We discuss the rationale for such behavior: the key point is that the under-declaration in fiscal data is not subject to substantial sanctions and it can allow firms not to comply with the labor law. Event studies and comparisons of firms below and above the 50-employee threshold suggest that this threshold may only have limited effects on firm performance or growth potential. Consequently the welfare costs of the regulations at 50-employee might be smaller than what was found by some of the studies that assume a perfect compliance with the law.

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Introduction

Depending on their number of employees, French companies must fulfill a certain number of legal obligations: setting up a works council, a profit sharing scheme, having their accounts validated by an external tax auditor, etc. These obligations are generally triggered from company size thresholds often called "social thresholds" because they induce obligations mainly in terms of "social dialogue".

Several studies have looked at the cost that these thresholds could represent for companies and their effect on their growth (Aghion, Bergeaud and Van Reenen, 2021; Garicano, Lelarge and Van Reenen, 2016; Gourio and Roys, 2014; Smagghue, 2022). They attempt to estimate the economic cost of legal obligations (Garicano et al., 2016; Gourio and Roys, 2014), their effect on the share of labor in added value (Smagghue, 2022) or their effect on innovation (Aghion et al., 2021). For example, Garicano et al. (2016) estimate that the obligations applying at the threshold of 50 employees would have a staggering economic cost: 3.4% of GDP, or 92 billion euros in 2019. These studies focus on the 50-employee threshold that concentrated a variety of additional regulations for private firms.

Their starting point is the existence of a peak at 49 employees in the firm size distribution, followed by a permanent decrease in the number of firms having 50 employees or more (Figure 1) according to raw fiscal data. The peak suggests that many companies do not want to cross the threshold, which would therefore represent a cost for them. Thus, for example, they would prefer to avoid embarking on innovations that could lead them to grow (Aghion et al., 2021). Regulations at the 50-employee threshold could not only affect the growth of certain companies just below the threshold, but also induce substantial additional economic costs for all those whose workforce is already above the threshold, and which must therefore in theory have in place the legal obligations. This could explain why these regulations have a very high overall cost. The papers cited above attempt to quantify this overall cost using economic models of equilibrium estimated by exploiting distortions in the distribution of the size of companies.

The existing literature focusing on firm size thresholds in France primarily uses firm size information provided by employers in their tax declaration as a measure of the size of companies. However, as this firm size variable is declared by the employer, it can be manipulated. An other data source made available to researchers by the French statistical institute (INSEE), gives us the possibility to reconstitute firms' number of employees from the information sent by them to social security schemes about all employees paying social security. This second measure of the workforce is difficult for employers to manipulate when their employees have an employment contract and receive remuneration. To our knowledge, we are the first ones to perform this

exercise, and when we use this second source in which company size is measured and not declared, the peak at 49 employees disappears and the distribution of firm size seems relatively smooth around the threshold of 50 employees (see comparisons in Figure 2).

This difference between sources has already been noted by Ceci-Renaud and Chevalier (2010) who, however, failed to precisely analyze its causes. It has then no longer been directly discussed in more recent works. The first purpose of this working paper is to provide a comprehensive explanation for the discrepancies between sources. To do so, we pay attention to the different ways in which company size can be measured and how legal obligations are applied and monitored in practice. We show that companies occasionally under-declare their workforce size so as not to have to respect the obligations that apply at the threshold of 50 employees without necessarily ceasing to grow. This under-declaration is made possible by the fact that the legal workforce concept used to enforce the main regulations is both complex to calculate and difficult to verify, and that the penalties in the event of false declaration are in practice non-existent.

These observations lead us to consider with caution the estimates made of the cost of the regulations applying at the threshold of 50 employees even though this cost as well as work such as Garicano et al. (2016) have been invoked to justify the provisions of the PACTE law of May 22 2019 which "soften" the methods of application of the social thresholds[1]. We indeed provide a couple of empirical exercises that suggest that the cost may not be as high as some former estimates suggest.

Finally, our results suggest a high level of non-compliance with the law, a result that may seem surprising for a developed and highly regulated countries like France. Before trying to mitigate the potential effect of legal obligations, it seems necessary for the credibility of legislators to ensure that they are properly respected.

The rest of this working paper is organized as follows. Section 1 presents briefly the institutional context. Section 2 the data and firm size variables we use. Section 3 shows that there is under-reporting of firm size in firm tax declarations at the 50-employee threshold, and it explains why such under-reporting is possible. Section 4 shows that the enforcement of two major regulations applying at 50 employees during the period we study (works council and profit sharing schemes) do depend on the firm size declared by firms in the tax returns, but not on a more accurate measure of firm size that we recomputed. Hence firms can avoid regulations by under-reporting their size. This result is all the more striking that the size declared by firms in tax returns is a headcount of employees, which is not the firm size concept that should be

[1]LAW n° 2019-486 of May 22, 2019 relating to the growth and transformation of companies. See section 2.1.3 "The need to limit the effects of thresholds with a unified and sustainable mechanism" of the impact study of the bill relating to the growth and transformation of companies, ECOT1810669L/Bleue-1, Accessed June 18, 2021.

used to apply the regulations we examine (which depend in principle on the full-time equivalent workforce). We discuss the institutional aspects that can explain this surprising result. In section 5, we try to reassess the cost of the 50-employee threshold and its effect on firm growth. To do so, we first compare firms on both sides of the 50-employee thresholds (either declared or recomputed) and we then examine if the trajectory of firms that under-declare their size at some point is different from the trajectory of other firms.

1 Institutional context

From 2000 to 2015 and the start of a variety of reforms, the regulations applying at the 50-employee thresholds were pretty stable. Actually, there were three thresholds related to three closed but different definitions according to the labor law, the social security law and the commercial law. The 50-employee commercial threshold was one out of 3 conditions for a mandatory external auditor of firm accounts. The timing of the payment of social security contributions or some specific job subsidies were connected to the social security threshold. But the most significant changes when a firm reached 50 employees were related to the labor code.

The appendix A provides the definition of the number of workers according to the labor law in the past decades. The changes were more and more frequent but relatively minor. A permanent point is that an exact calculation required an access to the full information on the nature and details of labor contracts. Neither individual workers of the firm nor unions which were not yet represented in the firm work council could get this information. Even administrative sources do not include the full information (see below). The calculus of the workforce by the employer according to the labor law was not declared.

Basically, the definition of the workforce according to the labor code was: Employees holding a full-time permanent employment contract are taken into account in full in the company's workforce; fixed-term contracts, casual workers, temporary workers and employees made available by an external company who are present on the premises of the user company and have been working there for at least one year are taken into account in the company's workforce in proportion to their time of presence over the previous twelve months, except if they are replacing an absent employee or an employee whose employment contract is suspended (maternity leave, etc.). Part-time employees are taken into account by dividing the total number of hours in their work contracts by the legal or conventional working hours; however, most employees on specific public employment policy contracts are excluded from the count (apprentices etc.).

In addition to the definition of the workforce, the labor law also defined the windows for considering that the threshold was breached and so that 4 main additional measures should be

implemented by the employers (see Appendix F for details covering the 2000-2015 period).

For example, in 2015, if the monthly headcount according to the labor code reaches at least 50 employees during 12 months (non consecutive) in the last 3 years :

- The company must organize the election of a Work Council (Enterprise Committee), if one does not already exist. The three elected members of the Work Council benefit from a monthly credit of 20 hours. The Committee has a budget of 0,2% of the payroll (for e.g. buying equipment, paying assistants or external auditors) and a room provided by the employer.

- A CHSCT Health and Safety Committee must be set up.

- The monthly credit of hours of the staff representatives is increased from 10 to 15.

And, if the monthly workforce according to the labor code reaches at least 50 employees during 6 months of the fiscal year, the company must set up a profit-sharing agreement for the fiscal year concerned.

Additional minor regulations apply as soon as the 50-employee threshold is breached.

This mandatory measures thus induce significant direct costs of dozens of thousands Euros for a typical firms (see below). If we exclude that profit-sharing schemes can increase the engagement of workers or that work councils can improve labor relations, these direct costs can make firm reluctant to growth over a 49.99 workforce.

2 Data sources and firm size variables

As our main contribution relies heavily on the comparison of different data sources to measure firm size, it is essential to describe precisely (i) how the information on firm size is collected or constructed in each source, and (ii) what size concept this information is supposed to measure.

2.1 Data sources

Fiscal Data FICUS (2000-2007). French firms are subject to different types of tax declarations depending on their activity: the *Bénéfices Industriels et Commerciaux* (BIC) covering most companies, the *Bénéfices non commerciaux* (BNC) for firms in non commercial activities (notaries etc.) and the *Bénéfices Agricoles* (BA) in the agriculture sector. FICUS is a compilation made by the French national statistical office, the *Institut National de la Statistique et des Études Économiques* (INSEE) of the firm tax returns in the two regimes BIC and BNC. Besides balance sheets and financial statements, firms report in an annex of these tax returns their size over the current fiscal year (usually corresponding to a calendar year, but not always). The size concept is the same in the different regimes: the size must be computed as the arithmetic average of the total number of employees present in the firm the last day of each trimester of the

fiscal year.[2] At each of these dates, all individuals having a working contract with the firm and directly paid by the firm must be included in the calculation, no matter their weekly working time or contract duration. Interim workers are however excluded from the calculation. The INSEE makes corrections to some of the raw balance sheet variables but not to firm size, which is left exactly as what employers have declared.

FICUS is the main data source used in most of the papers studying the cost of the size dependent regulations in France. Figure 2 (panel a) shows the distribution of this firm size for 2006. We observe a large spike at 48-49 employees, followed by a permanent drop in the number of firms above the 50-employee threshold. Similar patterns are observed for all other years between 2000 and 2005.

Fiscal Data FARE (2008-2015). FARE are the continuation of FICUS, extended to firms declaring under the BA regime. They contain the same information as FICUS except for a few variables. One important difference is that the INSEE replaces the raw size variable, which it considers of poor quality. The algorithm used for this correction is described in Béguin and Haag (2017), p. 188. It amounts to retrieving firm size from other sources when possible–the other source primarily used being the social security records DADS described below–and to only rely on firms' declaration when these sources are unavailable. Figure 2 (panel d) shows that in 2015, the drop in the density of firms at 50 employees is less pronounced for this corrected variable. This is also observed for other years between 2008 and 2014.

Registry data DIANE (2002-2015). DIANE are collected by the private firm Bureau Van Dijk from the registries of Commercial Courts; it is the French part of the Amadeus/Orbis European dataset. Firms are required to provide their balance sheet and financial statements to Commercial Courts. The statements are then public, except for micro-firms (less than 10 employees) since 2014, and for firms declaring less than 50 employees since 2016. In practice, some firms prefer paying fines rather than making their accounting information (or firm size) public. Over the period 2002-2015, between 30 and 40% of firms having between 30 and 70 employees are observed with non-missing employment in DIANE.[3]

The size concept reported in DIANE corresponds to the same definition as in FICUS or FARE. This variable comes from the raw declarations of firms as in FICUS (contrary to FARE)

[2]Firms have to fill only integer values in their fiscal declarations. While there is a written instruction for the monetary variables–rounded to the closest integer in Euro–, there is no instruction for the number of employee meaning that firms can declare its integer part; we assume hereafter that it is the case.

[3]Firms can be missing from DIANE either because they did not report their accounts or because the Bureau Van Dijk did not collect their reports. The second case seems more frequent (see section 4.2).

and is thus usually identical to the size variable declared in FICUS.[4]. The difference between FICUS and DIANE is that the latter variable is public. Panels c) and f) of figure 2 show the distribution of firm size in DIANE for years 2006 and 2015. We find again for both years the spike at 48-49 employees and the permanent drop in the distribution afterwards.

Fiscal Data BIC-RN (2008-2015). BIC-RN are the raw financial reports of firms subjected to the BIC (Manufacturing and Trade Industries) class.

Social Security data DADS POSTES (2002-2015). The DADS POSTES is constructed by the INSEE from compulsory declarations made annually by all employers for each of their employees. The main purpose of these declarations is to provide the different Social Security schemes with the earnings information necessary to determine workers' eligibility to benefits and to compute their levels, notably for pension schemes. The declarations are transmitted electronically using files generated by payroll management software certified by national standards, limiting the risk of manipulation or errors.

The INSEE transforms the raw DADS data into user files available to researchers under restricted access. For each calendar year it includes the beginning and end date of all job spells in all private sector firms, their type of contract (full time, part time), gross earnings, and the number of hours worked. The only source of employment we may miss is undeclared work, which remains limited in France and, as it will become clear from the results and discussion below, is unlikely to be used strategically to avoid the 50-employee threshold.

Each calendar year, the INSEE uses the DADS to compute a measure of the number of full-time equivalent employees present in each firm over that year and a head count of employees present on December 31^{st}. Panels b) and d) of figure 2 show the distribution of the full-time equivalent firm size computed by the INSEE for years 2006 and 2015. For both these years, We do not detect any clear pike or drop in the distribution around 50 employees. Similar observations can be made for all other years between 2002 and 2015 and for the INSEE headcount on December 31^{st}.

2.2 Firm size concepts and variables

Legal requirements applying at the 50-employee threshold are enshrined in different parts of the French law: the Labor code (*Code du Travail*) for all requirements directly related to workers' rights, the Social Security Code (*Code de la Sécurité Sociale*) for everything related to social

[4]Some discrepancies may arise when a firm made corrections between depositing its accounting information to the tax authorities and to the Commercial Court.

security contributions (including exemptions), and the Commercial Code (*Code du commerce*) or Tax code (*Code général des Impôts*) for other requirements. The firm size concept triggering additional obligations at 50-employee is not the same in these codes, as explained below.

Full-Time Equivalents (FTE) size. We call FTE size the number of hours worked in a firm during the entire year divided by the number of hours corresponding to a full-time job for the entire year in the firm. This is the firm size concept used by the *Code du Travail* and *Code de la Sécurité Sociale* during the period 2002-2015 (amid some minor differences in the included/excluded workers). Major regulations such as setting up a works council and a profit-sharing scheme depend on this size concept and apply from 50 employees onward (see Appendix F for the full list of regulations). In practice, during most of the period 2002-2015, to trigger these obligations, a firm must have reached the 50-employee threshold during at least 12 months over the past three years. From the first month when this is the case, firms have 12 month to comply with the law.

Fiscal size. We call fiscal size the integer part of the average of the headcount of employees taken at the end of each trimester of the fiscal year. This is the information reported by employers in tax returns. It is also the size concept used for regulations in the *Code du commerce* or Code général des Impôts.

Even if most analyses of the effects of the 50-employee threshold have so far primarily used this firm size concept and the corresponding variable in the fiscal data, in practice, up to recently, it only triggered two constraints for firms: the obligation to present a detailed version of the appendix of their annual accounts (e.g. including the remuneration of the members of the board of directors), and more importantly for the business companies, the necessity to have the accounting information certified by an external tax auditor.[5] Anecdotal evidence suggests that these regulations may not be for firm managers as cumbersome as those that depend on other firm-size concepts (see description below and additional details in Appendix F). More importantly, the size triggering the additional duties in the Commercial or tax codes is not at 50 employees but strictly above. This means that a firm declaring 50 employees is not subject to these additional constraints. Hence the regulations depending on the fiscal size cannot directly explain that firms overly declare a firm size at 48 or 49 employees rather than at 50 employees.

An additional problem when using fiscal size to study the cost of the 50-employee threshold is that the two regulations that depend on this threshold also depend on two other firm char-

[5] If the balance-sheet total or the turnover is large enough (e.g. resp. below 4 million and 8 million Euros in 2014).

acteristics (sales and balance sheet total), blurring the relationship between firm size and the corresponding requirements.

For the reasons above, we think that the FTE size might be better suited to study requirements applying at the 50-employee threshold. Nevertheless, the papers previously cited focusing on the 50-employee threshold rely on the fiscal size as their unique or main size concept, taking it either from FICUS (even if this source dates back to 2007 at the latest) or from DIANE.[6]

Using the DADS to measure firm size. We take advantage of the observation of all job spells in the DADS to reconstruct measures of the fiscal size and FTE size. Our reconstructed fiscal size corresponds exactly to the size concept declared by employers (in particular, we make sure it focuses on the same time period, see details on our algorithm in Appendix C).[7] Panels a) and c) of figure 3 show for years 2006 and 2015 its distribution between 30 and 70 employees. Contrary to what is observed for the fiscal size declared by employers, there is no detectable spike or discontinuity in the distribution around the 50-employees threshold.

We then also recompute a FTE size from the DADS. We do not use the FTE size directly provided by the INSEE because it excludes a large number of jobs that should be included in the legal FTE size concept.The legal FTE size concept actually also includes temporary employees (*salariés intérimaires*) working in the firm. This is the only type of workers we miss in our reconstruction because those workers are linked to their interim firm in the data, and we do not observe to which external firm they have been sent. As a consequence, our reconstructed FTE size is a lower bound of the FTE size at which apply the corresponding regulations. Panels b) and d) of figure 3 show for years 2006 and 2015 its distribution between 30 and 70 employees. There is no detectable spike or discontinuity in the distribution around the 50-employees threshold.

[6] Aghion et al. (2021) and Gourio and Roys (2014) exclusively use FICUS, Ando (2021) uses DIANE (from AMADEUS). Ceci-Renaud and Chevalier (2010) have compared the distributions of firm size obtained from the DADS and FICUS, but they could not provide a clear explanation for the observed differences. They eventually used FICUS to estimate the cost of the regulations applying at the threshold. (Garicano et al., 2016; Gourio and Roys, 2014) uses FICUS as the main source but it is actually the only paper we are aware of that does provide robustness results using the FTE size provided by INSEE in the DADS.

[7] The only difference may come from rounding. We assume that, absent of any clear instruction, employers have in general rounded to the integer below their firm size. If this is not the case, our measure provides a lower bound of the firm size declared by employers.

3 Under-declaration of firm size around the 50 employee threshold

We show in this section that a significant fraction of firms under-report their actual size to pretend they remain below the 50-employee threshold. We then explain why such under-reporting is made possible.

3.1 Evidence of under-declaration below 50 employees

To provide evidence that French firms did misreport their size in their fiscal declaration, we compare their declared size to our fiscal size variable constructed from the social security records, a source that cannot be easily manipulated. Figure 4 shows the proportion of firms between 30 and 70 employees reporting a fiscal size either identical, larger or smaller than the reconstructed one, as a function of the reconstructed fiscal size for all years 2002 to 2015 pooled together. We first observe that the proportion of firms for which what employers declare corresponds to our reconstructed variable is low–between 10 and 20%. Firms are then more numerous to "under-report" their workforce relative to our measure (between 50 and 70%) than to "over-report" it (between 20 and 40%). These results suggest that even when firms have no incentive to misreport their number of employees (around 30 or 40 employees for example), they are not able to provide a fully accurate measure. This might be because some firms fail to keep track correctly of a headcount of employment each past trimester, because they make rounding errors, or because they have a poor knowledge of the workers that should be included in the calculation and exclude some categories such as trainees.[8] Even though it is hard to see why it would be the case, we cannot finally completely rule out that measurement errors in our variable reconstructed from the DADS also contribute to the observed discrepancies between the two sources.

The key point in Figure 4 is however not the discrepancy between the two measures of fiscal size, but how this discrepancy varies at the threshold of 50 employees. The share of firms under-reporting their size according to our method increases from about 50% to 70% when size gets close to the 50-employee threshold, while the share of firms that over-report or report their size correctly falls by an equivalent amplitude.[9] This suggests that the difference between the reported headcount and the reconstructed headcount is not just related to approximations

[8] While the two rarely perfectly correspond, differences between the declared and recomputed fiscal size remain often limited. The difference is for example 0 or 1 in 51.4% of firms having a reconstructed fiscal size between 30 and 70 employees. It is of 2 employees or less in two thirds of these firms, and of 3 employees or less in three quarters of them.

[9] See Figure E2 for an investigation of the extent of under-reporting below 50 employees for distinct industries.

made one way or the other by employers. Indeed, if this were the case, one should not observe a jump in the probability to under-report the fiscal size exactly at the threshold where this under-reporting can enable firms to avoid some regulations.

In panel a) of figure 5, we push the exercise further and examine how the proportion of firms under-reporting their size by exactly one employee, or exactly two employees (and similarly up to six employees) varies with the reconstructed fiscal size. We observe a "stepped profile": the proportion of firms under-reporting by exactly 1 employee presents a jump at 50 employees, the one under-reporting by exactly 2 employees a jump at 51 employees, and so on. Whatever its magnitude, the under-estimation of firm size by the employer is observed to a larger extent exactly when it brings the reported firm size to 49 employees. Is this pattern of under-reporting to maintain the declared size at 49 employees still observed for larger reconstructed fiscal sizes? To find out, we replicate the exercise for under-reporting ranging from 7 to 12 employees (panel b), from 13 to 18 employees (panel c), and from 19 to 24 employees (panel d). The size of the under-reporting peaks become smaller as the extent of under-reporting becomes larger, but the peaks nevertheless remain clearly visible, suggesting that some firms continue to under-report their size even when they are more than 20 employees beyond the 50-employee threshold.

Additional checks. We are implicitly assuming that our reconstructed fiscal size variable does capture well the true fiscal size, allowing us to measure employers' under-reporting behavior.[10] We now challenge this central assumption and consider the hypothesis that employers do declare the true size, while the reconstructed firm size would simply be a noisy measure. The extra mass of firms at 48 or 49 employees would in that case be a real phenomenon, and the noisy measure we reconstruct would spread out this mass around the threshold.

If the hypothesis above is true, it is immediately clear that the difference between the two size variables only captures noise and should vary smoothly as a function of the true declared firm size around the threshold.[11] We reject this prediction on Figure E3, which shows a clear jump in the "noise" at 49 employees. Additionally, if the extra mass at 49 employees in the fiscal data were simply spread out due to noise in the DADS data, we should indeed see in Figure 5 a spike in the proportion of firms that "under-report" by exactly one when the reconstructed size is exactly 50, but we should observe symmetrically a spike in the proportion of firms that

[10] We provide in the next subsection additional arguments to support the idea that the reconstructed fiscal size variable is of high quality.

[11] The only reason why this would not be the case is that firms under-declare some workers to social security schemes strategically around the 50 employees threshold. As the enforcement of the main regulations at the 50-employee threshold actually does not depend of size measures in the social security records (see next section), there is absolutely no reason why this would be the case. Additionally, if anything, the evidence in Figure E3 would be consistent with over-declaration of workers to social security schemes around the threshold, not under-declaration.

"over-report" by exactly one when the reconstructed size is exactly 48. This is however not true empirically: Figure E4 shows that the proportion of firms that over-report by a fixed number of employees exhibits no spikes. Instead, it increases *permanently* when moving away to the right from 49 employees. Hence, we see that under-declaration and over-declaration by a fixed number of employees exhibit very different profiles when the reconstructed firm size varies around the threshold. This is not consistent with an absence of strategic behaviors by firms around the threshold.[12]

3.2 Is it costly to misreport firm size in the tax returns?

Garicano et al. (2016) argue that employers cannot cheat when they declare their employment to the fiscal authorities; follow-up papers take as given this claim. Now, it is at odd with our empirical results. This section globally reject it. To do so, we clarify the French institutional context and the actual content of the different data sources.

First, if lying to the fiscal authorities on fiscal claims can lead to heavy fines, it is known that the prison sentences are truly exceptional (Spire and Weidenfeld, 2015; Weidenfeld and Spire, 2017). But the crucial point is that the employment variable (named YP) declared to fiscal authorities is not in general a fiscal input used for the calculations of the taxes. Therefore, its misreporting if detected, has no impact on the paid taxes and cannot lead to a fine (see below).[13]

One can still claim that the fiscal authorities control this variable. However, the INSEE, which belongs to the same ministry as the fiscal authorities but enjoys a guarantee of independence clearly discards that. In the methodological guide of the FARE data (Béguin and Haag, 2017), the INSEE explains its choice to use the declared firm size only for filling missing observations: "the fiscal declarations contain an employment variable which it was obviously very tempting to use [...]. The experience of the previous system [FICUS] had unfortunately shown that this variable–not checked because it is generally not used by the DGFiP [French fiscal administration]–is of average quality and is not always filled in. (p.150, translation by authors)".[14] In addition, the employment variable filled in a fiscal declaration corresponds to

[12] On top of the empirical evidence provided here, We have also tried various data-generating processes with a true firm size distribution having a spike at 49 employees, and observed size measures capturing this true size plus a random noise. It appeared impossible to reproduce the patterns shown on Figures 4 and 5.

[13] A new tax, the CVAE (tax on the value added) had been introduced in 2010: it is collected for funding local communities. When a firm has facilities in different municipalities, the breakdown of the tax is proportional to the (non-weighted) headcount of employees who have worked at least one month in the past year in each facility. This headcount becomes a fiscal variable subject to fines because paid taxes depend on it. However, even in that case, the specific fine faced by employers in case of under-reporting remains very moderate: 200 euros per missing worker (Article 1770 decies of the tax code).

[14] Figure E1 in the appendix shows the difference between the raw fiscal variable and the one adjusted by the INSEE for years 2008 and 2015.

a size concept which is, as explained in section 2, out of the scope of both the Labor and the Social Security inspectorates; by contrast, their thousands of inspectors are focused on the fight against undeclared work: each individual worker must be correctly declared to the social security, implying that social security data is likely to provide much more accurate measures of firm size.

If the tracking of undeclared workers is a key mission of both the labor and Social Security inspectorates. their inspectors are not concerned by the size declared in the fiscal documents. As discussed above, this is in practice not likely to induce any direct cost, consistent with the fact that we indeed observe under-reporting empirically.

4 Non-compliance

Why would firms under-report their size at 49 employees? As most major legal requirements depend in principle on another size concept, it is not immediately obvious to see what the gains are. Our main point is that, by under-reporting their fiscal size, firms can avoid some of the major regulations applying at the 50-employees threshold. Indeed, we show that these regulations depend on the firm size, as it is declared by the employer, rather than the actual firm size, and we explain why this can be the case.

4.1 Firm size and the prevalence of work councils and profit sharing schemes

Works Councils Until 2017, all firms with an FTE size of 50 employees or more during more than twelve months over a three year period have to organize works council elections.[15] These elections occur in each firm subject to the legal requirement every two, three or four years, depending on the length of the mandates of the works council members. When they hold such an election, firms must transmit to the administration an official report ("*Procès verbal*") with the date and results of the election, as well as the mandate duration. All reports for elections held between 2009 and 2016 have recently been made publicly available by the administration in the so-called MARS dataset.[16] Combining the information on the election dates and the duration of the mandates, it is possible to know at each point of time between 2012 and 2016 which French firms had a work council.[17]

[15] After 2017 works councils were grouped with other representation bodies.

[16] They are available at `https://www.data.gouv.fr/fr/datasets/resultats-des-elections-professionnelles-periode-2013-2016/` and the most recent election results can also be directly consulted at `https://www.elections-professionnelles.travail.gouv.fr/web/guest/liste-des-pv`.

[17] We cannot go further back in time because a firm may have a work council in 2011 that has been elected in 2008, and we only observe elections since 2009. Note as well that in many firms, there are no candidates for the elections. In that case, firms still have to notify the administration (they send a report called *Procès verbal de carence*) and they do not have to organize a new election until the predefined mandate duration expires. We

Figure 6 shows the share of firms that have a works council (or organized a works council election) the next year, as a function of the reported fiscal size (panel a) and the reconstructed FTE size (panel b). The Figure is obtained by pulling together all years between 2011 and 2015. We consider the presence of a works council the following year because when it crosses the 50 employee threshold, a firm has 12 month to organize an election. We also keep only mono-establishment firms because it is a bit less straightforward to identify the presence of works councils from the election reports in multi-establishment firms.[18]

The figure clearly shows that the prevalence of works councils in firms jumps when the fiscal size declared by the employer reaches 50 employees (from about 25% to 60%), but not when the reconstructed FTE size reaches 50 employees. This is despite the fact that the FTE size corresponds to the size concept that legally triggers the requirement to have a works council. These results show that under-declaring its size at 49 employee can enable firms to avoid setting-up a works council. They also highlight a high degree of non-compliance with the law in general. More than one half of the firms whose FTE size is around 70 employees—well above the threshold—have not sent to the administration an election report. Similarly, not all firms declaring a fiscal size above 50 employees have a works council. It could be that some of these firms actually use as a reference the FTE size as required and that the FTE size remains below 50. It could also be that absent any request from workers or the labor inspectorate, some firms do not bother organizing an election or sending the corresponding report to the administration.[19].

We provide in Appendix E a number of robustness checks. First, Figure E5 examines the presence of work council the same year rather than the following one. Second Figure E6 includes all firms in the analysis rather than just mono-establishment firms. Third, to better take into account the dynamic aspects of the law, Figure E7 considers the presence of work councils as a function of the exact number of months for which the FTE size was above 50 during the three past years.[20] All these checks confirms the results in Figure 6.

count those firms as having complied with their legal requirements regarding work councils. See all details in appendix C

[18] In these firms, there must be a firm-level works council as soon as there is one in any of the establishments, allowing us to infer from the MARS establishment-level data work council at firm level (see Appendix C). However, the absence of direct information on the firm-level work council pushed us to remove multi-establishment firms in our baseline results.

[19] We note as well that the prevalence of works councils jumps in "two steps", first when the declared fiscal size reaches 50 employees, and again when it reaches 51 employees. This may be in part because some employers think that the legal requirement apply at 51 employees and not 50. There would be wrong twice. First, because they use the wrong size concept, and second, because they misunderstand the exact location of the threshold (see Askenazy, Breda and Pecheu (2022) for evidence supporting this interpretation)

[20] Figure E10 additionally provides for firms of different size the distribution of the number of month during the past three calendar years for which FTE size was above 50. The is in particular no evidence of bunching at 11 months in order to avoid setting up a works council.

Profit sharing. Besides works councils, all French firms with an FTE size of 50 are legally mandated to set up a profit sharing scheme called *Participation* which leads to a payment to workers when the return on equity is above 5 percent. Firm tax returns include a specific cell for the amounts disbursed in profit sharing every year. We can therefore directly observe if a firm has spent on profit sharing depending on its size. Figure 7 displays the proportion of firms that disburse in profit sharing as a function of declared and FTE size concepts (for calendar years 2002 to 2015 pooled together. It shows that the conclusions obtained for the work councils apply to profit sharing too.[21]

4.2 Robustness checks and additional results

Using the raw tax returns (BIC-RN). In our empirical analyses of the presence of work councils or profit sharing schemes, we have primarily used the DIANE data source for firm size. The rationale for this choice is that we know for sure that firms observed in DIANE have made their firm size public. A drawback is that we miss several firms. To check that our results are not driven by sample selection, we have replicated them using the raw tax returns in the BIC and BNC which are available in the BIC-RN database collected by the Ministry of Finance.[22] When we do so, hence focusing on the universe of private sector firms, our conclusions are maintained (see Figure E9 for the results on under-reporting and the presence of work-councils).[23]

Subsidies to small businesses. For several decades, the French state and local authorities have tried to help small businesses. As a consequence, crossing the threshold of 50 employees may not only imply new regulations for firms: it can also mean the loss of eligibility for certain aids or exemptions, which can be local or national. Firms may not want to grow—or appear as small—not because new obligations are imposed on them, but because they are deprived from opportunities for some public subsidies. New hires are for example exempt from social security contributions for one year for firms with less than 51 employees (and not 50) in some specific geographic units (the "*zones de revitalisation rurale*"). Holiday vouchers are also exempt from social contributions up to 400 euros per employee in firms with less than 50 employees. Early

[21] Figure E8 in the appendix shows the same difference on a sample restricted to firms with an ROE above 5%. This contributes to explain the low fraction of firms spending on profit sharing even when they declare more than 50 employees.

[22] We have also looked at the share of firms observed in DIANE as a function of the firm size declared in the raw tax returns, and checked that there is no discontinuity in the selection in DIANE at 50 employees.

[23] Recall that we cannot be sure that firms not observed in DIANE have not deposited their accounts to Commercial Courts. Hence, we cannot consider that these firms have not made their size public and it is difficult to know to what extent they start enforcing the regulations depending on the FTE size when they declare to the tax authorities a fiscal size above 50 because (i) they have actually made this size public and workers or other observers use the information to push firms to comply with the law, or because (ii) they have a poor understanding of the relevant firm size concepts and just use what they declare as the trigger for enforcing the law, even when they have not made this information public.

2022, 5 business support programs by the Capital Region (Ile de France) were opened only to firms with at most 49 workers.

These subsidies or exemptions for small businesses are actually often targeted to help them growing and eventually cross the 50-employee threshold. The legislator therefore tried to limit threshold effects, either by choosing a different one (51 instead of 50 employees), or by relying on pluri-annual subsidies that can remain long after a firm has crossed the 50-employee threshold. In total, the net effect of advantages or opportunities specific to small businesses on their growth when they reach the threshold is unclear. However, the fact that firms can also loose exemptions or subsidies imply that behavioral responses at firm-size thresholds may not only capture a reaction to additional regulations above the threshold, contrary to the assumption made by Garicano et al. (2016) and other papers.

4.3 A possible explanation

Why do we observe that two of the main regulations[24] depend on the wrong size concept, as it is (mis)reported by the employer? We argue that the explanation lies in two main factors: information asymmetries between the employer and other parties that have interest in having the regulations enforced, and the limited extent of actual controls of firm size.

Information asymmetries. The fiscal size variable provided by employers to commercial court registries is public; access is free and since the beginning of the century has been easily found on websites that provide the firm's workforce class size (20-49, 50-99, etc.). By contrast, trade unions outside a firm as well as individual employees have no possible access to the firm's personnel register or to its social security declarations. They are then unable to calculate the FTE firm size as defined in the Labor Code.

Even within the firm, access to the data required to calculate the workforce size is very restricted. The staff representatives do have access to the personnel register. However, although it provides an exhaustive list of staff, it does not contain, for example, the number of hours of part-time workers, which is essential for the weighting of the workforce according to the Labor Code. The only person actually allowed to access all that information by the Labor Code is an external auditor appointed by the works council (Baumgarten, 2012); so, there must already be a works council for the information to be available to workers! It is only since a decision of the French Supreme Civil Court (*Cour de Cassation*) in 2016 that trade unions present in firms

[24]See Appendix A for a comprehensive list of the regulations applying at the threshold. Another important one is the duty to set up a Health and Safety Committee, but in practice this requirement is related to the existence of a works council, so that we indirectly examine it. Other regulations are arguably more minor.

have had access to the data provided by the firm to the DADS prior to a works council election in order to know the employees allowed to vote for this election.

The rules above imply that, at least until 2016, trade unions, worker representatives and employees themselves could only rely on publicly available information on firm size to know whether they could request the creation of a work council or a profit sharing scheme. This information is actually likely to come from the employer's tax declaration given to commercial courts, explaining why this data source can become in practice the signal of the breach of the 50-employee threshold.[25] Such a setting in conjunction with the lack of sanctions for misreporting the fiscal employment can create strong incentives to under-report.

Controls. The logic above is reinforced by the lack of control of the FTE firm size. In contrast to employees or unions, the labor inspectorate can access the full firm data upon request. Do they use it to check the size of the company and the compliance to the labor law? We have screened thousands pages of reports of the French inspectorate to the International Labor Organization.[26] We did not find any evidence of size verification activity. More generally, according to these reports, the disputes raised by the French labor inspectorate on employee representation issues are only a few dozen per year. Most of the inspection activity focuses on clarifying to firms their legal requirements, the compliance with health and safety or minimal compensation regulations, and the fight against undeclared work.[27]

An example. The most cited recent jurisprudence on the computation of firm size at 50 finally provides a good illustration of the challenges related to the application of size-dependent regulations. The decision of the *Cour de Cassation* (Supreme Civil Court) was taken in June 2017.[28] The firm did not implement a profit-sharing plan in 2005, arguing that its size was below the 50-employee threshold. In the following years, the firm grew and eventually accepted both a profit-sharing plan and a works council. The works-council then mandated in 2009 an auditor for verifying the compliance with the profit-sharing regulation during the previous years. This auditor concluded that the size according to the definition of the labor code was above the threshold in 2004-2005. However, an extra auditor mandated by the employer nonetheless

[25] Firm size brackets according to yet another definition–headcount at the end of the calendar year–are also publicly available with a lag of two or three years in the *Répertoire Sirene*. Until 2017, extractions were provided by the INSEE as a costly commercial service.

[26] These reports are mandatory thanks to the ILO Labour Inspection Convention No. 81 of 1947. They are available online since 2000 at `https://travail-emploi.gouv.fr/demarches-ressources-documentaires/documentation-et-publications-officielles/rapports/article/rapports-l-inspection-du-travail-en-france`

[27] An efficient strategy for the labor inspectorate in order to identify non-compliers and optimize their controls would be to use the DADS data as we do here. So far, they have not taken this approach.

[28] https://www.legifrance.gouv.fr/juri/id/JURITEXT000034857950/

concluded that the size was below the threshold. Some workers went directly before a first court in 2009 to request the payment of the profit-sharing compensation. Neither the workers nor three different courts in charge of this case did ask the expertise of labor inspectors. Eventually, the Supreme Court retained the calculus of the auditor of the works council for 3 specific months, enough to prove that the floor was breached: in November 2004, 50.31 workers versus the 49.98 claimed by the employer's auditor, in January 2005, 50.00 versus 49.67, and in March 2005, 50.14 versus 49.33. This shows how heavy and lengthy procedures together with complex legal rules for the calculation of firm size can prevent workers from obtaining the enforcement of the law in a reasonable amount of time.

5 An attempt to reassess the cost of the 50-employee threshold

5.1 Discarding a theoretical approach

To be clear, we do not claim that the regulations at the 50-employee threshold have no welfare cost. Actually, if firms under-declare their size in order to avoid the regulations, it probably means that they are costly for them, or at least that they are perceived as such by the executive or the manager in charge of implementing them in the firm. Assessing the cost of the regulations in the presence of non-compliance is beyond the scope of this working paper. We nevertheless discuss briefly how this could be done.

One route that may seem natural would be to adopt a structural approach and to model explicitly non-compliance, assuming for example that firms can pay a cost to under-declare their true size, the cost being increasing with their real size. This is the approach followed by Moreau (2019). However, we are uneasy with this approach for two reasons. First, we think that firms' managers have personal incentives to avoid regulations, because they imply some delegation of their authority to workers through increased collective bargaining or social dialogue, and because they induce an important administrative direct cost involving tasks they may individually dislike. Inferring the costs of the regulations from the behavior of the CEO or manager in charge requires assuming that the firm's interests and profit-maximization objectives are perfectly captured by the behavior of the manager, a hypothesis we are not ready to make.[29] Second, we think that access to information (e.g. managers are more or less aware that they

[29]We are also uneasy with the necessary theoretical hypothesis that regulations (only) generate welfare costs that can be inferred solely from the observation of firm behavior. Regulations usually have an objective (e.g. fighting against tax fraud for regulations related to the auditing of accounting information, improve the balance of power across stakeholders for regulations about social dialogue, etc.) and impact several stakeholders. It is not clear to us that firms are able to internalize all the related costs and benefits. For example, there is an extensive literature on works councils and profit sharing, highlighting that these institutions have varying effects on firm performances.

can under-declare their size at no cost) and cultural factors (e.g. some managers respect the law because it is a matter of principle for them) are likely to play a big role in explaining the likelihood that a manager tries to avoid the regulations. Hence modeling non-compliance as the sole result of a pure cost-benefit calculation is likely to be misleading, making a theory-driven approach complicated.

We therefore take another route which is more reduced-form. It is not fully conclusive but provides various insights suggesting that the cost of the threshold and its effect on firm growth may not be very large.

5.2 Revisiting outcomes of firms on both sides of the threshold

In this section, we provide direct evidence on differences between firms that declare their size just below and just above the 50-employee threshold. The objective is in particular to examine if firms that declare their size just below the threshold (and potentially under-declare) are substantially different from other firms and potentially growth less.

Firm growth. We start by an examination of firm growth (in number of employees) as a function of firm declared size. Figure 8 shows that firms on both side of the 50-employee threshold grow on average by a similar number of employees. When growth is measured in terms of recomputed FTE size (right panel), we see clearly that firms declaring 49 employees do not grow less than those that declare having crossed the 50-employee threshold. When growth is measured in terms of declared fiscal size (left panel), we observe a small positive but not statistically significant discontinuity at the threshold, which is likely to reflect statistical noise (as statistical precision seems lower on this left graph). In particular, on both panels, we do not observe that firms that bunch at 48 or 49 employees grow substantially less. Hence, under-declaring its size at 49 employees does not seem to induce a lower growth, a point that we will more directly in the next subsection.

Interestingly, while the average growth does not vary around the 50-employee threshold, the distribution of the growth of declared size does so substantially. This is established by Figure 9, which shows the share of firms that stagnate (number of employees in t+1 is the same as number of employees in t), grow (more employees the next year) or downsize (fewer employees the next year) depending on their declared fiscal size. We see that firms just below the 50-employee threshold are 2 to 3 times more likely to declare they stagnate than those above the threshold or further below it. This is of course because declaring that they grow will make them cross the threshold, something we confirm directly on panel b which shows that firms at 49 employees are less likely to declare a number of employees the next year larger than the current one. Finally,

firms below the 50-employee threshold are less likely to downsize, consistent with the idea that some of them under-report their true size and do not need to adjust their declared size when their true size decreases. These patterns of growth in terms of declared fiscal size are however not observed when we examine the growth of the recomputed number of employees (right graphs on Figure 9).

Two conclusions emerge from the analyses above. First, firms below and above the 50-employee threshold grow similarly. Second, firms below the threshold tend not to report their growth to remain below the threshold, but as a consequence, they are also less likely to report downsizing.[30]

Financial performance. We also examine if firms on both side of the threshold differ in terms of (i) financial performance, (ii) economic performance, (iii) wages or social security contributions. We detail how we constructed these variables from firms' accounting information available in the tax returns in Appendix D. Figure 10 shows the results, both when size is declared by the employer (fiscal size, on the left of each sub-figure) and when it is recomputed by us (FTE size, on the right of each sub-figure).

We observe for declared size that firms on both side of the threshold are different in terms of profits per employee or measures of financial performance (Returns on Assets or Returns on Equity). We have checked that the discontinuity at 50 employees for the two ratios of financial performance is driven by the discontinuity of profits, which is the numerator of these ratios. Regarding profits per employee, they are around 6,400 euros per employee per year for firms declaring 40 to 49 employees, while they are only around 5,300 euros per employee per year for firms above the 50-employee threshold. The difference of 1,100 euros per employee is statistically significant (in standard RDD empirical specifications), and it represents a total profit loss of about 55 thousands euros. It appears that direct compliance with the two regulations as observed in Figures 6 and 7 can almost entirely explain this profit loss. The works council is granted a financial allocation of 0.2% of the total wage bill, which at 50 employee represents an average cost of about 29 thousands euros. The members of the works council and the union delegate usually appointed as well (five of them at 50 employees) are then granted statutory delegation hours for their representation activities (up to 1080 hours per year in total, i.e. two thirds of a full-time job, for five representatives). Pricing these hours at the average hourly wage cost for firms of 50 employees over the studied period (about 20 euros[31]), we find they

[30] Additional analyses presented in Figure E11 show that the distribution of growth in terms of number of employees over one year or 5 years is less dispersed for firms just below the threshold than for firms just above. Interestingly, this is also true to a small extent for the reconstructed fiscal size, suggesting some effect of the threshold on real firm size, which adjusts less from a year to the next around the threshold.

[31] Bourdieu and Breda (2016) show that on average, wages of workers' representatives do not differ strongly

represent a total cost in terms of contractual hours of another 21 thousands euros. Assuming that the prevalence of works councils at 50 declared employees jumps by 40 percentage points (see Figure 6), we get an extra cost of about 20 thousands euros, which combines the actual direct cost of works council and the variation in their prevalence at the threshold. Regarding profit sharing, we simply examine the discontinuity in the amount of participation paid (directly observed in the tax returns) at the threshold (results not shown) and find that it is around 20 thousands euros. Hence, together, partial compliance with works councils and profit sharing schemes at the 50-employee threshold can induce a direct cost of 40 thousands euros. This is close to the observed discontinuity in profits inferred from Figure 10, suggesting that the variations in profits or financial performance at the threshold is mostly explained by the fact that the two regulations we examine redirect some of the firms revenues toward workers. It is not immediately clear that this forced change in the split of revenues between shareholders and workers induces a large welfare loss. It would only be the case if the distribution of revenues at the left of the threshold was fully efficient. There are however clearly winners and losers: we see for example on panel (e) that the wage bill per employee jumps at the threshold (in terms of declared size), something that we can largely explain by the amounts received from profit sharing. An additional explanation that could also explain the drop in profits is that employers, anticipating the mandate to implement a profit sharing scheme when they reach 50 employees, may inter-temporally manipulate their profits, for example by resorting to more debt.

Economic performance and other outcomes. Turning to economic performance, we see that firms on both sides of the threshold (expressed either in terms of declared fiscal size or reconstructed FTE size) do not differ in term of value added per worker. Regarding TFP per employee, the same can be said when TFP is constructed using the FTE workforce to measure labor inputs. Instead, when one use the total wage bill to measure labor inputs (see details in Appendix D) as is customary, we observe a discontinuity at the threshold in terms of declared size which simply reflects the discontinuity observed for the wage bill per employee. Except this mechanical effect of the threshold on TFP transiting through the extra earnings obtained by workers, there is no detectable difference of economic performance at the threshold, no matter the variable we use to measure firm size. In particular, firms at the right of the threshold do not appear clearly more productive than those at the left, something one would expect if the threshold was implied a large cost that only the most productive firms could afford to pay.

We then observe that when firms declare 50 employees or more, they pay significantly more employer social security contributions (left of panel f), possibly because they loose some social

from those of their colleagues

security exemptions, as explained in section 4.2. The corresponding extra cost induced for the firm can also contribute to explain the drop in profits at 50 employees.

5.3 Comparison of firms that do and do not under-declare their size

We now compare firms that under-declare their size with firms that do not, in the fashion of an event study over time. To do so, we consider firms that have a reconstructed fiscal size between 50 and 54 employees a given calendar year c and split them in two groups: those that declare a size below 50 ("under-declare" below the threshold) and those that declare a size at 50 or above ("do not under-declare" below the threshold).[32] We exclude firms that declare less than 35 employees or more than 65 in year c (the year when the two groups of firms are defined) in order to avoid outliers. We then look at the past and future trajectories of firms from the two groups, both in terms of size (number of employees) and economic or financial performance. We do the analysis on data from 2002 to 2015.[33] To increase statistical power, we also systematically use the BIC-RN data that include the universe of private firms. For each of these years separately, we identify firms having a reconstructed fiscal size between 50 and 54 employees that do and do not under-report their size and track them over past and future years when possible. Hence, for each calendar year, we do construct a panel, with the "treatment" year $t = 0$ being defined as the year for which we define the two treatment groups. We then pool together all these panels (in order to increase statistical power) and include a calendar year fixed effect that identifies each of them. Note that if a firm is defined as "under-declaring" in several calendar year, we keep and track only the first occurrence. Hence a firm that under-declares its size is followed over time only once, that is the first time the under-declaration is observed. the The results we display are then time coefficients (relative to the calendar year for which we measure under declaration) in a regression with both calendar year fixed effects, time relative to treatment fixed effects, dummies controlling for the exact reconstructed fiscal size the "year of the treatment",[34] and a dummy for under-reporting interacted with each time relative to treatment dummy. We report the coefficients obtained for the latter interactions. We do not report results when $|t - c| > 11$, as there are too few observations to get statistically informative coefficients for these extreme points. Our empirical specification can be written:

[32]The latter group could potentially under-declare their firm size relative to the reconstructed fiscal size. However because what matters regarding compliance with the law is the position of the declared size with respect to the threshold, we assume that they do not under-declare *with respect to the regulation*. This could be an issue if employers (wrongly) believe that they should enforce the regulations at 51 employees.

[33]We cannot extend the analysis in the past because before 2002 the older DADS format does not allow us to reconstruct an FTE size.

[34]We keep the exact, not rounded fiscal size and include dummies for size groups of a quarter of a unit (from 50 to 50.25, from 50.25 to 50.50, etc.).

$$y_{jct} = \sum_{k=-11}^{k=11} \alpha_k \mathbb{1}_{\{t-c=k\}} + \sum_{k=-11}^{k=11} \beta_k \mathbb{1}_{\{t-c=k\}} \times T_{jc} + \gamma_c + \epsilon_{jct} \quad (1)$$

where y_{jct} is the outcome of interest for firm j which belongs to the panel defined in calendar year c (i.e. j is defined as under-reporting or not under-reporting in calendar year c) and observed in this panel in year t. Time to treatment is defined as $t - c$. γ_c denote the calendar year fixed effects. The coefficients β_k shows the average difference in outcome between firms that do and do not under-declare each year relative to treatment. We do not normalize the outcome to be identical at $t - c = 0$ in order to also observe differences between the two groups of firms the year where under-declaration is observed.

Figure 11 displays the results for measures of firm size, economic performance and financial performance. Consider first size variables. Firms that under-declare their size were growing (much) faster in the past relative to those that do not, both in terms of reconstructed size measures, and declared firm size. However there is no noticeable difference in future growth (panels a to c). This is consistent with the idea that under-declaring does not reduce firms' future growth. However, as both groups of firms were on very different growth trajectories before the under-reporting behavior is observed, no causal interpretation can be made from our results. The key insight from panels (a) to (c) in Figure 11 is actually that firms that under-report their size used to be much smaller in the past. This is consistent with the idea that these firms are less likely to have already crossed the 50-employee threshold in the past, something we directly verify on panels (d) and (e). Hence, the firms that under-report their size are more likely to reach the threshold for the first time, while those that do not are more likely to have already fluctuated around the firm-size threshold in the past. Finally, we see that 10 years after under-declaration is observed, firms that under-declare are almost as likely as firms that do not to both declare a fiscal and have a reconstructed size above the threshold. This shows that under-declaration is to a large extent a temporary phenomenon.

Turning to economic performance variables, we observe in years following the under-declaration a limited decrease in value-added per employee or TFP for firms that under-declare relative to those that do not. The reasons for this relative decrease are hard to identify. Maybe, the firms that under-declare their size loose in economic performance because they delay the application of legal constraints that actually have a positive effect of performance. Maybe the opposite is true: the firms that under-declare their size will likely apply the regulations in future years (as suggested by panel d) and this will reduce their economic performance. Without precise information on when the regulations are applied, and how long it takes for them to potentially affect firms' productivity, the two opposite scenarios are hard to tease out.

Finally, firms that under-report also experience a relative decrease in their financial performance for years following the under-declaration. This is consistent with the fact that they will eventually cross the 50-employee threshold, and experience a profit loss (as shown on Figure 10, panel a) that will in turn reduce their financial performance. Once again, regarding the difference in size pre-trends between firms that under-declare and those that do not, one should refrain from drawing any causal conclusions from these event study analyses. We can also note that the ROA exhibits a U-inverted curve with a top just before crossing the threshold; as already explained, this shape can be the result of a legal short-term accounting manipulation by firms, for example by playing with debts: the firm can maximise its profits before the mandatory implementation of the profit-sharing plan, and mechanically reduce them just after. The decrease of the financial performance could partly mirror this manipulation. They mostly highlight that the firms that under-declare their size were different from those that do not beforehand, and tend to become more similar afterwards (this is the case for most outcomes we examine).

6 Conclusion

This working paper shows that substantial number of French companies may under-report their fiscal workforce. A number of them do so when they cross the 50-employee threshold. This under-reporting behavior allows them to temporarily avoid the legal obligations that apply at the threshold, but, our RDD analyses at the threshold and event studies over a long time span suggest it might not affect substantially their performance or growth potential.

Why then would managers under-report the size of their firms? Various explanations can be put forward. Implementing the obligations is time-consuming and represents an immediate administrative cost to the business owner. In particular, a manager may not wish to pay these costs if the workforce exceeds the threshold only temporarily in order to cope with a one-off increase in activity. Under-declaration then appears to be a practical way of delaying by a few years the moment of applying the rules in force beyond the threshold. Second, the implementation of obligations leads to a loss of exclusive control of the managers over the firm since they imply that the employees or the public authorities will be able to interfere more in the management of the firm. Some managers may be reluctant to accept these constraints. Avoiding the regulations through under-reporting can finally be driven by the long-lasting political discourse that a social threshold is bad for business: suppressing the "costly" size-dependent rules at 50-employees was already a point of the economic program of the former French President Giscard d'Estaing for his lost presidential race for a second term in 1981. In

that perspective, the academic papers which conclude a deleterious impact of such regulations in France can also feed the fears from employers.

Our results cast doubts on the robustness of the literature that has attempted to estimate the cost size-dependent regulations in France without accounting for non compliance. We also question the approach that consists in taking advantage of distortions in the distribution of company size around the 50-employee threshold in order to estimate the overall economic cost of a set of disparate measures, while the effect of each of them in particular, and the way they affect the various actors in the company (employees, managers and shareholders) remain poorly understood.

The evidence of under-reporting behavior that allows firms to circumvent labor law finally invites us to rethink the way in which the legislator ensures that laws are respected. The implementation of complex regulations, based on concepts of workforce that are difficult to measure, combined with the absence of sufficiently well thought-out control procedures, largely explains the situation we have observed. The public authorities could, for example, systematically mobilise reliable data sources, as we are trying to do here, to monitor the size of companies.

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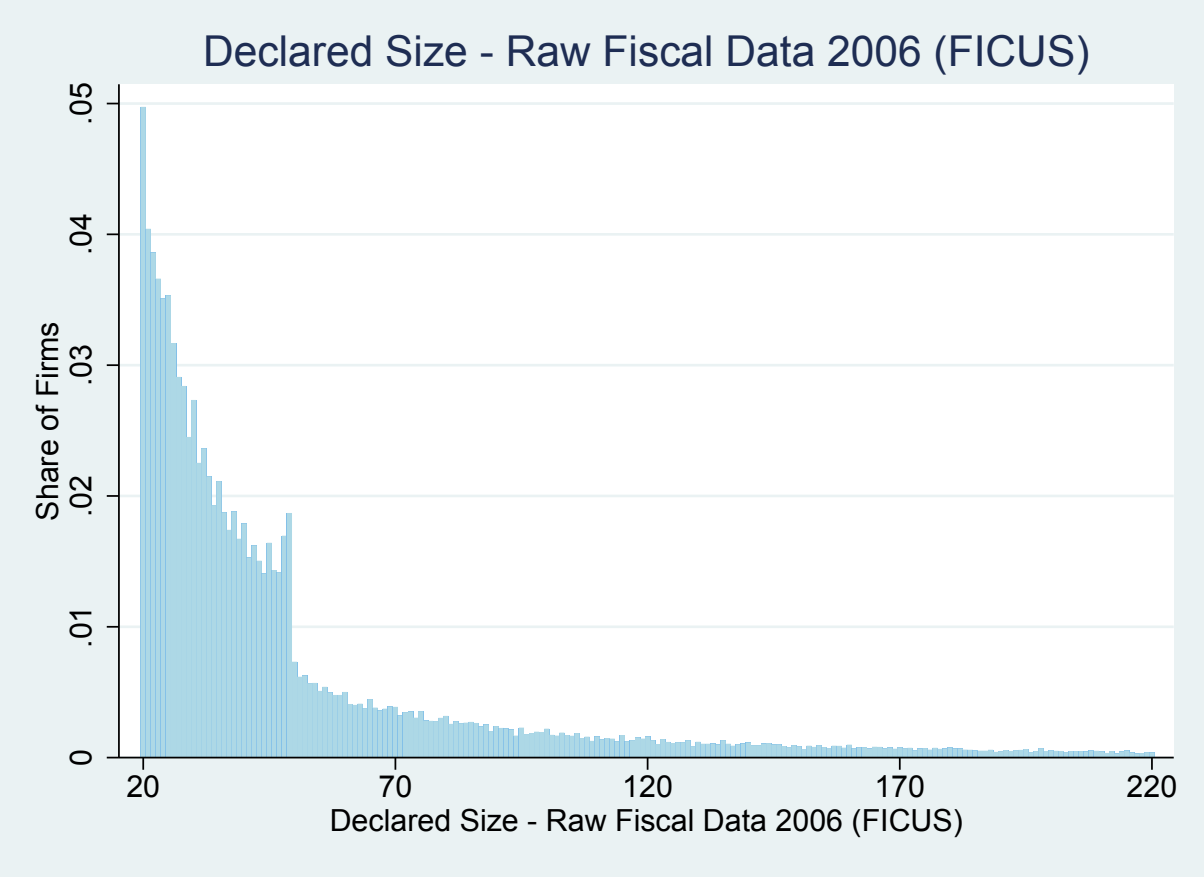
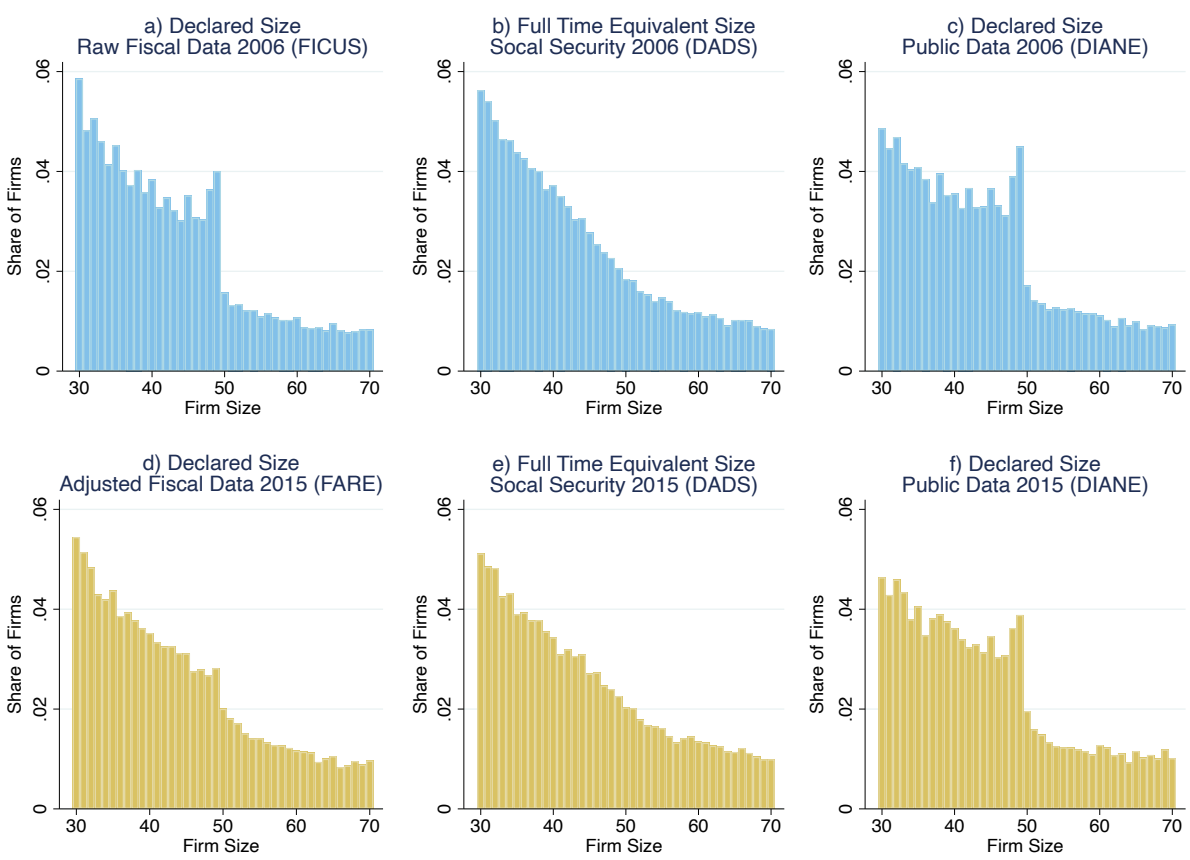
Figures and Tables

Figure 1: Firm Size Distribution for firms between 20 and 220 employees



Note: The figure displays the distribution between 20 and 220 employees of the firm size reported by employers to the fiscal administration in firm financial statements. See Section 2 for the detailed description of the size concepts and the data sources.

Figure 2: Firm Size Distribution for Administrative Databases



Note: The figure displays the distribution between 30 and 70 employees of firm size variables available from various data sources for years 2006 and 2015. In panel a), the firm size correspond to the one reported to fiscal administration in firm financial statements. The source is similar in panel d), but the variable has been corrected by the French statistical office (INSEE). In panels b) and e), firm size is reconstructed by the INSEE based on social security data gathering information on all employees with a working contract in each firm. In panels c) and f), firm size is the one provided by firms when they report their financial statements to commercial courts. See Section 2 for the detailed description of the size concepts and the data sources.

Figure 3: Firm Size Distribution for Reconstructed Databases

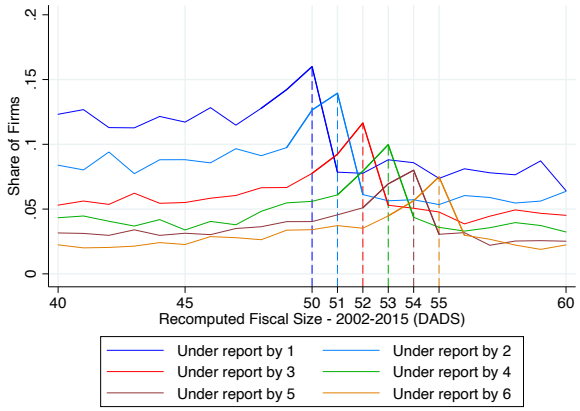
Note: The figure displays the distribution of our reconstructed firm size variables (fiscal size and FTE size) based on the DADS POSTES data for years 2006 and 2015. See Section 2 and Appendix B for details.

Figure 4: Under-Declaration by Reconstructed Fiscal Firm Size

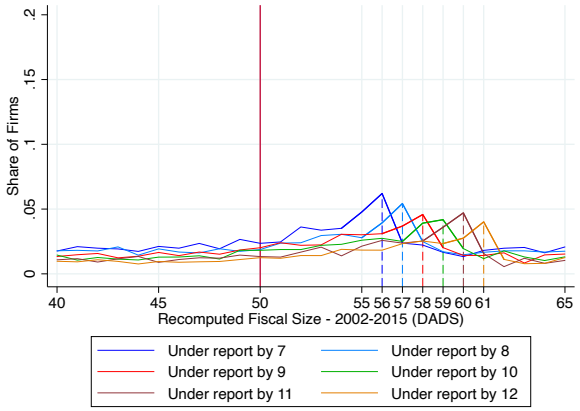
Note: The figure displays the share of firms that under-report their size (respectively over-report and report the same size) in their fiscal declarations relative to our the fiscal firm size reconstructed using the DADS data. Each series is computed by integer bin of our reconstructed fiscal firm size on pooled data from 2002 to 2015.

Figure 5: Under-Declaration by Reconstructed Fiscal Firm Size Split by Exact Amount Under-Declared

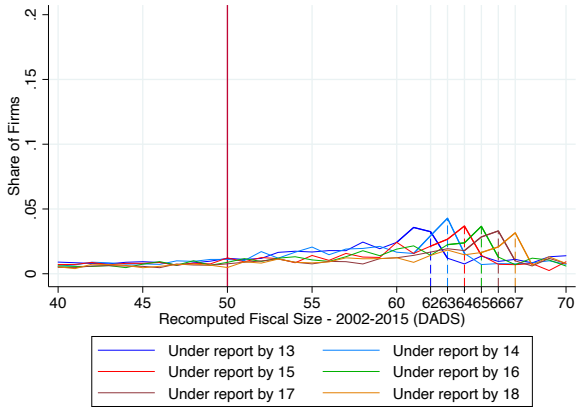
(a) 1-6



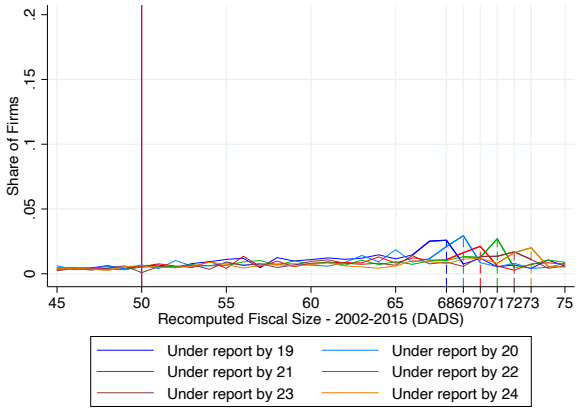
(b) 7-12



(c) 13-18

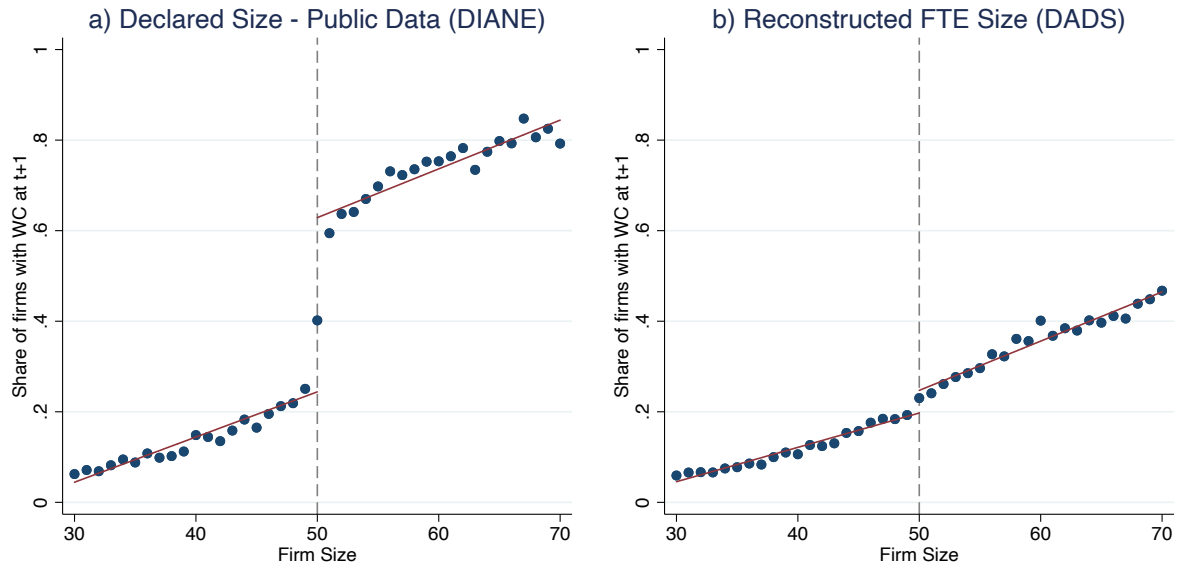


(d) 19-24



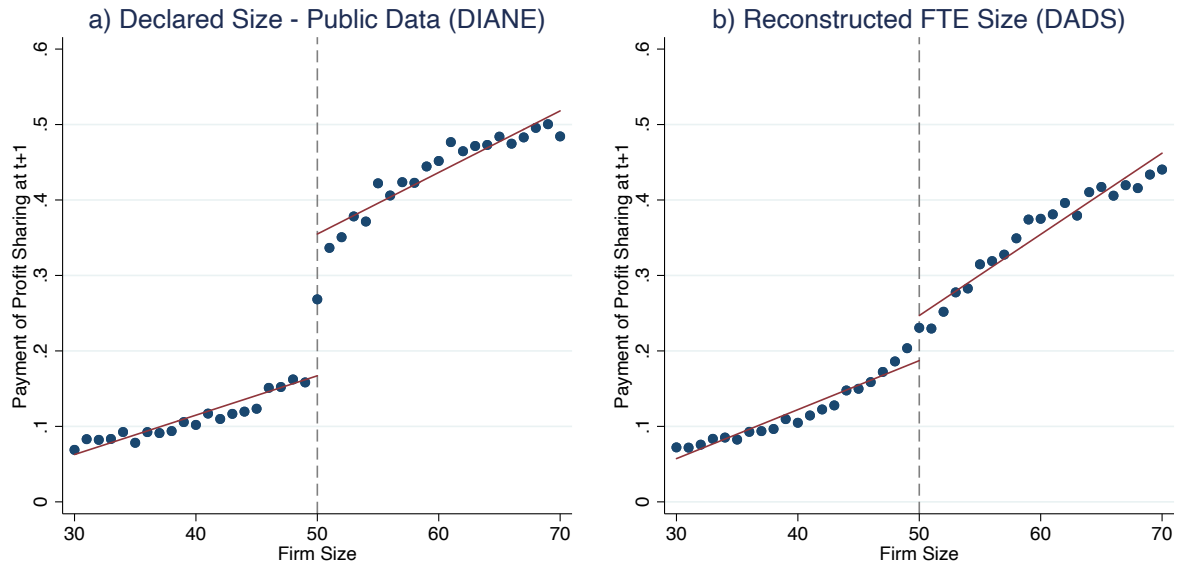
Note: The figure displays the share of firms that under-report their size by a given number of employees (ranging from 1 to 24) in their fiscal declarations relative to our reconstructed fiscal firm size from DADS data. Each series is computed by integer bin of our reconstructed fiscal firm size on pooled data from 2002 to 2015.

Figure 6: Presence of Works Council as a Function of Size



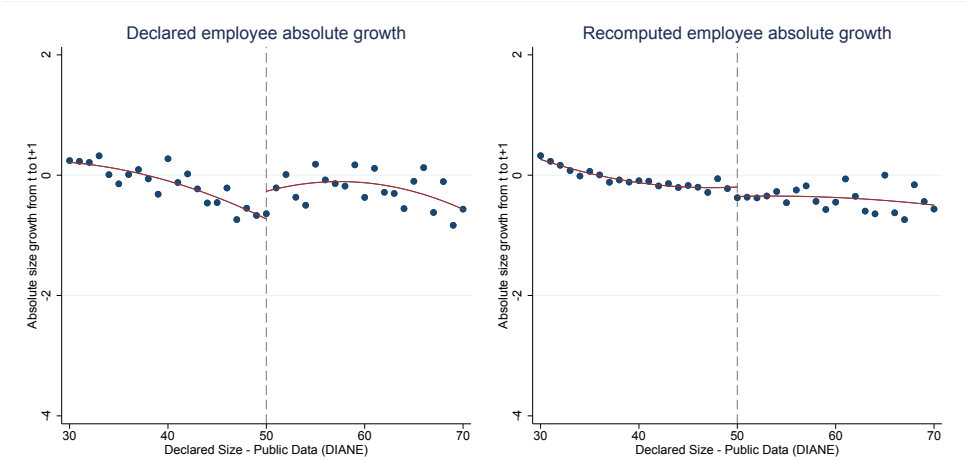
Note: The figure displays the share of firms that have a works council the year after, as a function of publicly declared fiscal firm size (DIANE), and of our reconstructed FTE size from the DADS. The sample is limited to firms with a single establishment. All calendar years from 2011 to 2015 are pooled together.

Figure 7: Presence of Profit Sharing Plan as a Function of Size



Note: The figure displays the share of firms that have paid profit sharing the year after, as a function of publicly declared fiscal firm size (DIANE), and of our reconstructed FTE size from the DADS. All calendar years from 2002 to 2015 are pooled together.

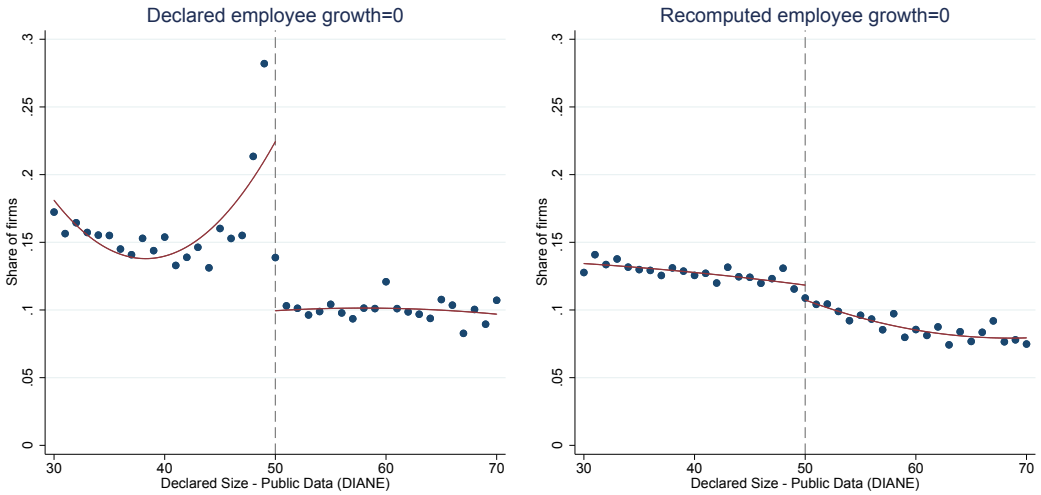
Figure 8: Average Growth by Declared and Recomputed Firm Size



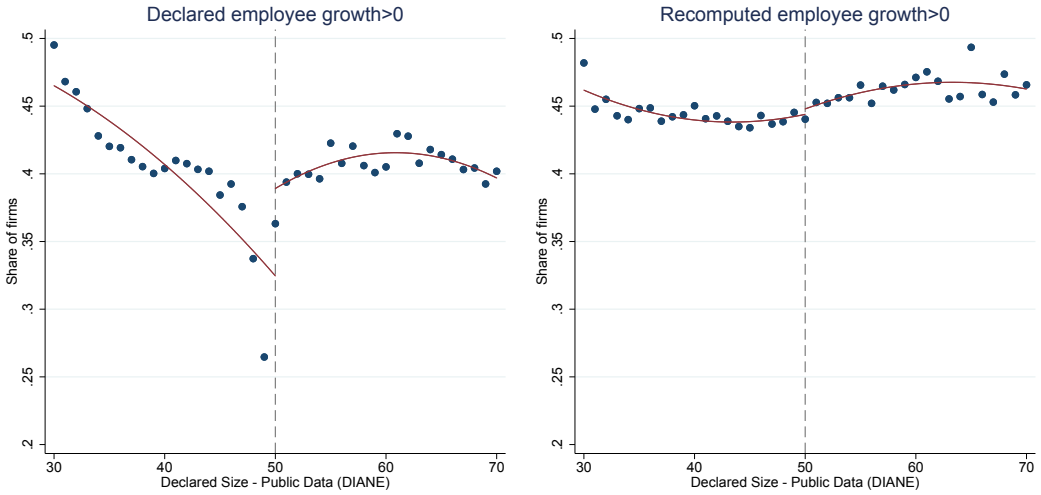
Note: The figure displays the results from observations pooled over 2002-2014. On the left panel, growth is computed based on the firm size declared by the employer in tax returns (FICUS and DIANE), on the right right panel, growth is computed using our recomputed FTE firm size.

Figure 9: Patterns of Growth by Declared and Recomputed Firm Size

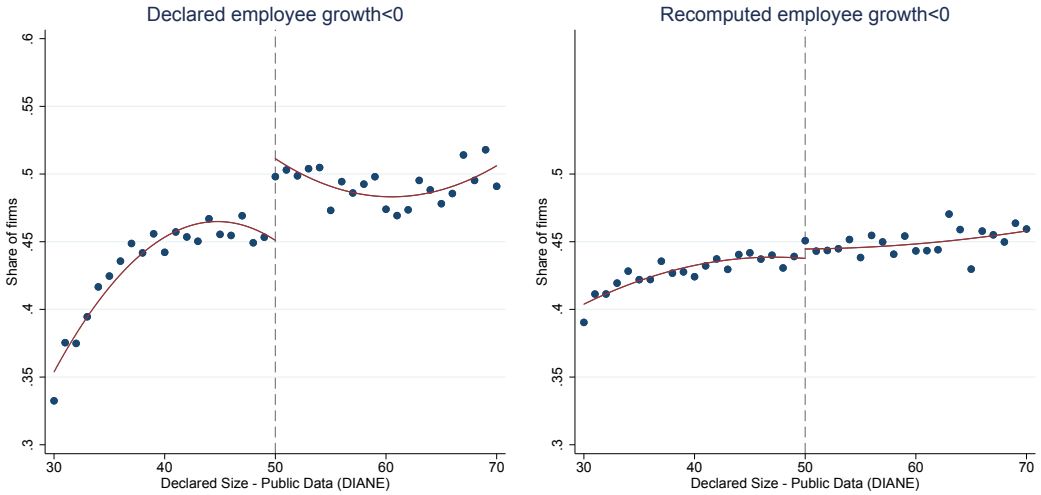
(a) Stagnate



(b) Grow



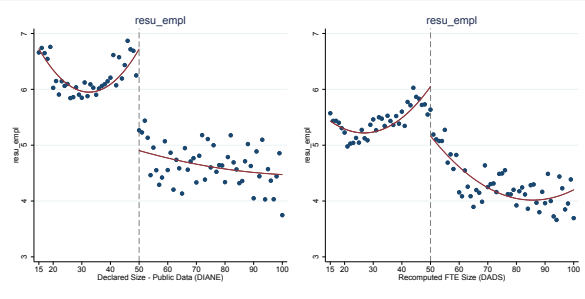
(c) Shrink



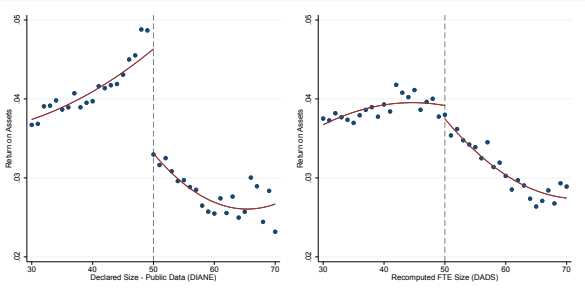
Note: The figures display the results from observations pooled over 2002-2014. On the left panels, growth is computed based on the firm size declared by the employer in tax returns (FICUS and DIANE), on the right right panel, growth is computed using our recomputed FTE firm size.

Figure 10: Performance Variables by Declared and Recomputed Size

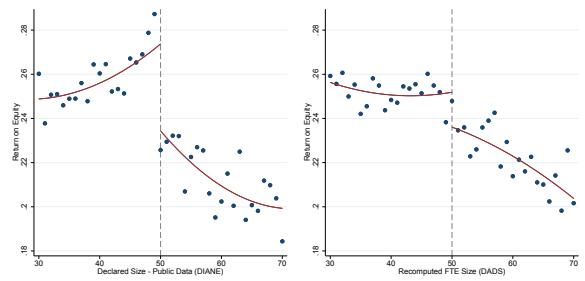
(a) Profits per Employee



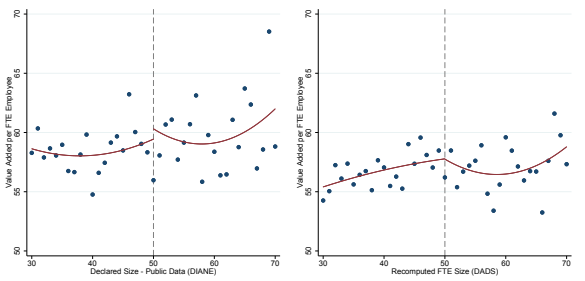
(b) Return on Assets



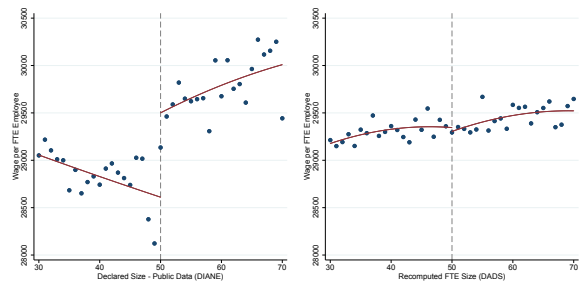
(c) Return on Equity



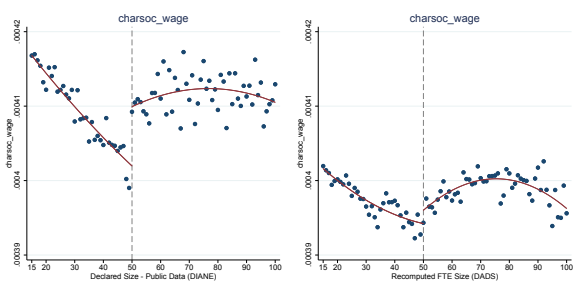
(d) VA per Employee



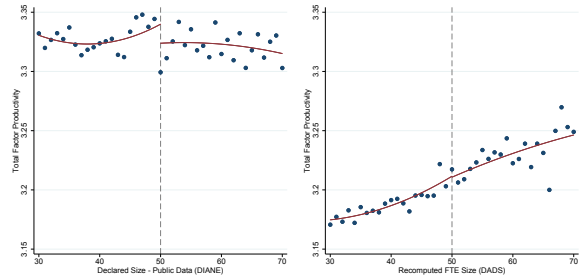
(e) Wage Bill per Employee



(f) Share of Employer Contributions in Payroll



(g) TFP per Employee



(h) TFP (Payroll) per Employee

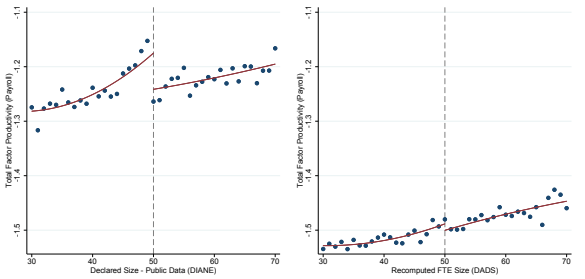
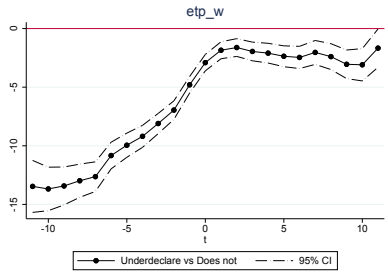
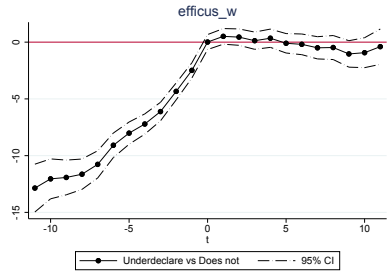


Figure 11: Event Study

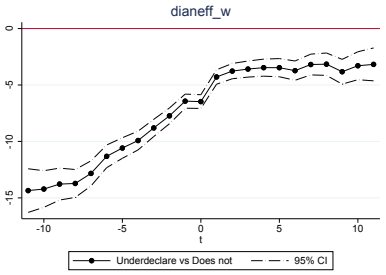
(a) Recomputed FTE Size



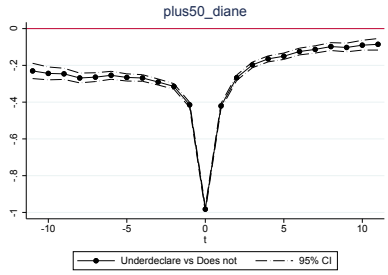
(b) Recomputed Fiscal Size



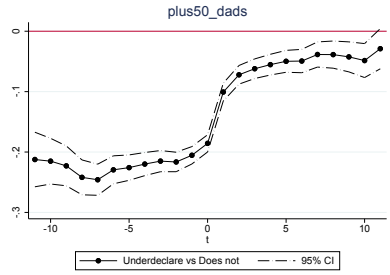
(c) Declared Size



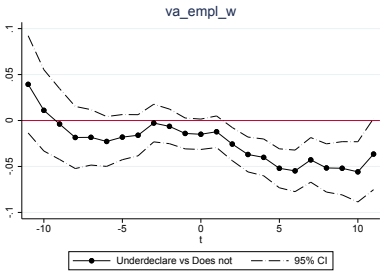
(d) Over 50 Declared



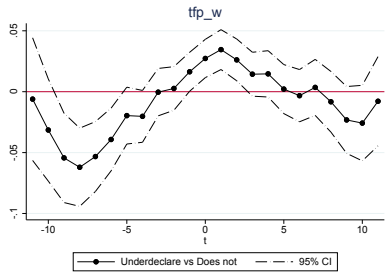
(e) Over 50 Recomputed



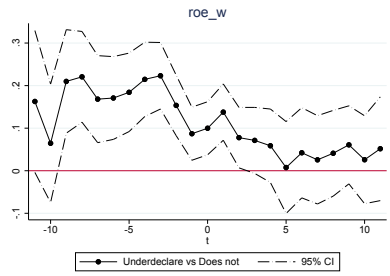
(f) VA per Employee



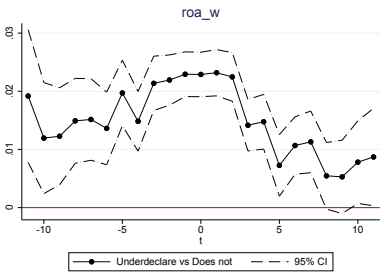
(g) TFP



(h) ROE



(i) ROA



Appendix to

Under-Declaration of Firm Size in France

Philippe Askenazy, Thomas Breda and Vladimir Pecheu

March 21, 2022

List of Appendices

Appendix A The changing definition of firm size according to the labor code from 1986

This appendix collects the articles of the labor code (translated by the authors) which define the firm size especially for the regulation of workers' representation and bargaining processes, from 1986 to late 2021. After a long period of stability from 1986 to 2004, a multiplicity of laws introduced changes mainly for excluding workers on subsidised short-term contracts.

Version in force from 12 August 1986 to 26 June 2004

Article L431-2

Employees under open-ended contracts, home workers and disabled workers employed in companies, sheltered workshops or home work distribution centres are fully taken into account in the workforce of the undertaking. Employees on fixed-term contracts, employees on intermittent contracts and workers made available to the company by an outside company, including temporary workers, are taken into account in the company's workforce in proportion to the time they have been present in the company over the previous twelve months. However, employees under fixed-term contracts, temporary contracts or contracts made available by an outside company are excluded from the workforce count when they replace an employee who is absent or whose employment contract is suspended. Part-time employees, regardless of the nature of their employment contract, shall be counted as part of the workforce by dividing the total number of hours recorded in the employment contracts by the legal working time or the contractual working time mentioned in the second and third paragraphs of Article L. 212-4-2.

Article L117-11-1

Apprentices shall not be taken into account in the calculation of the number of employees of the undertakings to which they belong for the application to these undertakings of the legislative or regulatory provisions which refer to a minimum number of employees, with the exception of those concerning the rating of occupational injuries and illnesses.

Version in force from 26 June 2004 to 03 August 2005

Article L620-10

For the implementation of the provisions of this Code, the number of employees of the undertaking shall be calculated in accordance with the following provisions. Employees holding a full-time open-ended contract and home workers are taken into account in full in the workforce of the undertaking. Employees with a fixed-term contract, employees with an intermittent

employment contract, workers made available to the company by an external company, including temporary workers, are taken into account in the company's workforce in proportion to the time they have been present during the previous twelve months. However, employees holding a fixed-term contract, a temporary employment contract or made available by an external company are excluded from the headcount when they replace an employee who is absent or whose employment contract is suspended. Part-time employees, regardless of the nature of their employment contract, are taken into account by dividing the total sum of the hours recorded in their employment contracts by the legal working time or the agreed working time.

Article L620-11

In order to calculate the number of employees of temporary work undertakings, account shall be taken, on the one hand, of the permanent employees of these undertakings, determined in accordance with the preceding article, and, on the other hand, of the workers who have been linked to them by temporary work contracts for a total duration of at least three months during the last calendar year.

Version in force from 03 August 2005 to 06 July 2007

Article L620-10

For the implementation of the provisions of the present code, the number of employees of the undertaking shall be calculated in accordance with the following provisions. Employees holding a full-time open-ended contract and home workers are taken into account in full in the workforce of the undertaking. Employees with a fixed-term contract, employees with an intermittent employment contract, workers made available to the company by an external company, including temporary workers, are taken into account in the company's workforce in proportion to the time they have been present during the previous twelve months. However, employees holding a fixed-term contract, a temporary employment contract or made available by an external company are excluded from the headcount when they replace an employee who is absent or whose employment contract is suspended. Part-time employees, regardless of the nature of their employment contract, are taken into account by dividing the total sum of the hours recorded in their employment contracts by the legal working time or the conventional working time. (An employee hired as from 22 June 2005 who is under the age of 26 shall not be taken into account, until he or she has reached the age of 26, in the calculation of the number of employees in the company to which he or she belongs, regardless of the nature of the contract binding him or her to the company. This provision may not have the effect of abolishing an institution representing the staff or a mandate of a staff representative. The provisions of this paragraph are applicable

until 31 December 2007 (1). NOTE (1): By decision n° 283892, 284472, 284555, 284718 dated 6th July 2007, the Conseil d'Etat ruling on the contentious issue annulled order n° 2005-892 of 2nd August 2005 which modifies the present article.

Article L620-11

In order to calculate the workforce of temporary employment undertakings, account shall be taken, on the one hand, of the permanent employees of these undertakings, determined in accordance with the preceding article, and, on the other hand, of the workers who have been linked to them by temporary employment contracts for a total duration of at least three months during the last calendar year.

Version in force from 06 July 2007 to 01 May 2008

Article L620-10

For the implementation of the provisions of this Code, the number of employees of the undertaking shall be calculated in accordance with the following provisions. Employees holding a full-time open-ended contract and home workers are taken into account in full in the company's workforce. Employees with a fixed-term contract, employees with an intermittent employment contract, workers made available to the company by an external company, including temporary workers, are taken into account in the company's workforce in proportion to the time they have been present during the previous twelve months. However, employees holding a fixed-term contract, a temporary employment contract or made available by an external company are excluded from the headcount when they replace an employee who is absent or whose employment contract is suspended, in particular because of a leave taken in application of Articles L. 122-26 or L. 122-28-1. Part-time employees, regardless of the nature of their employment contract, shall be taken into account by dividing the total sum of the hours recorded in their employment contracts by the legal working hours or the agreed working hours.

Article L620-11

In order to calculate the workforce of temporary work companies, account is taken, on the one hand, of the permanent employees of these companies, determined in accordance with the previous article, and on the other hand, of the workers who have been linked to them by temporary work contracts for a total duration of at least three months during the last calendar year.

Version in force from 01 May 2008 to 22 August 2008

Article L1111-2

For the implementation of the provisions of this code, the workforce of the company is calculated in accordance with the following provisions: 1° Employees holding a full-time permanent employment contract and home workers are fully taken into account in the company's workforce; 2° Employees holding a fixed-term employment contract, employees holding an intermittent employment contract, employees made available to the company by an external company, including temporary employees, are taken into account in the workforce of the company in proportion to their time of presence over the previous twelve months. However, employees holding a fixed-term employment contract and employees made available by an external company, including temporary employees, are excluded from the headcount when they replace an employee who is absent or whose employment contract is suspended, in particular because of maternity leave, adoption leave or parental leave; 3° Part-time employees, regardless of the nature of their employment contract, are taken into account by dividing the total sum of the hours recorded in their employment contracts by the legal working hours or the agreed working hours.

Article L1111-3

The following shall not be taken into account in the calculation of the number of employees of the undertaking 1° Apprentices ; 2° Holders of an initiative-employment contract, for the duration of the agreement provided for in Article L. 5134-66 ; 3° Holders of an insertion-minimum activity income contract, for the duration of the agreement provided for in Article L. 5134-75; 4° Holders of an employment support contract; 5° Holders of a contract for the future; 6° Holders of a professionalisation contract until the end of the contract when it is for a fixed term or until the end of the professionalisation action when the contract is for an indefinite term. However, these employees are taken into account for the application of the legal provisions relating to the rating of occupational injuries and illnesses.

Version in force since 22 August 2008

Article L1111-2

For the implementation of the provisions of this code, the workforce of the undertaking shall be calculated in accordance with the following provisions: 1° Employees holding a full-time permanent employment contract and home workers are fully taken into account in the workforce of the undertaking; 2° Employees holding a fixed-term employment contract, employees holding an intermittent employment contract, employees made available to the company by an external company who are present on the premises of the user company and have been working there for at least one year, as well as temporary employees, are taken into account in the workforce of the company in proportion to their time of presence over the previous twelve months. How-

ever, employees holding a fixed-term employment contract and employees made available by an external company, including temporary employees, are excluded from the headcount when they replace an employee who is absent or whose employment contract is suspended, in particular because of maternity leave, adoption leave or parental leave; 3° Part-time employees, regardless of the nature of their employment contract, are taken into account by dividing the total sum of the hours recorded in their employment contracts by the legal working hours or the agreed working hours.

Version in force 22 August 2008 to 01 January 2010

Article L1111-3

The following shall not be taken into account in the calculation of the number of employees of the undertaking 1° Apprentices ; 2° Holders of an initiative-employment contract, for the duration of the agreement provided for in Article L. 5134-66 ; 3° Holders of an insertion-minimum activity income contract, for the duration of the agreement provided for in Article L. 5134-75; 4° Holders of an employment support contract; 5° Holders of a contract for the future; 6° Holders of a professionalisation contract until the end of the contract when it is for a fixed term or until the end of the professionalisation action when the contract is for an indefinite term. However, these employees are taken into account for the application of the legal provisions relating to the rating of occupational injuries and illnesses.

Version in force from 01 January 2010 to 01 November 2012

Article L1111-3

The following are not taken into account in the calculation of the company's workforce 1° Apprentices ; 2° Holders of an initiative-employment contract, for the duration of the agreement provided for in Article L. 5134-66; 3° (Repealed) ; 4° Holders of an employment support contract for the duration of the agreement mentioned in Article L. 5134-19-1; 5° (Repealed) ; 6° Holders of a professionalisation contract until the end of the term provided for in the contract when it is for a fixed term or until the end of the professionalisation action when the contract is for an indefinite term. However, these employees shall be taken into account for the application of the legal provisions relating to the rating of occupational injuries and illnesses.

Version in force from 01 November 2012 to 01 January 2016

Article L1111-3

The following are not taken into account in the calculation of the company's workforce: 1° Apprentices ; 2° Holders of an initiative-employment contract, during the period of allocation

of the financial aid mentioned in Article L. 5134-72 as well as holders of an employment access contract during the period of allocation of the financial aid mentioned in Article L. 5522-17; 3° (Repealed) ; 4° Holders of an employment support contract during the period of allocation of the financial aid mentioned in Article L. 5134-30; 5° (Repealed) ; 6° Holders of a professionalisation contract until the end of the term provided for in the contract when it is for a fixed term or until the end of the professionalisation action when the contract is for an unlimited term. However, these employees shall be taken into account for the application of the legal provisions relating to the rating of occupational injuries and illnesses.

Version in force since 01 January 2016

Article L1111-3

The following are not taken into account in the calculation of the company's workforce: 1° Apprentices ; 2° Holders of an initiative-employment contract, during the period of allocation of the financial aid mentioned in Article L. 5134-72; 3° (Repealed) ; 4° Holders of an employment support contract during the period of allocation of the financial aid mentioned in Article L. 5134-30; 5° (Repealed) ; 6° Holders of a professionalisation contract until the end of the contract when it is for a fixed term or until the end of the professionalisation action when the contract is for an indefinite term. However, these employees are taken into account for the application of the legal provisions relating to the rating of occupational injuries and illnesses.

Appendix B Data

Fiscal Data FICUS (2000-2007). Ficus reports the data contained in financial reports of firms subjected to the BIC (Manufacturing and Trade Industries) an BNC (Non Tradable Industries) classes. Besides balance sheets and income statements, firms report in an annex their average size over the financial year.

Fiscal Data FARE (2008-2015). FARE are the continuation of FICUS, extended to BA firms (Agriculture). They contain the same information as FICUS except for a few variables. One important difference is that the French public statistic administration INSEE retreats the raw size variable, which it deems inconsistent. The algorithm used to retreat the variable is described in **?**.

Fiscal data DIANE (2002-2015). DIANE are collected by the private firm Bureau Van Dijck from the registries of Commercial Courts. Firms are required to deposit their financial statements in Commercial Courts or they are subject to sanctions. The statements are then public, except for micro-firms (less than 10 employees) since since 2014 (and for firms declaring less than 50 employees since 2016). The size measure reported in DIANE should be the same as the one in FICUS, unless the firm reports different statements to the Commercial Court.

Fiscal Data BIC-RN (2008-2015). BIC-RN are the raw financial reports of firms subjected to the BIC (Manufacturing and Trade Industries) class.

Social Security Employment data DADS (2002-2015). Each year, every French firm with employees has to report a series of information relative to their workforce and their establishment. These include the beginning and end date of employment of each employee, the type of contract (full time, part time), the amount of compensation, the number of hours worked. The INSEE then computes firm size measures: the headcount of employees on December 31^st and a full time equivalent size.

Reports of Elections of Worker Representatives MARS (2009-2016). The French legal system mandates all firms with more than 10 employees to organize every 2 to 4 years, elections of worker representatives (as well as Works Council elections for firms with more than 50 employees). The MARS data report the results of these elections over the two cycles 2009-2012 and 2013-2016. They allow identifying firms with Works Councils after 2012.

Appendix C Reconstruction of Firm Size Measures

C.1 Data Sources

The databases we use are described in the main text. The data sources FICUS, FARE, DADS, and BIC-RN were all accessed through the CASD secure data center. Firm size from DIANE comes from two distinct extractions. The first was done early 2012 for the years 2006-2010 at the Paris School of Economics by one of the authors. The second is an extraction from Orbis realized on 11th February 2020 for years 2010-2017, keeping each of these years all firms declaring a fiscal size between 5 and 500 employees.

C.2 Reconstruction of the Declared Fiscal Size

We use the DADS POSTES database for years 2002 to 2015 (before 2002, the start and end dates of jobs spells are not reported) to recompute the firm size measure that employers are asked to report in their financial statements. They are asked to report "the arithmetic average of the number of employees at the end of each quarter of the fiscal year"[A.1]. These are "all individuals with a labor contract and directly paid by the firm", and thus exclude temporary workers employed by other firms.

The DADS POSTES record all employment spells inside every French firm each year. They contain the beginning and end dates of each contract. Combined with the end date of the fiscal year reported in financial statements (FICUS and BIC-RN), we can compute the headcount of the number of employees present at the end of each quarter of the fiscal year, and hence recompute the size measure that should be reported in the firms' financial reports. We treat each year of financial statements separately. The date of reporting is recorded in a DDMMYY format. We drop observations with missing months or days as well as those reporting different years (around 2.9 percent of observations, of which 99 percent are firms with less than 20 employees). We also drop observations with two statements attached to the same firm identifier (between 0 and 0.02 percent of observations. For 0.8 percent of observations only the month and day of the statement are reported. We keep those firms and assume they report for the year of the data. In order to match the DADS date format, we transform dates to a 360-day calendar year where every month lasts 30 days. We use the following formula: new day number = round(old day number / number of days of the month of report $\times$ 30). XX percent of observations report wrong numbers for the last day of the month (31 instead of 30, or 29, or 30 in the case of February). We correct these by coding them all as 30 in the new date format.

[A.1] variable YP of the form

The end-of-quarter dates are then computed by simply adjusting the month number, which is the additional advantage of having converted the date format.

In a second step, we match these dates to the DADS data of the same and adjacent years. We need to do that for two reasons. First, for firms declaring an end of fiscal year before October 1st, at least one of their previous quarters ends the year before the year of the statement. Second, a small percentage of firms (less than 10 percent) compensate some of their employees with a month of delay, so that their December payroll is declared the year after. We therefore need the headcount in January of the following year for these firms that end their fiscal year in December but whose workforce is observed with a one month delay in the DADS. The end-of-quarter firm size is then the sum of employees whose employment contract spans over the end-of-quarter date. In the process, we make sure that employees that may have worked in multiple establishments in the same firm over overlapping periods are not counted twice. The recomputed fiscal size is the integer part of the arithmetic average of the four end-of-quarter firm sizes.

C.3 Reconstruction of the full time equivalent firm size

The DADS firm level data provides a full time equivalent (FTE) firm size variable that has been computed by the INSEE. This variable does not include employees working very few hours or having a compensation that is too small, which constitute about a quarter of jobs. We therefore construct an alternative FTE size variable closer to the legal concept (see main text) based on all employment contracts using the DADS POSTES dataset. Our goal is to construct a firm size that is as close as possible to the size concept used by the administration to determine whether a firm has reached the 50 employee threshold. We count an employee as one full-time equivalent if he or she has worked more than a number of "reference hours" over the year. If the employee has worked less, we divide her number of hours worked during the year by "reference hours" to calculate her contribution to the FTE firm size. For reference hours, we use the definition used by the INSEE and provided in the documentation of the DADS. Reference hours are defined separately for each 4-digit industry times broad firm-size category (less than 20 employees and between 20 and 1000 employees) as the 75th percentile of the distribution of contractual paid hours among all employees working the whole year in a firm in the corresponding 4-digit industry and firm-size category. For firms with more than 1000 employees, reference hours are computed as the 75th percentile of distribution of paid hours of all employees working the whole year but without categorizing by industry. Firm FTE size for a given calendar year is finally the sum of the FTE measure of all employees that have worked for the firm at some point during

the calendar year. Note that our reconstructed FTE size might be marginally noisy since the legal FTE size concept is based on the number of hours stated in the labor contract, while our measure may also include supplementary hours for part-time workers (the DADS does not distinguish complementary and contractual hours).

C.4 Reconstruction of the monthly full time equivalent size measure

Monthly FTE size is the same concept as the annual one but applied to monthly hours. The DADS POSTES report the number of days worked by an employee in a given month but hours are only reported annually. We thus compute a second-best FTE monthly size based on the number of days spent working in a month, but also on hours worked during the total employment period relative to the measure of reference hours adjusted to this duration. Monthly FTE firm size is then the sum of FTE employees working in the firm in a given month.

C.5 Construction of the Variable Measuring the Presence Works Council

The MARS dataset contains the information on works council elections of all firms that transmitted their officials reports to the administration from 2009 onward. All firms are required to report them. Elections need to be held every four years, unless a prior industry-level or firm-level collective agreement has reduced this time span to two or three years. This implies that over the period 2009-2012, all firms that have had a works council in the past and are still required to have one must have held an election. We are thus able to construct an exhaustive measure of the presence of a works council inside every French firm from 2012 onward by inferring that firms that did not report any election between 2009 and 2012 do not have a works council in 2012. Note that firms that have organized elections but did not have candidates among the workforce must also report this outcome to the administration by providing a *PV de carence*. We therefore observe these firms that do not have proper works councils and we count them as if they have one for the duration of the mandate because they have complied with the law. The situation is a bit more complicated for multi-establishment firms because elections are only reported at the establishment level, but not all firms hold elections inside all of their establishments the same year, and there exist establishment-level works councils alongside firm-level works councils (whose members and existence depends on the establishment-level works council). Consistent with what stipulates the law, we assume that an election at the establishment level automatically means the presence of a works council at the firm-level. Hence a multi-establishment firm is considered to have a works council as long as one of its establishments does. To make sure that this does not drive results, our main analysis focuses on single-establishment firms, but we

perform robustness checks on the sample including multi-establishments firms as well.

Appendix D Construction of variables of economic or financial performance

Wage Bill These are all salaried treatments paid to employees, including bonuses and financial participation schemes. They are net of employer contributions.

Profits These are accounting profits reported in the tax returns.

Return on Equity Profit divided by the value of equity reported in tax returns.

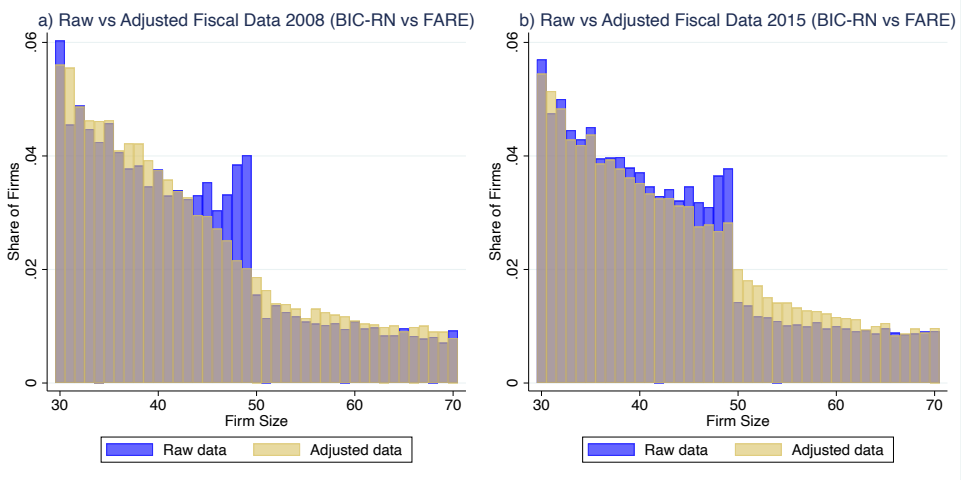
Return on Assets Profit divided by the value of assets reported in tax returns.

Total Factor Profuctivity (TFP) TFP is computed as the exponential of the residual of a regression of value added on tangible assets and FTE size (all variables in logarithm). Variables are censored at 1% and 99%.

Total Factor Profuctivity Payroll Computed as the other measure of TFP but using payroll instead of FTE size.

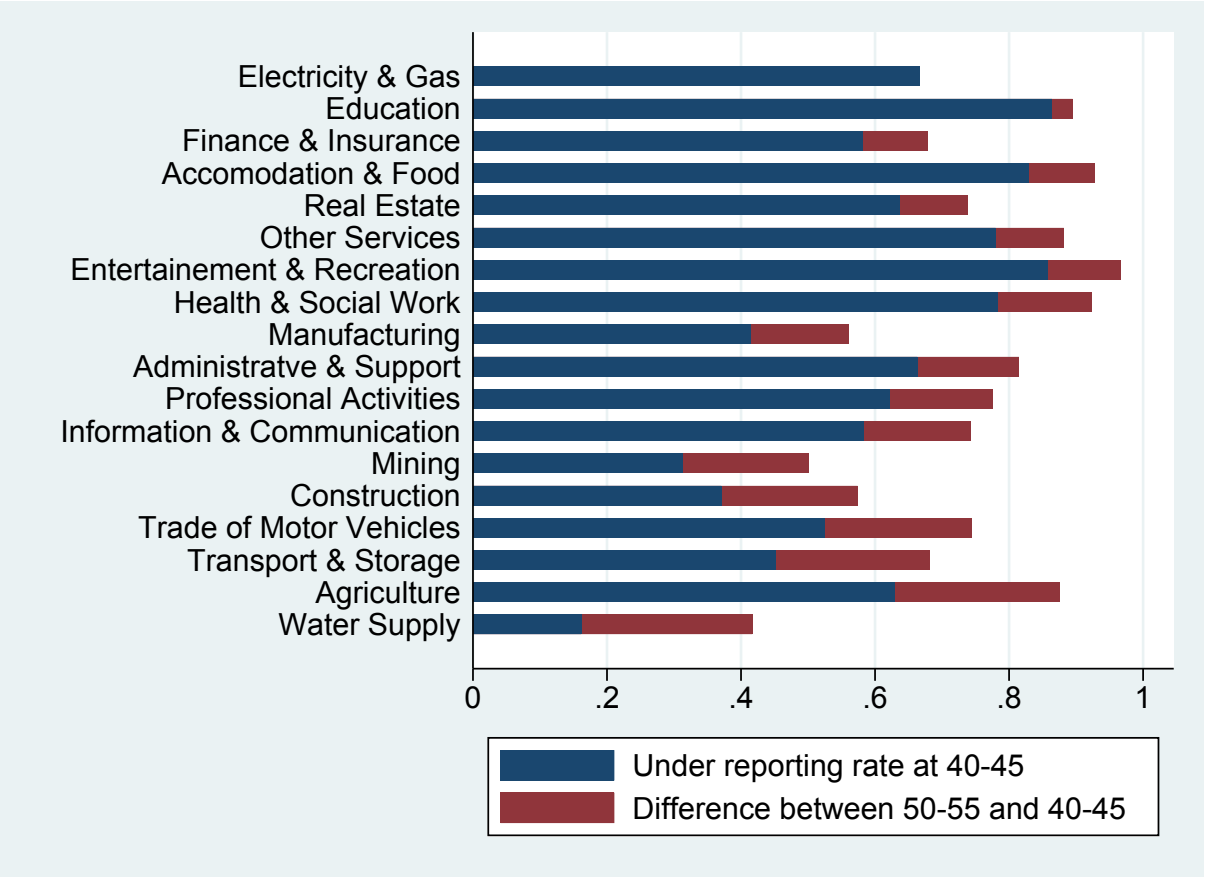
Appendix E Supplementary Figures

Figure E1: Difference between the distribution of Raw and INSEE-Adjusted Fiscal Size in 2008 and 2015



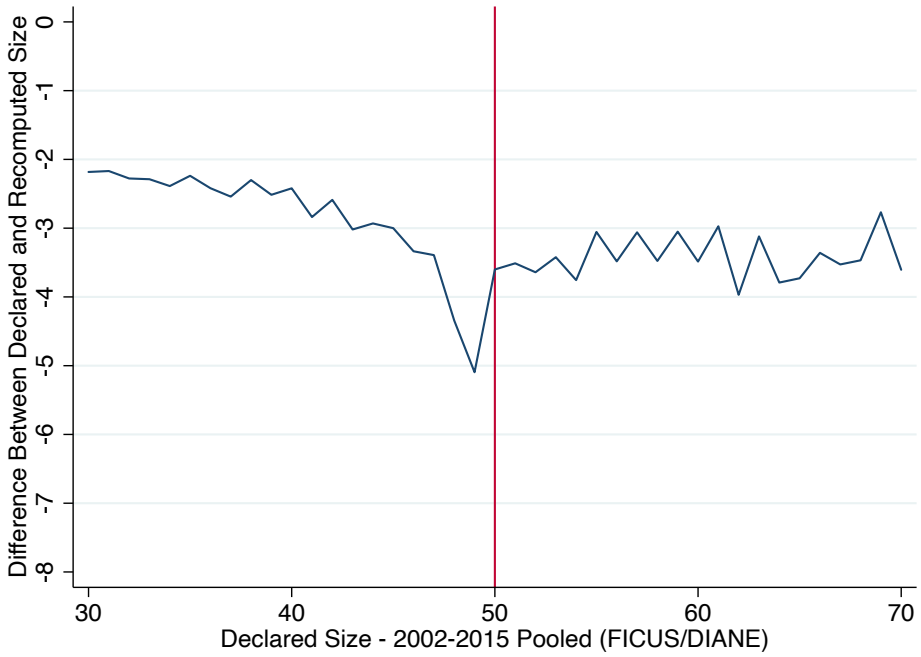
Note: The figure displays the distribution of declared fiscal firm size between 30 and 70 employees before (in blue from BIC-RN data) and after adjustment by INSEE (in yellow from FARE data) for years 2008 and 2015.

Figure E2: Under Declaration by Sector



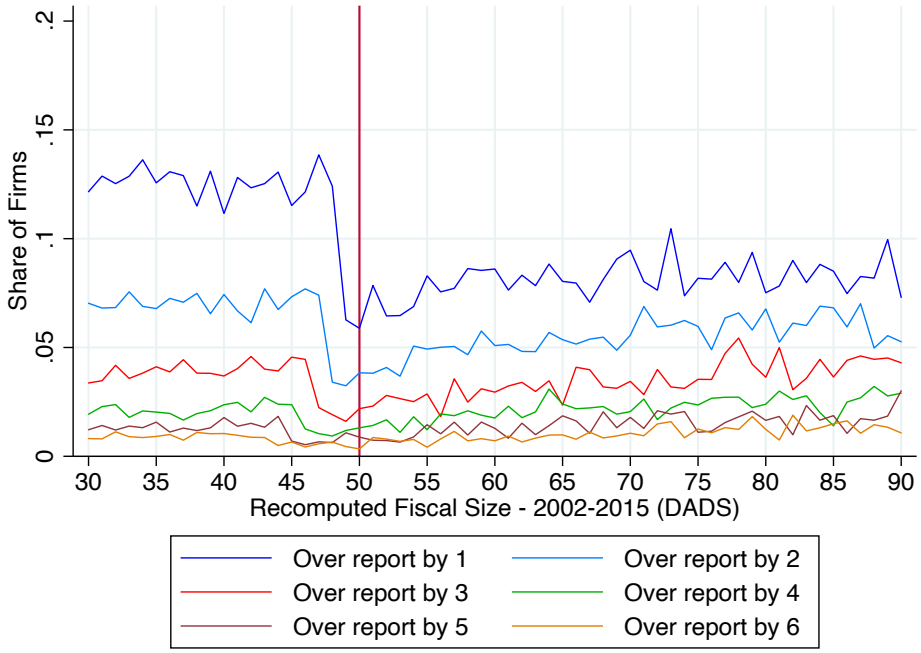
Note: The figure shows for the first level classification of French Industries by INSEE and over years 2002-2015, the share of firms that under-declare their firm size (comparing the fiscal size declared in FICUS or DIANE and the fiscal size reconstructed from the DADS) depending on their size. The blue bar is the rate of under-declaration for firms having 40 to 45 employees. The red bar is the additional under-declaration for firms just above the 50-employee threshold (50 to 55 employees).

Figure E3: Difference in Declared and Reconstructed Fiscal Size as a Function of Declared Fiscal Size



Note: The figure displays the difference (in number of employees) between the the declared fiscal firm size (in DIANE) and the fiscal firm size reconstructed using the DADS as a function of declared fiscal size. We show the average difference for each value of the declared fiscal firm size on pooled data from 2002 to 2015.

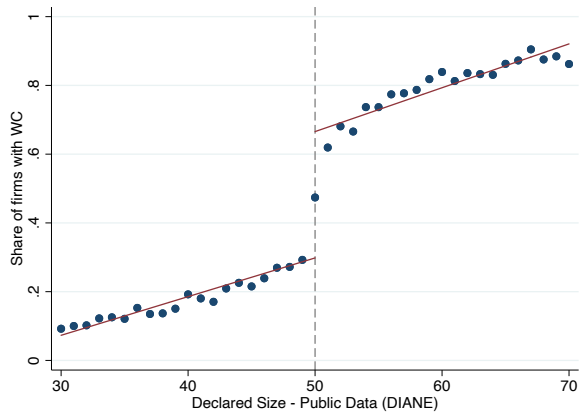
Figure E4: Over-Declaration by Reconstructed Fiscal Firm Size Split by Exact Amount Over-Reported



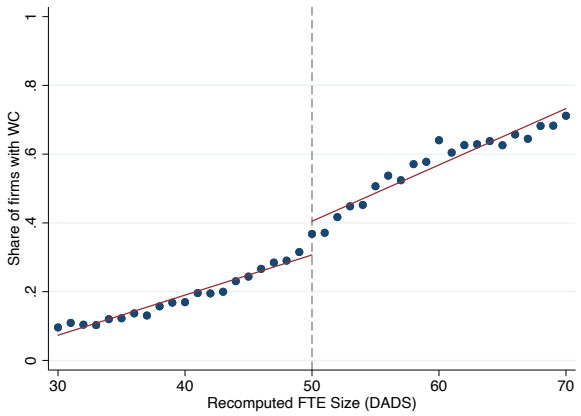
Note: The figure displays the share of firms that over-report their size by a given number of employees (ranging from 1 to 6) in their fiscal declarations relative to our reconstructed fiscal firm size from DADS data. Each series is computed by integer bin of our reconstructed fiscal firm size on pooled data from 2002 to 2015.

Figure E5: Same Year Presence of Works Council as a Function of Firm Size

(a) As Function of Declared Fiscal Size



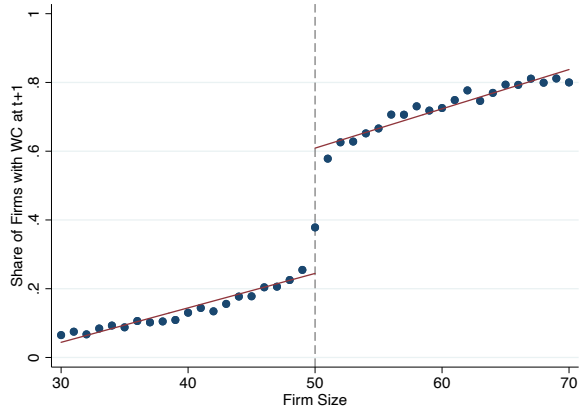
(b) As Function of Reconstructed FTE Size



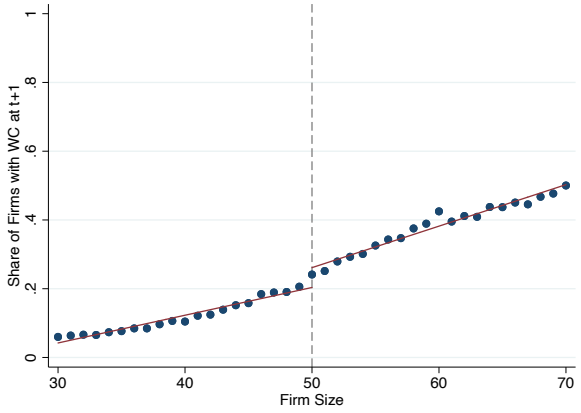
Note: The figure displays the share of firms that have a works council as a function of publicly declared fiscal firm size (DIANE), and of our reconstructed FTE size. The sample is limited to firms with a single establishment. Firm size and the presence of a work council are considered for the same calendar year. All years from 2012 to 2015 are pooled together.

Figure E6: Presence of Works Council as a Function of Size in All Establishments

(a) As Function of Declared Fiscal Size (DIANE)



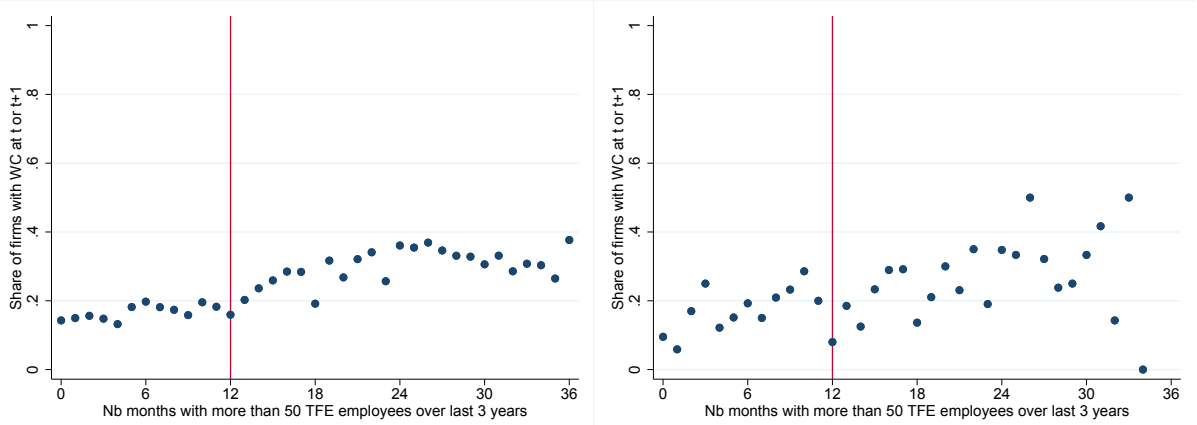
(b) As Function of Reconstructed FTE Size



Note: The figure displays the share of firms that have a works council the year after, as a function of publicly declared fiscal firm size (DIANE), and of our reconstructed FTE size. The sample comprises both single- and multi-establishment firms. All years from 2011 to 2015 are pooled together.

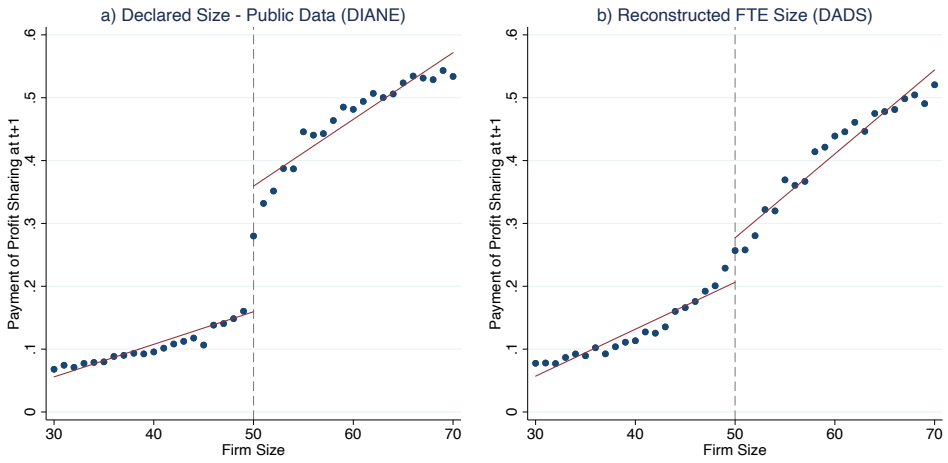
Figure E7: Presence of Works Council as a Function of Number of Months Above 50 FTE Employees in Past Three Years

(a) Firms with a Yearly FTE Size of between 45 and 55(b) Firms with a Yearly FTE Size of 49



Note: The figure displays the share of firms that have a works council the year after, as a function of the number of months they have operated with more than 50 FTE employees over the last three years. The data pools years 2011 to 2015. The left panel data is computed using only firms with a FTE size between 45 and 55 each of these calendar years, the right panel is computed using only firms with a FTE size of 49 employees each of these calendar years.

Figure E8: Firms Paying Participation as a Function of Firm Size. Keeping only firms with an ROE above 5%.

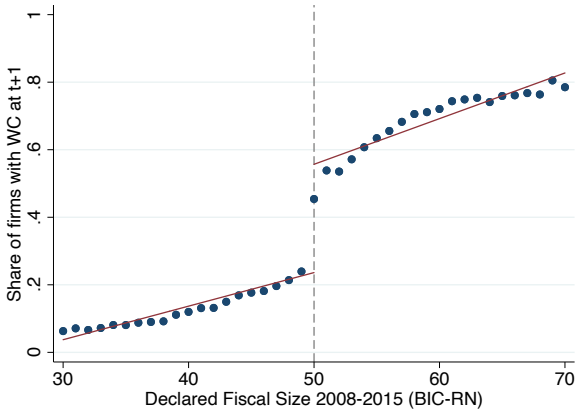


Note: The figure displays the share of firms that have paid profit sharing the year after, as a function of publicly declared fiscal firm size (DIANE), and of our reconstructed FTE size. The sample is limited to firms with a return to equity, measured as the ratio of after tax profits on equity, larger than 5%. All years from 2002 to 2015 are pooled together.

Figure E9: Difference in Declaration and Presence of Works Councils Based on BIC-RN Data

(a) Under Declaration by Recomputed Firm Size

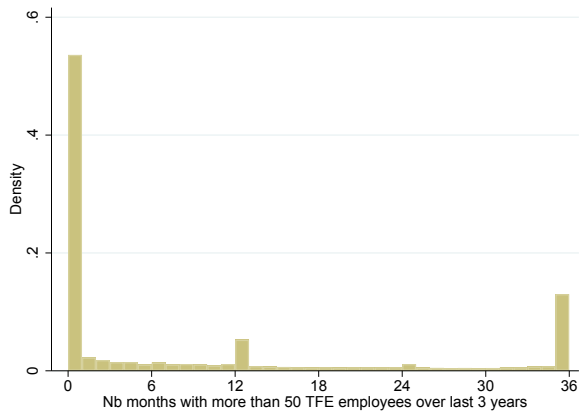
(b) Presence of Works Council on BIC-RN Size



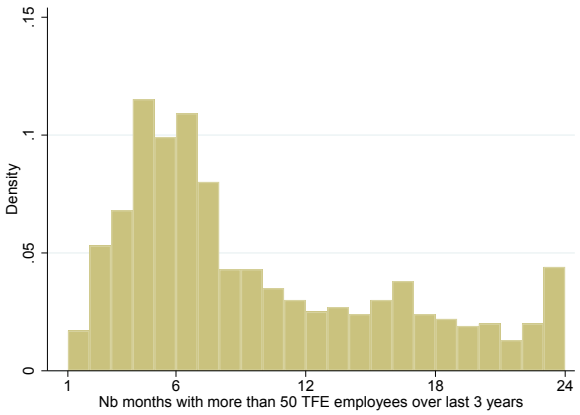
Note: Panel a) displays the share of firms that under-report their size (respectively over-report and report the same size) in their raw fiscal declarations (BIC-RN over 2011-2015) relative to the reconstructed fiscal firm size. Each series is computed by integer bin of the reconstructed fiscal firm size on pooled data. Panel b) displays the share of firms that have a works council the year after, as a function of the raw declared fiscal firm size in BIC-RN. The sample pools together all calendar years over the 2008-2015 period.

Figure E10: Distribution of Number of Months above 50 Employees During the three Past Years

(a) Firms with 30-70 Employees



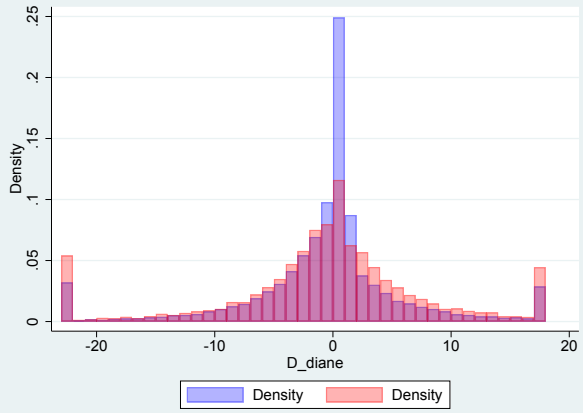
(b) Firms with 49 Employees



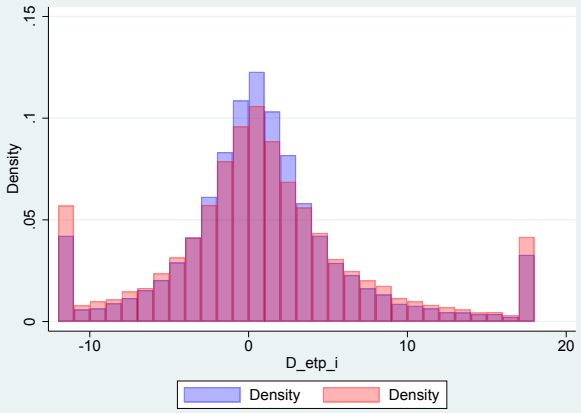
Note: The figure shows either for all firms having an FTE size between 30 and 70 employees (panel a) or for firms having an FTE size (integer part) exactly at 49 employees (panel b) in years (2012-2015), the distribution of the number of months during the past three years for which the firm had an FTE size larger or equal to 50 employees. The large spikes at 0 and 36 on panel a are for firms whose size is always below or above 50 employees during the past three years. Panel b only shows the distribution between 1 and 12 months in order to check for a possible bunching at 11 months (which appears non existent).

Figure E11: Distribution of Growth by Declared Size

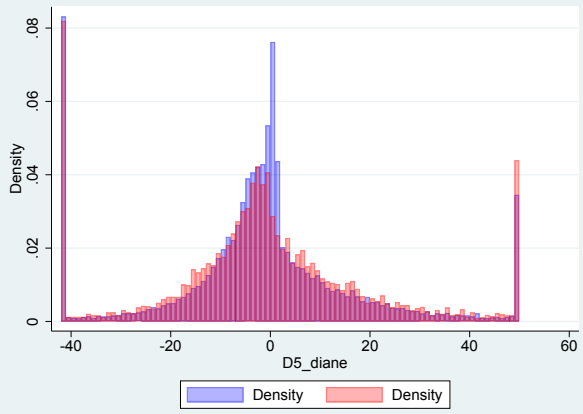
(a) One-Year Growth of Declared Size



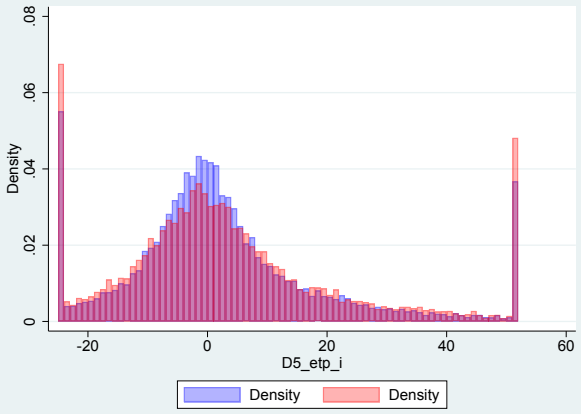
(b) One-Year Growth of Recomputed Size



(c) Five-Year Growth of Declared Size



(d) Five-Year Growth of Recomputed Size



Note: In blue are firms that declare 48-49 employees, in red those that declare 50-51.

Appendix F Regulations when crossing the 50-employee threshold

Over the period 2000 to 2015, social regulations that applied when crossing the threshold of 50 FTE employees were relatively stable. We describe hereafter these legal requirements coming from the Labor Code.

Note that on top of these social regulations, we are aware of only two others that depend on firm fiscal size strictly exceed 50 employees and that are described in the main text: the obligation to present a detailed version of the appendix of their annual accounts (e.g. including the remuneration of the members of the board of directors), and the necessity to have the accounting information certified by an external tax auditor.

If the monthly "Labor Code" number of employees reaches at least 50.00 or more during 12 (non-consecutive) months in the last 3 years:

- The company must organize the election of a Works Council (Comité d'Entreprise), if one does not already exist. The three elected members of the Works Council benefit from a monthly credit of 20 hours (paid hours taken from working time to fulfill the functions of an elected representative). The Committee has a budget of 0.2% of the wage bill and premises provided by the employer. Many of the employer's actions–such as a redundancy plan (see below)–require prior information of the works council. The latter can order expert auditing, particularly on the firm's accounts.

- The newly installed works council manages the company's social and cultural activities (holiday camps for employees' children, gift vouchers, tickets to shows, etc.). The budget is determined by agreement with the employer, but cannot be less than the proportion of the payroll that the employer used for such activities before the installation of the Works Council.

- A Health and Safety Committee must be set up. It includes the employer, the safety officer, an occupational physician and 2 elected staff members (among delegates or members of the works council); these two elected workers receive two additional hours of credit and training in occupational health and safety.

- The monthly credit of hours of the staff delegates is increased from 10 to 15 hours.

- While below 50, an union can appoint as shop steward only an elected staff delegate, a representative union could appoint any worker up to 2008; since a 2008 reform, the union can only appoint workers who attracted at least 10% of the vote on her name at the last work council election.

If the monthly number of employees "Code du travail" reaches at least 50.00 for 6 months

during the fiscal year, the company must set up a profit-sharing agreement (participation) for the fiscal year concerned. If there is no agreement, the labor administration impose a minimal bonus per employee (if positive) equal to $W(B–0.05C)/(2V)$, where B: net profit; C: equity; V: value added ; W: wage.

If the number of employees reaches at least 50.00, exceptional or more minor obligations also applied:

- Monthly reporting of all labor contracts to the administration. In practice, payroll software generates automatically these files; deadline for the payment of social contributions the 5 of the month (down from the 15).

- Obligation to propose a plan of job preservation in case of a redundancy of 10 or more employees (within a 30-day period) for economic reasons. This plan should promote alternatives to job destruction or unemployment (transfer, reduction or reorganisation of working time ;internal reclassification offers; job-search assistance and support for business start-ups; training or conversion assistance...). From 2013, the process is more complex, in particular, the labor administration has to approve the plan.

- From 2010, obligation to reach an agreement on gender equality or to build a dedicated plan.

- From 2009, an occupational physician should provide information on the employee's suitability for training in order to offer a suitable job in the event of unfitness after an occupational injury or illness.

- From 2009 to 2014, obligation of a formal professional assessment meeting (second part of the professional live) for each worker in the year following her 45 birthday.

- From 2011, if the firm increases its dividends, the employer had to bargain over an additional profit sharing (there is no obligation to reach an agreement), except if the employer had already increased some bonuses/benefits.