

# Tax evasion and productivity: do firms escape EPL through informality?

Giuseppina Gianfreda

University of Tuscia  
Luiss LLEE and Celeg

Giovanna Vallanti

Luiss  
Luiss LLEE and Celeg

*Tax compliance has costs and benefits which may depend on the institutional environment in which firms operate. The relationship between tax evasion and productivity is not always unambiguous and firm size can be a crucial issue whenever firms are constrained by the institutional framework in a measure that depends on their size. We argue that firms may respond to string employment protection legislation through accrued informality thus (partially) offsetting the negative effect of tax evasion on productivity. We exploit the Italian dismissal legislation imposing higher firing costs for firms with more than 15 workers and show that tax evasion reduces job turnover for firms above the 15 workers threshold; furthermore, while the overall effect of tax evasion on firms' productivity is negative, the differential effect for firms above the threshold as compared to smaller firms is positive and significant.*

JEL CODE: D02; D22; D24

KEY WORDS: tax evasion, EPL, productivity, firm size, RD estimation

## 1. Introduction

A growing attention is recently being devoted to tax compliance as a determinant of growth. Tax evasion has been shown to negatively affect firms' productivity through various channels. Poor compliance limits firms' access to market supporting institutions and law enforcement services; under-reporting firms have to face concealment costs; the productivity of hidden resources is lower as compared to official use and the access to capital market for evading firms is limited; reduced fiscal revenue imply under provision of public services. However, formality implies costs which go beyond the burden of taxes, such as compliance with legal requirements or rent seeking bureaucracy, so that evasion may not necessarily be detrimental to growth (Sarte, 2000).

One crucial issue in the causation chains is firms' size. Several studies show that firms' size is negatively related to tax evasion (Dabla Norris et al. 2008). One reason is that as the marginal cost of tax evasion increases with firms' size due to concealment efforts (Fortin et al. 1997; Carfora et al.) which may cause firms to operate below the optimal size to avoid the attention of fiscal authorities (OECD 2004). Also, tax evasion may be a way for smaller firms to get financing; in this respect, smaller firms tend to reduce tax evasion the more they can access the financial markets (Beck. et al., 2005; 2010).

However the relationship between tax evasion and firms' size may not so clear-cut; on empirical grounds, Kenyon (2008) has shown that the reduction in underreporting as firms' size increases is quite limited.

One of the problems in featuring the interaction between firms' size and tax evasion unambiguously is that the relationship is influenced by institutional environment as large. Regulation usually constrains firms differently according the firms' size and firms' second best response to strict regulations through tax evasion may depend on the different stance of rules. Excessive regulation has been found to be a major determinant of tax evasion rather than high marginal tax rates (Friedman et al. 2000); Almeida and Carneiro (2009) have shown that reduced informality caused by a stricter enforcement of employment regulation constraints firms' size in Brazil.

We claim that firms react to strict employment protection legislation (EPL) by adjusting workforce in the informal sector; as a result, the negative effect of tax evasion on productivity for firms facing higher firing costs - typically bigger firms – may be partially offset by the gain in terms of flexibility.

We exploit the EPL legislation in force Italy until recent reforms<sup>1</sup> which imposes higher firing costs on firms with more than 15 workers as compared to “smaller” firms and we investigate whether firms with higher firing costs resort to tax evasion to escape an excessive dismissal regulations. In particular, firms with less than 16 employees must compensate the unfairly dismissed worker with a fixed severance payment that varies between 2.5 and 6 months of salary, independently of the length of the judicial procedure (and with no obligation of reinstatement of the dismissed worker). Conversely, in case of unfair dismissal, firms with more than 15 employees have to pay for forgone wages, social security and health insurance contributions over the entire litigation period with no upper limits; moreover, firms above the 15 employees threshold are forced to reinstate the unfairly dismissed worker.

We measure tax evasion by the relative tax gap at province level and we estimate the impact of tax gap on productivity for firms with 10 to 20 workers from 2007 to 2010.

---

<sup>1</sup> Reforms passed in 2012 and in 2015 reduced the differences in firing costs stance at the threshold. The change in legislation does not affect our estimates, since our data covers the period 2006-2010.

The impact of EPL on firms' outcome is a well-established result since the seminal contribution by Mortensen and Pissarides (1994). Labour reallocation is considered crucial in determining labour market outcomes through the capacity of the firm to quickly adjust to exogenous shocks. In a world where agents (firms and workers) are heterogeneous and the matching process between vacancies and workers is costly, when a shock hits the economy the desired allocation of jobs among firms and sectors changes, leading to job destruction on the one hand and to the creation of new vacancies on the other. As long as the reallocation of workers and jobs across industries and firms is important for productivity, policy and institutional factors which hinder the firm-worker match – such as EPL - also affect firms' and aggregate economic performance<sup>2</sup>.

A more controversial issue is how this effect translates into changes in productivity at firm level. In a standard search model of labour market with Nash bargaining, the presence of firing costs on the one hand reduces the productivity threshold at which firms dismiss their workers with a negative effect on productivity; on the other, it increases the productivity threshold at which firms hire workers, with an opposite effect on overall productivity. Moreover, firing restrictions may positively impact firm productivity through human capital specific investments and learning-by-doing.

Given the effect of EPL on firms' productivity, if firms react to higher firing costs through increased tax evasion we should expect: a negative effect of tax evasion on labour reallocation at firm level and a positive differential impact of tax evasion on productivity for firms with stricter EPL regulation as compared to smaller firms.

However propensity to compliance, labour adjustments and productivity may be partly driven by unobserved factors which have to be controlled for; furthermore the relationship between tax gap and productivity can suffer from inverse causation as firms' output may affect tax compliance.

Our identification strategy is based on the discontinuity at the 15 workers threshold; we perform an RD analysis which allows us to account for any unobserved differences between the “small firms” group (those hiring from 10 to 15 workers, i.e. the control group) and the “big firms” group (from 16 to 20 workers, i.e. the treatment group). We can thus isolate the effect of increased tax evasion on productivity for bigger firms from other facts which could influence firms falling in those categories in a different way.

The interplay between firm size and employment protection legislation has been widely considered in the empirical literature, since in many countries the EPL provisions are less stringent for firms below certain size thresholds. There are a number of studies for Italy that exploit the 15 employees threshold in order to identify the effects of EPL on jobs

---

<sup>2</sup> A higher degree of workers protection has been shown to unambiguously reduce both job creation and job destruction (Hopenhayn and Rogerson, 1993; Mortensen and Pissarides, 1994; Pissarides, 2000).

and workers flows. See, among the others Cingano et al. (2014), Kugler and Pica (2008) and Boeri and Jimeno (2005).

Furthermore we control for the potential endogeneity of our indicator of tax evasion by using a set of instruments which are not related to labour adjustments and productivity but do influence the enforcement of tax collection, i.e. the judge turnover in the Courts and the occurrence of an administrative election at province level.

Judge turnover has been found a determinant of trial delays (Guerra and Tagliapietra 2015) which on turn may affect the enforcement of the legislation on tax evasion; it also satisfies the exclusion restriction as it depends on the occurrence of a vacancy in the Court due to transfers of judges to others district or to other occurrences, i.e. career advancements, or to retirement. The complexity of the transfer procedure, to which the decisions taken by different agents contribute, is such that the judges turnover in each district ends up to be independent from (local) factors that might also affect firm-level outcomes.

As far as our second instrument is concerned, province elections take place at intervals which are established *ex ante* so that their occurrence is not influenced by contingent economic conditions in the area. However, when elections are held a reversal in the local ruling class may be expected which could influence the audit policy in the area hence firms' decision to evade.

The panel dimension of our data allows to control for unobserved heterogeneity via fixed effects. Therefore, our main results are not driven by cross-sectional differences among provinces, such as cultural, economic and social characteristics that may impact on both tax evasion propensity and firms' productivity.

## 2. The data

Firm level data are drawn from Aida (Analisi Informatizzata delle Aziende Italiane) produced by Bureau van Dijk (BvD). BvD collects balance sheet data from the national Chambers of Commerce. Apart from balance sheet data, AIDA provides a wide range of financial and descriptive information (industry and activity codes, firm age, etc.) and the number of employees. Moreover, AIDA gives information on the location of firms at a municipality level, allowing the match of firms' data with the courts' database. From the data base we picked firms hiring between 10 and 20 workers, i. e. 318,433 firms operating in all productive sectors.<sup>3</sup>

The Aida dataset has a drawback, as it does not allow to distinguish between newly created firms and firms that simply enter the sample at a given period *t* but were already operating in the period before; similarly, it is not possible to identify firms' closures from firms that exit the sample for other reasons. Therefore, we have restricted the analysis to continuing

---

<sup>3</sup> In order to be included in AIDA, a firm must satisfy at least one of the following criteria: operating revenues equal to at least 1.5 million euro, total assets equal to at least 3 million euro, number of employees equal to at least 15

firms, e.g. firms that are in the sample for at least two consecutive periods. Given this limitation, we restrict our dataset to around 180,000 private firms from all industries operating in both the manufacturing and non manufacturing sectors<sup>4</sup>.

We draw data on tax evasion from the Italian Revenue Agency (Agenzia delle Entrate) dataset. The dataset contains data on the expected as well as the actual revenue reported to fiscal authorities in the Italian provinces from 2007 to 2010. We then constructed an indicator of tax evasion as the relative difference of the expected and the reported revenue, i.e.

$$\text{Tax gap} = (\text{expected revenue} - \text{reported revenue}) / \text{expected revenue}.$$

Firm level data and tax gap data are then matched with the Italian Statistic Institute (Istat) from which we draw per capita gdp at region level.

We draw data on the number of judges allocated to each judicial districts as well as on the number of inbound and outbound judges from 2006 to 2010 from courts' self regulating body (CSM) database.

### 3. The identification strategy

In estimating the impact of tax evasion on firms' labour adjustments and productivity we have to exclude that our results are biased by omitted variable and reverse causality problems.

First of all, propensity to compliance, labour adjustments and productivity may be partly driven by time varying unobserved factors, such as factors related to the quality of local institutions, which may (partly) explain our results.

Furthermore the relationship between tax gap and firms adjustments/productivity can suffer from endogeneity, as tax compliance may be influenced by both labour market conditions and firms' performance.

In order to tackle with the omitted variable and inverse causation problems and properly identify our effect of interest we rely on two main strategies. First of all we exploit a threshold provided for by Italian EPL which depend on the number of firms' workers,

---

<sup>4</sup> The sectors are: (1) Agriculture, forestry and fishing; (2) Mining and quarrying; (3) Food, beverages and tobacco; (4) Textiles; (5) Wood products; (6) Paper products, publishing and printing; (7) Refined petroleum, nuclear fuel and chemical products; (8) Rubber and plastic products; (9) Other non-metallic products; (10) Basic metals and fabricated metal products; (11) Machinery and equipment; (12) Electrical and optical equipment; (13) Transport equipment; (14) Other manufacturing sectors; (15) Electricity, gas and water supply; (16) Construction; (17) Wholesale and retail trade, Repairs; (18) Hotels and restaurants; (19) Transport and communications; (20) Other services. The financial and public sectors are excluded from the analysis

with firms employing more than 15 workers facing higher firing costs than smaller firms (*ceteris paribus*), and estimate an RD model.

Furthermore we estimate an IV model by using a set of instruments for tax evasion which do not depend on firms' adjustment decisions and performance nor on the underlying economic conditions, i.e. the rate of judges' turnover in the judicial districts and the occurrence of a local election at province level.

Lastly, we use fixed effects at firm level to control for unobserved heterogeneity, time dummies and a set of additional controls as well as robustness checks.

### *The "15 workers" threshold*

We estimate an RD model exploiting an important feature of Italian EPL in force until 2012. According to Italy's Statuto dei Lavoratori, passed in 1970, an individual dismissal is legal only when it satisfies a just cause, e.g. it can be justified by an objective reason (concerning the production activity for example) or subjective reasons, which are mainly related to misconduct on the part of the worker. The worker has always the right to appeal the firm's decision and the final outcome ultimately depends on the court's ruling on the specific case. If the worker does not appeal the firing decision, or if the dismissal is ruled fair, the legislation does not impose any severance payment to the firm. Conversely, when the dismissal is ruled unfair, the judge imposes a specific compensation on the firm.

The maximum compensation to which unlawfully fired workers are entitled to varies with firm size in two important dimensions. For firms with less than 16 employees, the unfairly dismissed worker must be compensated with a fixed severance payment that varies between 2.5 and 6 months of salary independently on the length of judicial procedure and with no obligation of reinstatement of the dismissed worker. Conversely, for firms with more than 15 employees, to which Article 18 of the Statuto dei Lavoratori applies, the worker is entitled to a compensation equal to forgone wages, social security health insurance contributions for a period from the date of the dismissal to the judicial settlement of the case (with a minimum of 5 months and with no upper limits). Moreover he/she can choose either to be reinstated in the firm or to be paid an additional financial compensation of 15 months of salary.

The Italian firing costs legislation in force during the years under study set up a threshold above which EPL is far more stringent; we argue that firms falling above that threshold responded to increased firing costs by resorting to informality and by this way and they reduced the negative impact of "falling above the threshold" on productivity. We then focus on the marginal effect of tax evasion on productivity for firms which are located below and above the 15 workers' threshold in a RD model specification.

However, in order to measure the gap in the effect of tax evasion on productivity for firms below and above 15 workers we have to make sure that no manipulation occurs at the threshold, i.e. no significant sorting in or out occurs due to the different EPL regime.

Table 1 displays the distribution of firms between 10 to 20 workers. If any significant manipulation occurred because of increased firing costs the graph should display a dip on the 15 workers threshold, which is not observed; rather density smoothly declines with the increase in the number of workers<sup>5</sup>, which is a distinguishing feature of Italian productive model.

[GRAPH 1 HERE]

The same pattern is observed also in other studies on the Italian EPL, so that our graphical results on the of significant manipulation are in line with a body of empirical analysis focusing on the consequences of the discontinuity in dismissal costs in Italy (Boeri and Jimeno, 2005; Schivardi and Torrini, 2008; Leonardi and Pica, 2013, Cingano et al. 2014).

Unfortunately our data no not contain information on tax evasion at firm level, so we could not directly infer any difference in tax compliance between small firms and big firms. We calculate average tax evasion (at province level) for firms grouped according to the number of workers. Graph 2 shows a jump after the 15 workers threshold, which can be interpreted as an accrued propensity of evading taxes in provinces where the incidence of firms above the threshold is higher.

[GRAPH 2 HERE]

### *The instrumental approach*

Judges' turnover in judicial districts.

A major determinant of tax compliance is the level of enforcement of the legislation, which on turn is related to the efficiency of the judiciary. One of the problems in dealing with the Courts' efficiency is that the outcome observed can be the result of a shift in the demand for or in the supply of justice. For example, if poor law enforcement is determined by a particularly high crime rate, which causes Courts to be overwhelmed by long and complex suits, enforcement wouldn't be endogenous with respect to the underlying

---

<sup>5</sup> Given the nature of our variable, i.e. the number of workers, which is discrete, the McCrary test could not be performed.

economic conditions (and would depend on the demand for justice). However, as far as Court's efficiency is a matter of internal organization of the judicial districts, changes in the level of enforcement across districts may be interpreted as the result of shifts in the (exogenous) supply of justice not related to the underlying conditions.

The turnover rate of judges in the judicial districts are a determinant of the duration of trials, which are a measure of judicial efficiency (Guerra and Tagliapietra, 2015). Turnover depend on the speed by which vacancies in Courts are created and filled, i.e. an "inbound" judge takes the place of an "outbound" judge, which on turn depend on judges' transfers policy. The decisions on judges' transfer are taken by the Courts' self-governing body, the Consiglio Superiore della Magistratura (CMS).

Vacancies within judicial districts primarily arise due to transfers of judges to others district or to other offices, i.e. career advancements, or to retirement. Once a vacant position is created, the judge who is willing to be transferred has to apply to the CSM; as a general rule, judges cannot be transferred to a different assignment or district without their consent.<sup>6</sup> Once applications are received, the CSM decides on the basis of a competitive procedure among candidates. The criteria for the CSM collegial decision are the following: competence, which is assessed on the basis of the functions so far carried out and the judge's capacities; the judge's health status and his/her family members' (offsprings, spouse, parents and brothers/sisters if leaving with the judge, in some cases relatives and relatives-in-law); family ties; merit (which also depends on the fact that in the past the judge has occupied vacancies for which an urgent procedure had been set up or vacancies for which no application had been received); seniority<sup>7</sup>.

Therefore, the complexity of the transfer procedure, to which the decisions taken by different agents contribute, is such that the time interval a vacant positions is not filled in each district ends up to be independent from (local) factors that might also affect firm-level outcomes.

We than instrument tax gap at province level with an index of judges' turnover rate at district level calculated as in Guerra and Tagliapietra (2015) according to the following formula:

---

<sup>6</sup> An important feature of the Italian judicial system is the principle of "inamovibilità", according to which a judge can be transferred to a different Court or to a different assignment only upon his/her consent. The principle of "inamovibilità" is a constitutional provision aiming at assuring the independence of the judiciary, which could be undermined should a judge be compelled to quit his/her activity for suspension or transfer. There are some exceptions namely the need to cover vacancies in cases established by law, as disciplinary actions or for reasons of "incompatibilità ambientale", i.e. the judge is considered incompatible with the workplace. The judge can appeal the CSM decision in all cases

<sup>7</sup> See the "Circolare 15098 of November 30, 1993 and subsequent amendments. Health status and family ties are not taken in consideration for top positions, such as for example the Supreme Court.



$$\text{Turnover} = 100 \times \frac{\text{number of outbound} + \text{number of inbound judges}}{\text{number of expected judges}}$$

### The occurrence of a local political election

The influence of electoral cycle on fiscal choices has been widely investigated since Nordhaus (1975). Recent literature on this topic follows two main approaches. A strand of contributions build on models based on information asymmetries between voters and politicians following Rogoff and Sibert (1988) and Rogoff (1990): according to this line, politicians manipulate budgetary instruments to signal their competency in electoral and pre-electoral periods. Another strand of literature focus on tax choices as a tool to increase the probability of re-election; in this framework not only tax setting but also the probability of auditing can be influenced by the occurrence of an election. On empirical grounds focusing on German municipalities Foremny and Riedel (2014) show that the growth rate of local business taxes is significantly lower in election periods while Skouras and Christodoulakis (2013) find that around election audit activity by tax collector is reduced and underreporting increases in Greece; Ronconi (2009) show that the occurrence of a political election influence actual enforcement of labour legislation.

In addition, other studies focus on the ruling coalition attitude toward tax compliance of as a determinant of tax evasion. Fantozzi and Raitano (2015) investigated tax compliance in Italy as a result of a change in ruling parties and found an increase in self-employed underreporting under centre-right coalition.

Building on these contributions we instrument tax gap at province level with a dummy indicating the occurrence of a province election in the year. There are several reasons for choosing province level elections. On the administrative point of view, the Italian territory is organized in regions, provinces and municipalities<sup>8</sup>. Province level constituencies match the organization of tax collection activity across the territory, as the Italian auditing activity is carried out at provincial level (by the so called “Direzioni Provinciali”). Although provinces have not tax setting competence, as local taxes are levied by municipalities, we interpret the occurrence of a province election as a potential shock to the local established powers. Elections can bring a switch in the local ruling coalition, which may influence firms’ expectation about the severity of tax enforcement and by this way tax compliance.

---

<sup>8</sup> On the administrative point of view, the Italian territory is organized in regions, provinces and municipalities. Provinces have administrative tasks in province areas and in inter municipality territory; they have coordination tasks and are in charge of the implementation of public works in various sectors, including the economic, productive, trade sectors; they carry out programming activity for the provincial territory.

In addition, province level elections take place at intervals which are established by the law, i.e. every 5 years<sup>9</sup>, and are not influenced by contingent conditions, so that the exclusion condition is met<sup>10</sup>.

#### 4. The empirical specification

We estimate the following basic RD model:

$$output_{ipt} = \beta_0 + \beta_1 tg_{pt} + \beta_2 size_{ipt} + \beta_3 (tg \times size)_{ipt} + \beta_4 f(r)_{ipt} + \beta'X_{pt} + \gamma_i + \lambda_t + \varepsilon_{ipt} \quad [1]$$

where output refers: i) in the first specification to labour reallocation at firm level (*flow*), which is calculated as in Cingano et al. (2014) as the absolute value of  $2(l_{it}-l_{it-1})/(l_{it} + l_{it-1})$ , where  $l$  is the number of firm workers and ii) in the second specification to the log of firm's value added (*productivity*); *tg* is province tax gap instrumented by *turnover*, i.e. judges turnover in the district Courts, which is calculated as  $100 \times (\text{the number of outbound} + \text{the number of inbound judges}) / \text{the expected number of judges}$ , and by the variable *election*, a dummy taking the value of 1 if there has been a province election); *size* is a dummy taking the value of 1 if the firm hires more than 15 workers,  $f(r)$  is a polynomial function of the rating variable, i.e. firm size, centered at the threshold,  $X$  is a matrix of control variables – among which the log of firms capital  $k$  and the log of per capita *gdp* (*gdp*),  $\gamma$  are firm dummies,  $\lambda$  are time dummies and  $\varepsilon$  is the error term; the subscript  $i, p, t$  stand for firm, province and time respectively. Errors are clustered at firm level.

As in previous literature (Cingano et al. 2014) controlling for firm size implies that all effects can be read as holding labour constant; as a result our value-added model can be interpreted as capturing the effect of regressors on labour productivity.

Our regressor of interest is the interaction  $tg \times size$ , for which we expect a negative and significant coefficient in the first specification, as firms having high firing costs tend to adjust less in the formal labour market, and a positive and significant coefficient for the second specification, as resorting to informality may positively affect productivity. In other words, we expect the incremental effect of tax evasion on productivity for firms having a stricter EPL be positive and significant at the threshold; firms after the threshold tend to adjust informally and this causes a bounce on the impact of tax evasion on productivity as compared to small firms.

#### 5. Results

---

<sup>9</sup> In the period under study the legislation regulating the election and the tasks of province level representatives was the Testo Unico, G.U. n. 227 del 28 settembre 2000, s.o. n. 162/L. The legislation was reformed in 2014.

<sup>10</sup> In the years covered by our study only in 13 cases province elections have occurred before the end of the natural term; in most cases anticipation was due to the resignation of the President motivated by choice to campaign in the Parliament election.

Table 1 shows estimation results for specification 1, i.e. the effect of tax evasion on firms' (official) labour adjustments. The instruments flows and election are used both separately (columns 1 and 2) and jointly (column 3).

Tax evasion has no significant effect on labour adjustments for firms under the 15 workers threshold while it has a negative impact for firms employing more than 15 workers. The latter result is fully driven by the negative differential effect of tax gap on big firms' adjustments, i.e. the coefficient of the interaction term  $TG \times size$ , which is always negative and significant. If the level of tax compliance in Brindisi (which is situated in the 90<sup>th</sup> percentile of the tax gap distribution) was as high as in Monza (which is situated in the 10<sup>th</sup> percentile) the reduction in job reallocation for firms after the 15 workers threshold as compared to smaller ones would be of around 36% (column 3).

In all cases the instruments are relevant, as the null that the equation is underidentified is always rejected, while the F statistics is well above the rule of thumb threshold of 10 in all cases. Furthermore, the overidentification test does not reject the null that the instrument are uncorrelated with the error term. First stage regressions are displayed in table 3, while table 4 shows findings from OLS estimates.

Table 2 shows the effect of tax evasion on firms' labour productivity. In all cases the marginal effect of tax evasion on firms' productivity is negative and significant; this result is in line with previous literature. However, our variable of interest is the interaction term  $TG \times size$ , i.e. the incremental effect of tax evasion on productivity for firms after the 15 workers threshold as compared to smaller firms. The interaction coefficient is positive and significant; bigger firms react to strict labour legislation by adjusting informally and this reduces the negative impact of tax evasion on productivity. In other words, if Monza experienced the same level of tax evasion as Brindisi the positive incremental effect on bigger firms' labour productivity would be of around 15% (column 3).

Here again instruments are relevant and the null that the instruments are uncorrelated with the error term is not rejected.

## 6. Concluding remarks

Tax evasion is detrimental to growth. However firms may resort to informality in order to escape severe constraints to their activity such as those imposed by strict EPL; the possibility to adjust informally (partially) offsets the negative effect of tax evasion on productivity for firms facing high firing costs.

## References

- Almeida, R.. and P. Carneiro, Enforcement of labour regulation and firm size. *Journal of Comparative Economics*, 37 (2009) 28-46.
- Beck, T., A. Demirguc-Kunt, V. Maksimovic, Financial and Legal Constraints to Growth: Does Firm Size Matter? *The Journal of Finance*, vol. LX No.1 (2005), 137-177
- Beck, T., C. Lin, Y. Ma, Why Do Firms Evade Taxes? The Role of Information Sharing and Financial Sector Outreach. *The Journal of Finance* 69 (2010).
- Boeri, T., and J. F. Jimeno (2005), "The Effects of Employment Protection: Learning from Variable Enforcement", *European Economic Review*, 49(8), 2057-2077
- Carfora, A., R.V. Pansini, S. Pisani, Spatial Dynamics in Tax Gap Determinants. Agenzia delle Entrate, Discussion Topics 01/2016
- Cingano, F., M. Leonardi, J. Messina, G. Pica, 2014, Employment protection legislation, capital investment and accesso to credit: evidence from Italy, Working Papers 4, Department of the Treasury, Ministry of the Economy and of Finance
- Dabla Norris, E., M. Gradstein, G. Inchauste, What causes firms to hide output? The determinants of informality. *Journal of Development Economics* 85 (2008) 1–27
- Fantozzi, R. and M. Raitano, Political cycle and reported labour incomes in Italy: Quasi-experimental evidence on tax evasion, *European Journal of Political Economy* 39 (2015) 269–280
- Foremny, Dirk and Riedel, Nadine, Business taxes and the electoral cycle. *Journal of Public Economics*, Elsevier, vol. 115(C), (2014) 48-61
- Fortin, B., N. Marceau, L. Savard, Taxation, wage controls and the informal sector. *Journal of Public Economics* 66 (1997) 293–312
- Friedman, E., S. Johnson, D. Kaufmann, P. Zoido-Lobaton, Dodging the grabbing hand: the determinants of unofficial activity in 69 countries. *Journal of Public Economics* 76 (2000) 459–493
- Guerra, A. and C. Tagliapietra, Does Judge Turnover Reduce Judicial Performance? Empirical Evidence from Italy, Sept 2005.
- Hopenhayn, H. and R. Rogerson, "Job Turnover and Policy Evaluation: A General Equilibrium Analysis," *Journal of Political Economy*, vol. 101-5 (1993) 915-38.
- Kenyon, T., Tax Evasion, Disclosure, and Participation in Financial Markets: Evidence from Brazilian Firms. *World Development* Vol. 36, No. 11, pp. 2512–2525, 2008

Kugler, A., and G. Pica, (2008), "Effects of Employment Protection on Worker and Job Flows: Evidence from the 1990 Italian Reform", *Labour Economics*, Vol. 15 (1) pp. 78-95

Leonardi, M. and G. Pica, Who pays for it? The Heterogeneous Wage Effects of Employment Protection Legislation, *The Economic Journal*, 123 (December), 1236–1278

Mortensen, D.T. and C. A. Pissarides (1994), "Job Creation and Job Destruction in the Theory of Unemployment," *Review of Economic Studies*, vol. 61(3), pages 397-415.

Nordhaus, W., The political business cycle. *Review of Economic Studies*, 42, (1975) 169–190.

Pissarides, C.A., (2000), *Equilibrium Unemployment Theory*, Cambridge MIT Press.

Rogoff, K. Equilibrium political budget cycles. *American Economic Review*, 80(1), (1990) 21–36.

Rogoff, K., and A. Sibert, Elections and macroeconomic policy cycles. *Review of Economic Studies*, 55(1), (1988)1–16.

Ronconi, L., Enforcement and compliance with labor regulations. *Industrial and Labor Relations Review*, 63(4) (2009).

Sarte, P.-D., Informality and rent-seeking bureaucracies in a model of long-run growth-*Journal of Monetary Economics* 46 (2000) 173-197

Schivardi, F., R. Torrini, Identifying the effects of firing restrictions through size-contingent differences in regulation, *Labour Economics* 15 (2008) 482–511

Skouras, S. and N. Christodoulakis, Electoral misgovernance cycles: evidence from wildfires and tax evasion in Greece, *Public Choice* (2014) 159:533–559

Table 1: The effect of tax gap on firms' labour reallocation - selected results

Dependent Variable: flows			
Instruments:	turnover	election	both instruments
tax gap	0.318 <i>0.398</i>	-0.022 <i>0.5</i>	0.198 <i>0.32</i>
tax gap x size	-0.379 *** <i>0.155</i>	-0.518* <i>0.282</i>	-0.405*** <i>0.143</i>
size	0.082*** <i>0.032</i>	0.111* <i>0.059</i>	0.088*** <i>0.03</i>
k	-0.002 <i>0.002</i>	-0.002 <i>0.002</i>	-0.002 <i>0.002</i>
gdp	0.065 <i>0.13</i>	-0.034 <i>0.152</i>	0.033 <i>0.116</i>
r2	0.065	0.061	0.065
N	53643	53643	53643
Underid Test <sup>a</sup>	707.486	317.216	906.035
chi-sq (1) P-val	0.000	0.000	0.000
Weak id Test	480.409	201.356	370.701
Hansen J stat.			0.522
Chi-sq(2) P-val			0.7703

(\*\*\*) (\*\*) (\*) refer to 1%, 5%, 10% significance levels. Robust standard errors (in italics) are clustered at firm level. All estimates are fixed effects; year dummies are always included; a) Kleibergen-Paap rk LM statistic; b) Cragg-Donald Wald F statistic; Instruments: *turnover*, *elections* and interacted terms.

Table 2: The effect of tax gap on firms' labour productivity - selected results

Dependent Variable: productivity			
Instrument:	turnover	election	both instruments
tax gap	-1.720*** <i>0.506</i>	-3.384*** <i>0.752</i>	-2.260*** <i>0.422</i>
tax gap x size	0.563*** <i>0.230</i>	0.746* <i>0.400</i>	0.609*** <i>0.220</i>
size	-0.123*** <i>0.049</i>	-0.161* <i>0.085</i>	-0.133*** <i>0.047</i>
k	0.050*** <i>0.003</i>	0.051*** <i>0.003</i>	0.051*** <i>0.003</i>
gdp	-0.112 <i>0.201</i>	-0.660** <i>0.294</i>	-0.292 <i>0.184</i>
r2	0.08	0.053	0.074
N	88829	88829	88829
Underid Test <sup>a</sup>	762.221	268.950	995.010
chi-sq (1) P-val	0.000	0.000	0.000
Weak id Test	196.546	196.546	364.584
Hansen J stat.			3.552
Chi-sq(2) P-val			0.1693

(\*\*\*) (\*\*) (\*) refer to 1%, 5%, 10% significance levels. Robust standard errors (in italics) are clustered at firm level. All estimates are fixed effects; year dummies are always included; a) Kleibergen-Paap rk LM statistic; b) Cragg-Donald Wald F statistic; Instruments: *turnover*, *elections* and interacted terms.

Table 3. First stage statistics - selected results

	TG	TG x size	TG	TG x size	TG	TG x size
turnover	-0.00053***	-0.0005***			-0.00052***	-0.00043***
	<i>0.00002</i>	<i>0.00004</i>			<i>0.00002</i>	<i>0.00004</i>
turnover x size	0.00004**	0.00125***			0.00005**	0.00118***
	<i>0.00002</i>	<i>0.00005</i>			<i>0.00002</i>	<i>0.00005</i>
election			0.00399***	-0.00332***	0.00393***	-0.00210***
			<i>0.00025</i>	<i>0.00031</i>	<i>0.00024</i>	<i>0.00030</i>
election x size			-0.00044	0.01292***	-0.00058*	0.00952***
			<i>0.00033</i>	<i>0.00058</i>	<i>0.00032</i>	<i>0.00055</i>
F	335.40	407.06	148.36	309.65	241.88	270.01
p-val	0.00	0.00	0.00	0.00	0.00	0.00
(Underid) SW Chi-sq						
a	676.10	747.70	299.02	649.23	979.65	1122.61
p-val	0.00	0.00	0.00	0.00	0.00	0.00
(Weak id) SW F <sup>b</sup>	675.99	747.58	298.98	649.13	326.49	374.14

(\*\*\*) (\*\*) (\*) refer to 1%, 5%, 10% significance levels. Robust standard errors (in italics) are clustered at firm level. All estimates are fixed effects; year dummies are always included. a) Sanderson-Windmeijer (SW) chi-squared; b) Sanderson-Windmeijer F statistics.

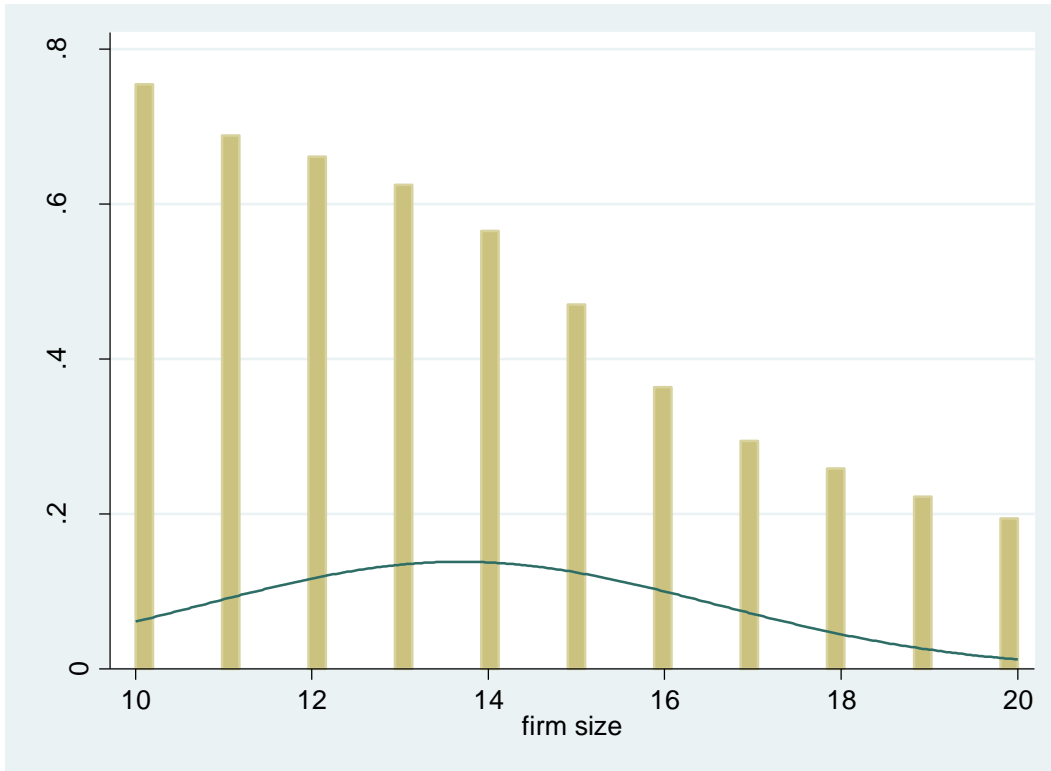
Table 4. OLS selected results

	flows	productivity
TG	0.256***	-0.414***
	<i>0.064</i>	<i>0.073</i>
TG x size	-0.06	0.064*
	<i>0.038</i>	<i>0.036</i>
size	0.016*	-0.019**
	<i>0.009</i>	<i>0.01</i>
k	-0.002	0.05***
	<i>0.002</i>	<i>0.003</i>
gdp	0.084	0.268**
	<i>0.091</i>	<i>0.117</i>
r2	0.068	0.088
N	72928	108941

(\*\*\*) (\*\*) (\*) refer to 1%, 5%, 10% significance levels. Robust standard errors (in italics) are clustered at firm level. All estimates are fixed effects; year dummies are always included.



Graph 1: Firm size distribution



Graph 2: Firm size and average tax gap at province level.

