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Cross-country differences in self-employment rates: the role of institutions

Roberto Torrini*

Economic Research Department, Bank of Italy, Via Nazionale 91, 00184 Rome, Italy

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Abstract

This paper examines the role of institutional variables in determining the large disparities observed in self-employment rates across OECD countries. We develop a simple model analysing the role of taxation and tax evasion opportunities. This model predicts tax evasion opportunities to have an unambiguous positive impact on self-employment, while taxation can either spur or reduce the self-employment rate depending on the country attitude towards tax evasion. We find empirical support for the model predictions using a panel of OECD countries. We also show that the selfemployment rate depends negatively on the share of workers in the public sector, while we do not find any robust relationship with employment protection legislation. We find a positive correlation with product market regulation and a negative one with the unemployment benefit replacement rate, but their relevance is sensitive to model specification.

JEL classification: J23; J24
Keywords: Self-employment; Institutions; Taxation; Tax evasion

1. Introduction

Until recently, most cross-country labour market analyses have focused on paidemployment, while research on self-employment has been mostly conducted at the micro-level.[1] Yet, self-employment rates show great cross-country variation, which is likely to affect

* Tel.: +39 6 47923040.
E-mail address: roberto.torrini@bancaditalia.it.
[1] See Le (1999) for a survey on empirical studies of self-employment.

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labour market performances and certainly deserves to be understood. Recently, also due to a resurgence of self-employment in countries that had previously experienced a steady decline in the self-employment rate (OECD, 2000), several studies have tried to fill this gap. Cross-country analyses include Acs et al. (1994), who focus on differences in factor endowments (capital per worker), industry composition and demographic characteristics and Blanchflower (2000) who studies the role of labour market conditions and worker characteristics. Other cross-country studies (Staber and Bogenhold, 1993; Robson and Wren, 1999; Parker and Robson, 2000; OECD, 2000) and several country specific contributions have investigated the role of institutional variables, such as taxation and labour market regulation.

The empirical literature has shown a rather robust, negative relationship between the per capita GDP level and self-employment rate, so that richest countries typically have a lower incidence of self-employment. This stylised fact, taking per capita GDP as a proxy for capital per worker, can be rationalised theoretically by the model of Lucas (1978), which predicts a decline in returns to entrepreneurship relative to wages, as economies become more capital-intensive. Moreover, certain industries, like private sector services, have been shown to display higher self-employment rates than others, so that changes in industry composition and cross-country differences in industry specialization could explain changes over time in self-employment spread and cross-country differences in self-employment rates (Acs et al., 1994). These factors, however, do not seem to account for the persistence of the observed large cross-country differences.

Following a rather vast literature, we thus study the role of a selected number of institutional variables, with a particular focus on the size of the public sector and taxation. Previous cross-country empirical studies have almost ignored the potential role of the public sector in crowding-out self-employment opportunities. In fact, public sector expansion can both tilt distribution of workers between industries toward public services where self-employment has no role (e.g. general administration), and crowd out private business in sectors like education and health where the State typically gets involved. We provide evidence that these effects have a significant negative impact on self-employment in a panel of OECD countries.

As to taxation, whose impact on self-employment has received most attention, we show with a simple model the theoretical relevance of considering jointly tax rates and tax law enforcement. Previous empirical literature has mostly assumed a positive relationship between the level of taxation and self-employment, on the ground that self-employed workers would have higher opportunities to hide their income from the tax authorities. A tax increase would thus increase the incentive to become self-employed in order to avoid taxation (Blau, 1987; Evans and Leighton, 1989a,b; Parker, 1996; Shuestze, 2000). From a theoretical point of view, however, this negative relationship cannot be taken for granted. If the income of self-employed workers is more sensitive to individual effort than wage income, a tax increase will hurt self-employed workers more than employees (Robson and Wren, 1999).[2] This effect could offset the benefit of greater opportunities of evading

[2] For a review of theoretical models of self-employment with an analysis of the impact of taxation, see De Witt (1993). This survey presents models with heterogeneity in risk aversion or entrepreneurial abilities, where taxation has ambiguous effects depending on the specification of the model.

taxation, so that the impact of a tax increase on the incidence of self-employment is theoretically ambiguous. In fact, a few empirical studies have provided evidence of a negative relationship between tax rates and self-employment (Davis and Henrekson, 1999; Fölster, 2002). Moreover, in the policy debate, it is often stated that higher tax rates are detrimental to entrepreneurial activities.

We argue that to understand the relationship between taxation and self-employment we should distinguish between the effects of taxation per se and the effect of tax law enforcement. In the simple model we develop, assuming that tax evasion is easier for self-employed workers, an increase in the probability of being detected by the tax authorities unambiguously reduces the incentive to become self-employed, irrespective of the level of taxation; cross-country differences in the enforcement of the tax legislation could thus explain some of the differences in self-employment rates. Moreover, according to the model, tax rate changes can affect in a different (even opposite) way countries characterised by high or low enforcement of their tax legislation. Assuming that self-employed income is more sensitive to individual choices (say effort), if irrespective of employment status tax evasion were not allowed, an increase in the tax rate would unambiguously shift workers from self-employment to paid-employment (incentive effect). On the contrary, in countries where the detection probability is low and possibly lower for self-employed workers, a tax increase can be expected to spur self-employment, or at least we could expect the incentive effect to be offset by higher tax evasion opportunities. We test the predictions of our model on a panel of OECD countries finding empirical support for all of them.

We also investigate the role of employment protection legislation, of product market regulation and of the unemployment benefit replacement ratio. Like Robson (2003), we find that the cross-section correlation between self-employment rates and EPL does not hold in a multivariate context. We do find evidence of a more robust positive correlation between product market regulation and self-employment and a negative one with the unemployment benefit replacement ratio. These results, however, are sensitive to the model specification.

The paper proceeds as follow. The next section analyses trends over time in selfemployment and the role of industry composition in explaining cross-country differences in self-employment rates. In Section 3, we discuss the relationship between selfemployment and institutional variables and we develop a simple model of employment choice, investigating the role of taxation. In Section 4, we present our empirical results, which are summarised in the last section.

2. Cross-country differences and long-run trends in self-employment rates

According to a broad definition including all workers not classified as employees, in most industrialised countries the share of self-employment accounts for at most 10% of people working in the non-agricultural sector. Nevertheless, there are significant exceptions.

The aggregate we consider includes entrepreneurs (those who run a firm or are helped in their activity by one or more employees), people self-employed on their own account, and unpaid family workers. According to this broad definition, at the beginning of this decade the self-employment rate in the non-farm sectors ranged from 5% to more than 30% in the OECD countries excluding transition economies. At one extreme were some

Table 1
Self-employment rate in the non-agricultural sectors

Country	(1)					(2)
	1970	1978	1990	1998	2000	1998–2000
AUS	9.6	12.3	13.0	12.4	12.3	12.7
AUT	12.7	9.4	7.9	8.7	8.7	8.9
BEL	15.2	14.3	16.4	16.9	16.9	15.6
CAN	7.0	7.2	7.4	10.2	9.5	9.9
DEU	10.3	8.3	8.5	9.9	9.6	9.9
DNK	13.4	11.4	8.6	7.7	7.2	7.7
FIN	6.7	6.9	9.5	10.2	10.0	9.9
FRA	12.5	10.7	9.3	8.2	7.9	9.5
GBR	6.7	6.8	14.2	12.5	11.7	11.6
GRC	–	31.9	32.4	32.1	30.4	31.5
ICE	10.3	8.5	11.3	14.9	15.0	14.9
IRL	10.8	11.0	13.8	14.2	13.7	13.9
ITA	24.5	22.7	25.8	27.0	26.7	26.4
JPN	22.6	21.4	17.3	13.7	13.2	13.5
KOR	–	34.5	27.9	31.3	31.0	31.2
LUX	12.3	9.8	7.1	5.7	5.6	7.7
MEX	–	–	33.1	31.5	30.3	30.8
NLD	–	8.7	9.1	10.4	9.9	10.1
NOR	8.6	8.0	7.0	5.6	5.1	5.1
NZL	–	9.4	15.5	17.0	17.4	17.2
PRT	13.1	15.5	18.2	20.1	18.7	19.3
SPA	21.2	19.8	21.0	20.0	17.8	18.7
SWE	6.2	4.5	7.8	9.1	9.0	9.5
TUR	–	–	31.0	27.8	27.3	27.7
USA	7.6	7.4	7.7	7.1	6.6	6.8

(1) Source: OECD.
(2) Source: OECD and Eurostat.

north European economies and, at the other, the Mediterranean countries and some new OECD members (Table 1). Statistical discrepancies could explain part of these differences.[3] However, considering the magnitude of the observed differences and taking into account that Eurostat data guarantee substantial consistency across the EU countries, they can hardly explain such a large variability.

In principle, even excluding agriculture, which traditionally has a high self-employment rate, the industry distribution of employment at country level could be an important explanatory factor. The self-employment rate shows a similar pattern across countries: it is higher than average in industries like retailing, hospitality and business services, and much lower in others such as manufacturing and telecommunications. Hence, economies specialised in the former should show higher self-employment rates than those specialised in the latter. In fact, differences in industry composition are not big enough to account for

[3] The low rate in the United States, for instance, is partly due to the exclusion of ''incorporated business'' from the self-employment pool. According to Manser and Picot (1999), if this category of workers were classified as self-employed, as in most other countries, the self-employment rate in the US would rise from about 7% to9.6%, in line with other industrialised economies.

the differences in self-employment. Comparing self-employment rates at sector level across the European economies, it is apparent that countries with high self-employment rates have higher than average rates in almost every sector (Table 2). Moreover, computing theoretical self-employment rates by assuming the same industry composition for each European country (the European average), it turns out that they do not differ substantially from those actually observed (Table 3).

As recalled in the previous section there is evidence (Acs et al., 1994) and sound theoretical grounds (Lucas, 1978) for a negative relationship between self-employment and per capita GDP, as a proxy for capital intensity. The simple cross-section regression of the self-employment rate on per capita GDP in purchasing power parity terms explains more than 60% of cross-country variability, even if some countries, notably Italy, Korea and Greece exhibit substantially higher than expected rates. However, self-employment rates in the non-farm sectors do not show a clear pattern of convergence. Differences among OECD countries seem to be persistent, and it is not possible to identify a common

Table 2
Self-employment rates by sector

Industry	EU-15	B	DNK	DEU	GRC	ESP	FRA	IRL
Agriculture (A–B)	67.7	79.1	57.6	47.9	95.9	62.7	69.9	81.5
Mining and quarrying (C)	4.2	0.0	0.0	1.6	5.6	3.5	2.1	0.0
Manufacturing (D)	8.5	6.1	4.6	5.2	29.1	12.9	5.8	7.3
Electricity, gas, water supply (E)	2.3	0.0	0.0	1.5	0.0	1.2	0.5	0.0
Construction (F)	23.8	25.6	15.6	11.9	36.5	22.5	22.2	27.0
Wholesale and retail, repairs (G)	25.5	34.9	13.9	14.5	56.1	37.7	17.8	20.4
Hotels and restaurants (H)	27.4	44.0	16.2	24.8	48.2	35.8	26.7	18.4
Transport, communication (I)	11.6	6.3	10.1	7.6	28.6	25.9	5.1	19.5
Financial intermediation (J)	7.3	12.9	1.2	10.3	5.2	6.7	4.5	5.5
Real estate, business act. (K)	22.8	28.2	16.1	22.4	55.2	24.4	12.8	22.2
Public administration (L)	0.3	0.3	0.0	0.0	0.4	0.0	0.1	0.0
Other services (M–Q)	10.1	12.4	4.0	10.1	15.5	9.8	8.0	9.9
Non-farm sectors	14.2	16.0	7.9	9.9	32.1	19.7	9.8	14.1
Total	16.7	17.4	9.7	11.0	43.4	23.1	12.5	20.2

Industry	ITA	LUX	NLD	AUT	PRT	FIN	SWE	GBR
Agriculture (A–B)	62.3	80.0	56.9	86.4	83.5	75.5	70.8	53.3
Mining and quarrying (C)	11.4	0.0	0.0	9.1	5.9	20.0	0.0	4.0
Manufacturing (D)	17.0	4.8	4.9	5.0	13.9	6.2	5.5	5.4
Electricity, gas, water supply (E)	6.2	0.0	0.0	0.0	9.4	0.0	0.0	3.9
Construction (F)	39.2	0.0	15.5	7.1	26.7	26.5	23.0	35.1
Wholesale and retail, repairs (G)	57.4	13.6	13.2	12.1	41.8	16.4	20.4	12.5
Hotels and restaurants (H)	45.2	25.0	16.3	24.2	35.7	11.7	18.1	13.0
Transport, communication (I)	18.0	8.3	5.2	5.6	14.6	12.2	10.0	11.9
Financial intermediation (J)	13.9	0.0	3.8	3.5	6.9	4.2	2.3	4.1
Real estate, business act. (K)	47.8	16.7	14.7	18.4	26.9	16.8	17.3	20.0
Public administration (L)	0.6	0.0	0.6	0.0	0.7	0.0	0.0	0.6
Other services (M–Q)	16.1	7.7	8.6	8.5	10.6	5.9	4.4	10.2
Non-farm sectors	26.6	7.8	10.1	8.8	20.1	9.9	9.6	12.0
Total	28.7	9.9	11.7	13.8	28.8	14.6	11.4	12.7

Source: Eurostat.

Table 3
Actual and theoretical self-employment rates in non-agricultural sectors

Country	Self-employment rate 1998	Theoretical self-employment rate[a]	Difference
EU-15	14.2	14.2	0.0
EUR-11	14.5	14.7	−0.1
AUT	8.8	8.5	0.3
BEL	16.0	16.7	−0.7
DEU	9.9	10.4	−0.5
DNK	7.9	8.0	−0.1
ESP	19.7	18.1	1.7
FIN	9.9	10.2	−0.3
FRA	9.8	10.3	−0.5
GBR	12.0	11.7	0.3
GRC	32.1	30.1	2.0
IRL	14.1	13.2	0.9
ITA	26.6	27.1	−0.4
LUX	7.8	7.8	0.0
NLD	10.1	8.8	1.3
PRT	20.1	19.1	1.0
SWE	9.6	10.1	−0.5

Sources: Eurostat, own calculations.

[a] Theoretical values are computed assuming the European average industry composition of employment according to the following:

$$SS_{.j} = \sum_i \frac{S_{ij}}{E_{ij}} \frac{E_{ie}}{E_{.e}}$$

where i, is the sector, j the country, e is the European average, S is the number of self-employed, E is total employment, SS is the self-employment rate.

trend: during the 1970s, some economies experienced an upturn in the self-employment rate after a steadily declining trend, others showed an increase only during the 1990s, and others again exhibited a constant decline or substantial stability[4] (Table 1). These different patterns suggest that common factors like technological trends or shift in industry distribution were not at work, or that their effect has been offset by other variables that show little variability over time or only slow convergence across different economies. Institutional characteristics are likely to be among these, as they are relatively stable over time, and in spite of economic convergence countries differ significantly as to taxation, business and labour markets regulation.

3. Institutions and labour choice

In modern economies, government plays an important role in shaping the incentives workers face in choosing their employment status and in determining the allocation of

[4] In our dataset, in the period 1970– 2000 there is only a weak negative relationship not statistically significant between the increase in the self-employment rate and its level at the beginning of the period.

labour between non-market and market activities. In fact, taxation and regulation are likely to determine distortions in the allocation of labour between paid employment and self-employment, while the size of public sector defines the scope for private business.

Insofar as the expansion of the public sector crowds out private entrepreneurial activities, public sector expansion should reduce the scope for self-employment.[5] Furthermore, a larger proportion of employment in sectors like defence, justice, general administration, where self-employment has no-role, automatically reduces its incidence in total employment.[6]

As to regulation, a few studies have established a theoretical and empirical link between employment protection legislation and the self-employment rate (Grubb and Wells, 1993; OECD, 1999). In economies with a high level of employment, protection firms would prefer to rely on sub-contractors rather than on employees to avoid hiring and firing restrictions. Less clear, apparently, is the theoretical link between the self-employment rate and product market regulation. A high administrative burden could be detrimental to business activities and in particular to small business; on the other hand, business regulation could be oriented to protect small-sized firms from large-sized competitors,[7] or to discourage the growth of firms operating in specific fields, by constraining their advertising activity or their ability to raise funds in the financial market (this is the case for professional services in several countries). Therefore, the overall impact of product market regulation is largely an empirical issue.

Another variable that has been related to self-employment rate is the unemployment benefit replacement rate. This is supposed to have a negative impact on self-employment, because unemployed workers relying on benefits would have little incentive to set up a business and employees would be discouraged from leaving paid employment to avoid losing entitlement to unemployment benefits (Staber and Bogenhold, 1993; Parker and Robson, 2000; Robson, 2003).

Taxation is the institutional variable that has received most attention as a potential determinant of the self-employment rate. Given that self-employed workers are supposed to have more opportunities to hide income from the tax authorities, previous studies have generally assumed a positive relationship between taxation and self-employment spread. In addition, one could argue that the higher the tax and social contribution wedge, the greater is the incentive for firms to replace employees with self-employed contractors, possibly disguised employees (OECD, 2000), to reduce the cost of labour. In a recent study, Parker and Robson (2000) try to disentangle the two effects considering both taxation and employers' contributions in their empirical

[5] See Davis and Henrekson (1999) for an analysis of the Swedish case.

[6] The only paper that as far as we know has considered public sector size in a cross-country analysis is Staber and Bogenhold (1993). They include public sector expenditures as an additional control variable and find a positive effect. This, however, is likely to be due to the omission of suitable controls.

[7] In Italy, for instance, the retail sector has a disproportionately large share of family-owned shops, which accounts for a sizeable part of the high self-employment rate of this country. This is largely because until recent reforms market regulation has supported traditional business, discouraging the spread of chain stores (Pellegrini and Cardani, 1993; Pellegrini, 1996; Autorità garante della concorrenza e del mercato, 1994).

analysis.[8] Some empirical studies find evidence in favour of the hypothesis that high tax rates would spur self-employment. Blau (1987) and Evans and Leighton (1989a,b) for the US, and Shuestze (2000) for Canada and the US, Parker (1996) and Robson (1998) for the United Kingdom find a positive relationship between tax rate and selfemployment rate. Robson and Wren (1999) for a panel of OECD countries find a positive relationship with the average tax rate but a negative relationship with the marginal rate. However, OECD (2000) finds no robust relationship between taxation and self-employment rates and Parker (2003) using micro data for the United Kingdom does not find any impact of taxation on the choice of labour status.

Others authors have challenged this view arguing that taxation could discourage entrepreneurial activities. Davis and Henrekson (1999), for instance, claim that the small share of small business and self-employment in Sweden can be partially explained by the higher personal income tax rate. They argue that those activities where small firms are more represented, like personal services, were implicitly penalised by the high level of taxation and by the limited opportunity to use instruments designed to reduce the tax burden on business, such as tax-deductible interest payments, more suitable for capitalintensive sectors. Fölster (2002), studying a panel of Swedish regions, consistent with their analyses, finds a negative impact of taxation on self-employment.

We argue that the evidence on the importance of taxation may only appear to be contradictory in that we should also take into account the enforcement of the tax law. To illustrate how the interaction between taxation and tax law enforcement may make the relationship between the tax rate and self-employment a complex one, we build up a simple model of employment choice, which compares the effect of taxation and tax law enforcement on the self-employment rate in two economies with different degrees of tolerance of tax evasion.

We assume that self-employed workers, when some tax evasion is allowed, have a lower or the same probability of being detected as employees[9] and that their income is more sensitive or at least as sensitive to individual choices (for instance to the effort provided) as the employees' wage. This seems to be a reasonable assumption, as selfemployed workers have more autonomy in deciding work arrangements, effort and working-time. In the first economy, some tax evasion is allowed; more precisely, we assume that the probability of being detected is less than one and that it is lower for selfemployed workers. In this case, workers' utility will be higher the lower is the probability of being detected. Moreover, a reduction in the likelihood of detection will have a larger impact on self-employed workers' utility than on employees'. Accordingly, we should observe higher self-employment rates in economies with a low probability of

[8] Other studies have considered the impact of different taxation regimes for paid-employment and selfemployment (Bruce, 2000), but we will not pursue this line of research.

[9] Our model is similar to that of Robson and Wren (1999). However, we omit their analysis of the different effect of average and marginal tax rates, and focus on the impact of different probabilities of being detected. Another strand of research, assuming that agents are risk averse, has shown that the impact of taxation on selfemployment could depend on the form of the utility function. In the model of Jung et al. (1994), a tax increase spurs self-employment only if preferences exhibit increasing relative risk aversion, whereas it has a negative impact with decreasing relative risk aversion.

detection. A tax increase, however, has an ambiguous impact on self-employment, depending on the parameters of the model and on the tax rate.

In the second economy, the probability of being detected in the event of tax evasion is set equal to one for both employees and self-employed workers, so that nobody evades taxes. Given the negative relationship between the probability of detection and self-employment, the self-employment rate in this economy should be lower than in the other one. In this case, if self-employment income were more sensitive to individual effort, a tax rate increase would have a larger impact on the utility of self-employed workers, shifting workers away from self-employment. A tax increase would be neutral if the incomes of both types of workers were equally responsive to individual effort.

3.1. The impact of taxation and of the enforcement of tax law in a model of employment choice

We assume workers' utility function to be composed of two parts: a non-monetary subjective component that depends on workers' status γ, and the expected income net of the cost of effort and taxation $E(I)$. Worker status is $t=$S, E, where S denotes self-employed workers and E employees.

The utility of a self-employed worker is

$$U_{i\mathrm{S}} = \gamma_{i\mathrm{S}} + E(I_{\mathrm{S}}). \tag{1}$$

The utility of an employee is

$$U_{i\mathrm{E}} = \gamma_{i\mathrm{E}} + E(I_{\mathrm{E}}). \tag{2}$$

A worker will choose self-employment if

$$E(I_{\mathrm{S}}) - E(I_{\mathrm{E}}) > \gamma_{i\mathrm{E}} - \gamma_{i\mathrm{S}}. \tag{3}$$

The expected income is assumed to be a linear function of a choice variable that we call effort. Taking into account the cost of effort, taxation and tax evasion, the expected income of a worker is

$$\begin{aligned} E(I_t) &= (1-q_t)\left[b_t e - \tau b_t e + V\tau b_t e - \frac{1}{2}e^2\right] + q_t\left[b_t e - \tau b_t e - \frac{C}{2}V^2 - \frac{1}{2}e^2\right] \\ &= (1-\tau)b_t e + \tau(1-q_t)Vb_t e - q_t\frac{C}{2}V^2 - \frac{1}{2}e^2, \end{aligned} \tag{4}$$

where e is the worker's effort; τ is the tax rate; q is the probability of being detected in case of tax evasion; V is the proportion of income a worker chooses to evade, bounded between zero and one; $c/2\ V^2$ is the penalty in case of detection, a quadratic function of the share of income concealed from the tax authorities ; $1/2e^2$ is the cost of the worker's effort, a quadratic function of effort; b is a positive parameter. As mentioned above we assume that self-employed workers' income is more sensitive to individual effort, namely, we assume $b_{\mathrm{S}} \geq b_{\mathrm{E}}$.

Workers maximise their utility function with respect to effort and the share of income to evade, given the exogenous tax rate and probability of being detected. Workers choose their status by comparing the maximum utility they would obtain in paid-employment with the maximum utility they would obtain in self-employment.

First case: $q_S<1$, $q_E<1$ with $q_S \leq q_E$.

The first order conditions for an interior solution are:

$$e_t = b_t(1-\tau) + \tau b_t(1-q_t)V_t, \tag{5}$$

$$V_t = \frac{(1-q_t)}{q_t}\frac{\tau b_t}{c}e_t, \tag{6}$$

with V ranging between zero and one. The optimal interior solutions read

$$V_i^* = \frac{b_t^2(1-q_t)\tau(1-\tau)}{cq_t - b_t^2(1-q_t)^2\tau^2}, \tag{7}$$

$$e_t^* = b_t(1-\tau) + b_t\tau V_t^*. \tag{8}$$

Assuming $b_S>b_E$ and $q_S \leq q_E$ or $b_S=b_E$ and $q_S<q_E$, the following hold:

$$e_S^* > e_E^*, V_S^* > V_E^*. \tag{9}$$

Simple comparative statics shows the self-employment rate to be inversely related to the probability of detection. To prove this we compute the derivative of the maximum utility function with respect to the detection probability, showing that it is bigger in absolute value for self-employed workers.

For the envelope theorem, the derivative of the maximum function with respect to q is equal to the derivative of Eq. (4), taking V and e at their optimal levels. Consequently, comparing the impact of an increase of q on the utility of self-employed workers to the impact on the utility of employees, and knowing that $e_S^*>e_E^*$ and $V_S^*>V_E^*$ the following holds:

$$\frac{\partial U_S^*}{\partial q_S} = \frac{\partial U_S}{\partial q_S}\Big|_{e=e^*,V=V^*} = -\tau b_S e_S^* V_S^* - \frac{c}{2}V_S^{*2} < \frac{\partial U_E^*}{\partial q_E} = \frac{\partial U_E}{\partial q_E}\Big|_{e=e^*,V=V^*}$$

$$= -\tau b_E e_E^* V_E^* - \frac{c}{2}V_E^{*2}. \tag{10}$$

For $q_S<q_E$ inequality (10) still holds if we assume $b_S=b_E$. Moreover, as V and e are inversely related to q, the spread between the two is higher the lower the probability of detection for the self-employed relative to that for employees. Accordingly, inequality (10) implies that at any given tax rate an economy with a lower detection probability has a higher self-employment rate, the more so the more the two kinds of workers differ with respect to their probabilities of detection and/or the sensitivity of income to effort.

In contrast, the effect of a tax rate change is ambiguous. For the envelope theorem the derivative with respect to s of the maximum utility function of a self-employed worker reads

$$\frac{\partial U_S^*}{\partial \tau} = \frac{\partial U_S}{\partial \tau}|_{e=e^*,V=V^*} = -b_S e_S^* + b_S(1-q_S)e_S^* V_S^*$$
$$= -b_S e_S^*\left(1-(1-q_S)V_S^*\right), \tag{11}$$

which is bigger or smaller than the derivative of maximum utility function of an employee,

$$\frac{\partial U_E^*}{\partial \tau} = \frac{\partial U_E}{\partial \tau}|_{e=e^*,V=V^*} = -b_E e_E^* + b_E(1-q_E)e_E^* V_E^*$$
$$= -b_E e_E^*\left(1-(1-q_E)V_E^*\right), \tag{12}$$

depending on the parameters and on the tax rate. As $(1-(1-q_S)V_S^*)<(1-(1-q_E)V_E^*)$ and $e_S^*>e_E^*$, the relative impact of a tax increase on the utilities of these two kinds of workers is not determined.

Second case: $q=1$ for both employees and self-employed workers.

This represents the case of countries with a low tolerance for irregular activities like tax evasion. If q is equal to one it is trivial to show that it is optimal to set V equal to zero, whereas the first order condition for effort is:

$$e_t^* = b_t(1-\tau). \tag{13}$$

This implies that the optimal effort level is higher for self-employed workers. The maximum utility function is:

$$U_t^* = \gamma_{it} + (1-\tau)b_t e_t^* - \frac{1}{2}e_t^{*2} = \frac{(1-\tau)^2 b_t^2}{2}. \tag{14}$$

Individual i will choose self-employment if:

$$\frac{(1-\tau)^2 b_S^2}{2} - \frac{(1-\tau)^2 b_E^2}{2} > \gamma_{iE} - \gamma_{iS}. \tag{15}$$

In this case a tax rate increase will unambiguously reduce the share of workers choosing self-employment. By differentiating the left hand side of Eq. (14) with respect to τ we get

$$-\left(b_S^2 - b_E^2\right)(1-\tau)\Delta\tau < 0, \tag{16}$$

which is always negative if $b_S>b_E$.

Moreover, since the self-employment rate is negatively related to the probability of detection, ceteris paribus we should observe a lower self-employment rate in this economy, where q is set at its maximum level.

This extremely simple model can account for quite a complex relationship between self-employment and taxation. First, we should observe a higher self-employment rate in countries where tax evasion is easier (this could arise either as a consequence of a higher sensitivity of self-employment income to individual effort or as a result of a lower

detection probability for self-employed workers). Moreover, in countries with low tolerance for tax evasion, we should observe a negative or no relationship between the tax rate and the self-employment rate, while in countries where tax evasion is tolerated, a tax rate increase can either increase or reduce the self-employment rate. In the empirical analysis, we will try to reflect the complexity of the model outcomes by interacting taxation with a proxy for the enforcement of the tax law in different countries.

4. An empirical assessment of the role of institutional variables

We have collected data that should proxy the above institutional characteristics in 25 countries. We consider industrialised countries belonging to the OECD. Given the focus on institutional characteristics, we do not take into account former Communist countries.

As we do not have a direct measure of tax evasion opportunities, as a proxy for countries' attitude towards rules and tax evasion, we use a measure of corruption at the country level. This choice is motivated by a rather vast literature focusing on the incentives problem public administrations face when tax inspectors can be bribed (see for instance Chandler and Wilde, 1992), and a few empirical analyses which find evidence of a positive link between corruption of tax inspectors and levels of tax evasion (Johnson et al., 1999).

The Corruption perception index (CI)[10] used here is produced by Transparency International, an international leader in anti-corruption research. This index is based on a number of different surveys, measuring the perception of the degree of corruption by business people, risk analysts and the public. In our analysis, we use an average of the index for the years 1997, 1998 and 1999, and of the historical index computed by Transparency International over the period 1988–1992. The index shows substantial time persistence and year on year changes seem to reflect measurement errors rather than actual changes in corruption perceptions.[11]

As a proxy for the size of the public sector, we use the proportion of public sector employment computed using data from the OECD Economic Outlook Database. For the regulatory environment, we rely on the indicators of labour and product market regulation produced by the OECD, as published by Nicoletti et al. (1999). The labour market indicators take into account regulations on regular and temporary contracts.[12] The product market indicator aims at measuring public intervention on allocative mechanisms, trying to evaluate how friendly national regulations are to market

[10] This index has been used in related studies. For instance, Johnson et al. (1998) find that the corruption index is positively correlated with the underground economy, arguably more easily accessible to self-employed workers.

[11] Comparing this index averaged over the period 1997–1999 with historical data, the ranking of countries shows a low level of variability over time; this index is also strongly correlated with the three indicators published in La Porta et al. (1998) on corruption (0,92), rule of law (0.82), and efficiency of the judicial system (0.82). This seems to testify to the robustness of this measure and its capacity to capture the attitude towards illegal activities and law enforcement.

[12] These indicators are undoubtedly affected by measurement errors. The indicators computed for Italy, for instance, overstate the role of employment protection because of the erroneous inclusion within firing costs of a special kind of severance payment, which is due to the worker irrespective of the reason for the separation, even in case of resignation or retirement (Schivardi and Torrini, 2003).

mechanisms. To evaluate the role of taxation we use OECD data on tax and social contribution rates net of public transfers, published in The Tax\Benefit Position of Employees, and available in the OECD statistical compendium. We take the average over the wedge for a couple with mean income and only one person employed and the wedge for a single person with mean income. The replacement rates are the OECD estimates published in the statistical compendium.

In Table 4, we report the self-employment rate in non-agricultural sectors, per capita GDP and capital per worker in purchasing power parity terms and the institutional indicators. As shown in Table 5, self-employment is highly correlated with per capita GDP, Corruption index, product market regulation and, to a lesser extent, the public sector size and labour market regulation. These variables also show a substantial degree of collinearity.

Countries like Italy, Greece and Turkey, which combine high levels of regulation, taxation and a high level of the corruption index, have high self-employment rates. Also, countries like Japan, Mexico and Korea which show a small public sector, a small wedge and a high CI have higher than average self-employment rates. At the opposite extreme the Scandinavian countries, with a large public sector, high wedge and small Corruption index have very small self-employment rates.

Table 4
Self-employment rate in the non-agricultural sectors, per capita GDP and institutional characteristics

Country	Self-employment rate (1998–2000)	Per capita GDP (1998–2000)	Public sector size (1998–2000)	Corruption perception index	Total wedge (1998–2000)	Replacement rate (1997)	Product market regulation	EPL
AUS	12.7	24,335	15.0	1.3	19.7	26.2	0.9	1.1
AUT	8.9	23,540	16.1	2.4	38.4	31.0	1.4	2.4
BEL	15.6	24,066	18.9	4.7	48.8	39.8	1.9	2.1
CAN	9.9	25,638	21.1	0.8	26.6	30.0	1.5	0.6
DEU	9.9	22,678	12.6	2.0	43.2	27.1	1.4	2.8
DNK	7.7	25,071	31.4	0.0	37.4	66.4	1.4	1.5
FIN	9.9	22,727	16.0	0.4	44.9	35.5	1.7	2.1
FRA	9.5	21,882	26.1	3.4	43.5	36.5	2.1	3.1
GBR	11.6	20,693	25.9	1.5	27.1	18.8	0.5	0.5
GRC	31.5	14,482	18.5	5.0	36.0	22.3	2.2	3.5
ICE	14.9	25,969	12.3	0.6	12.8	–	–	–
IRL	13.9	25,224	15.0	1.9	25.4	30.0	0.8	1.0
ITA	26.4	21,430	18.7	5.2	42.0	18.3	2.3	3.3
JPN	13.5	24,380	17.5	3.9	20.8	10.6	1.5	2.6
KOR	31.2	12,739	8.8	5.9	15.4	–	2.4	2.3
LUX	7.7	40,134	11.3	1.3	23.0	–	–	–
MEX	30.8	7942	11.1	6.9	17.1	–	1.9	2.0
NLD	10.1	24,046	14.4	1.0	39.3	46.9	1.3	2.4
NOR	5.1	25,983	9.9	1.1	31.8	38.9	2.2	2.9
NZL	17.2	18,156	32.9	0.7	17.2	27.1	1.3	1.0
PRT	19.3	15,895	15.2	3.3	29.9	33.4	1.7	3.7
SPA	18.7	17,419	19.9	3.8	34.7	31.7	1.6	3.2
SWE	9.5	22,148	32.9	0.6	47.1	27.6	1.4	3.2
TUR	27.7	6210	12.6	6.6	36.8	–	2.9	3.6
USA	6.8	31,618	15.6	2.5	26.5	12.6	1.0	0.2

Table 5
Correlation coefficients

	Self-employment rate	Per capita GDP	Unemployment rate	Public sector size	Corruption perception index	Wedge	PMR	EPL	Replacement rate
Self-employment rate	1								
Per capita GDP	−0.610 (0.00)	1							
Unemployment rate	0.295 (0.00)	−0.244 (0.00)	1						
Public sector size	−0.441 (0.00)	0.18 (0.40)	0.045 (0.314)	1					
Corruption index	0.797 (0.00)	0.560 (0.00)	0.156 (0.00)	−0.444 (0.00)	1				
Wedge	−0.093 (0.038)	−0.136 (0.02)	0.355 (0.00)	0.354 (0.00)	0.119 (0.01)	1			
PMR	0.456 (0.000)	−0.43 (0.00)	−0.054 (0.22)	−0.029 (0.54)	0.641 (0.00)	0.291 (0.00)	1		
EPL	0.377 (0.000)	−0.43 (0.00)	−0.021 (0.63)	−0.062 (0.18)	0.472 (0.00)	0.412 (0.00)	0.721 (0.00)	1	
Replacement rate	−0.397 (0.000)	−0.160 (0.00)	0.135 (0.01)	0.379 (0.00)	−0.495 (0.00)	0.396 (0.00)	0.09 (0.71)	−0.046 (0.384)	1

Data covering the whole sample period 1979–2000.

Data present substantial collinearity, some of the variables are not regularly measured over time (e.g. Product market regulation), some are likely to show little variability over the sample period (e.g. Corruption perception index). This makes it difficult to analyse simultaneously the role of all the variables considered in the literature and reviewed in the previous sections. Hence, we first focus on the role of taxation, tax law enforcement, as proxied by the Corruption index and public sector size, which are at the core of our theoretical analysis, and we then go on to assess the role of the other variables. We first present pooled estimates then we move to a country fixed-effect model. To attenuate the possible problems arising from the fact that our dependent variable ranges from zero to one, we adopt a semilogarithmic specification.[13] Moreover, as in most related literature, in our multivariate regressions we control for per capita GDP as a proxy for capital per worker[14] and for the unemployment rate. The unemployment rate variable seems to be a suitable control for movements of the self-employment rate due to business cycle fluctuations. However, as the correlation between unemployment and self-employment rates can be due to changes in both the numerator (self-employed) and the denominator (self-employed and employees) of our dependent variable, our analysis does not allow us to judge upon the opposite views on the role of market conditions discussed in the literature (see Acs et al., 1994; Blanchflower, 2000). One view holds that a high unemployment rate pushes workers to set up in business; the other holds that a high unemployment rate and a depressed economy discourage workers from starting up entrepreneurial activities.[15] In fact, labour market conditions could affect the selfemployment rate even if they had no impact on self-employed workers: if wages were less flexible than self-employment income, the number of employees would respond more to business cycle conditions than the number of self-employed, changing the incidence of self-employment on overall employment.

Table 6 presents pooled estimates.[16] Controlling for per capita GDP and unemployment rate, public sector size is significantly related to self-employment and shows the expected negative sign (column 1). Moving on to test the predictions of our model on the role of taxation and of opportunities for tax evasion, in columns 2 and 3 we report the regressions

[13] Our results do not change substantially with a linear or a logistic specification.

[14] We have also tried in cross-section analysis a direct measure of capital per worker in the early 1990s from the Penn Tables. However, we have found per capita GDP to be a harder test for the institutional variables we analyse. Moreover, per capita GDP is available for the entire sample period while capital per worker is only available up to the early 1990s and it is likely to be affected by more serious measurement errors. Hence we only report the results obtained with per capita GDP.

[15] Most of the empirical evidence seems actually to support the push effect view. Evans and Leighton (1989a,b), Shuestze (2000), Martinez-Granado (2002) find a positive relationship between self-employment and unemployment rates. Evans and Leighton (1989b) find workers have experienced unemployment spells have a higher probability of entering self-employment. Carrasco (1999) provides evidence for Spain that a high unemployment rate pushes the unemployed workers into self-employment but reduces the probability of transitions from paid-employment to the self-employment pool. On the contrary, Blanchflower and Oswald (1991) and Taylor (1996) find evidence of a negative relationship between unemployment rates and self-employment.

[16] As we use country-year observations, without fixed effects, so that observations cannot be considered independent and the corruption index varies only across country, we adjust the standard errors for clustering (Moulton, 1986).

Table 6
The role of public sector size, taxation and the Corruption perception index

Dependent variable: log of self-employment rate	(1)	(2)	(3)	(4)	(5)
Per capita GDP	−0.064 (0.000)	−0.040 (0.001)	−0.041 (0.000)	−0.064 (0.000)	−0.046 (0.000)
Public sector size	−0.030 (0.000)	−0.015 (0.021)	−0.019 (0.000)	−0.028 (0.002)	−0.015 (0.002)
Corruption perception index (CI)		0.125 (0.003)			
Dummy CI			0.506 (0.000)		
Wedge				−0.004 (0.609)	−0.012 (0.000)
Wedge×Dummy CI					0.015 (0.000)
Unemployment rate	0.012 (0.000)	0.012 (0.151)	0.006 (0.316)	0.015 (0.110)	0.007 (0.282)
R^2	0.664	0.774	0.809	0.677	0.838
Number of observations	488	488	488	488	488
Year dummies	Yes	Yes	Yes	Yes	Yes

P-values in brackets (robust standard errors, adjusted for clustering).
Dummy CI is a dummy denoting countries with a higher than average CPI in Corruption perception index.

on the Corruption perception index, which should pick up the effect of the degree of toleration for tax and social contributions evasion. Consistent with our priors, the parameter estimate is positive and significant:[17] countries where tax evasion seems to be easier show higher than average self-employment rate.

Columns 4 and 5 show the results of regressions on the tax and social contribution wedge. Our model predicts that the impact of taxation can be either positive or negative depending on tax evasion opportunities. We try to account for this possibility by interacting the tax wedge with a dummy denoting countries with a higher than average Corruption perception index, controlling for public sector size which is collinear with taxation. Consistent with the model, the tax and social contribution wedge turns out to be negative and the interaction positive (column 5), while it is not significant when introduced in the regression without the interaction (column 4). In countries with few opportunities to evade taxes, the wedge has a negative impact on self-employment, while it has virtually no effect in countries where self-employed workers have presumably nonnegligible opportunities to hide taxes from tax authorities.[18]

To check the robustness of these results we move on to exploit the time variability in our sample, performing static fixed effect regressions that should catch the long-run relationship between the self-employment rate and the covariates. Fixed effects should account for time-invariant country-specific characteristics and for variables that are likely to have changed little over the sample period, like the Corruption perception index. In addition, we include country specific time trends among the regressors, which should account for specific technological, demographic or sectoral shifts that have been found of some relevance in other studies, and which we do not explicitly control for in our analysis.

Hence our model reads

$$y_{it} = x_{it}\beta + t\gamma_i + \mu_i + \lambda_t + \epsilon_i \tag{17}$$

where x is a matrix of covariates; t is a time trend; μ is a time-invariant, country-specific effect; λ is a time effect common across countries.

This analysis largely confirms the results obtained above. Column 1 in Table 7 reports the OLS estimates on public sector size and the tax and social contribution rate, controlling for per capita GDP and unemployment rate. The results are remarkably similar to those obtained in pooled regressions. The public sector size parameter is negative and significant, the tax wedge is negative and the interaction with the Corruption index dummy is positive. In addition, the unemployment rate turns out to be positive and significant, while per capita GDP, possibly due to the collinearity with time trends is not significantly different from zero. The magnitude of the parameters appears

[17] Similar results are obtained if instead of the raw Corruption index we use a dummy denoting countries with a higher than average level of this index (column 3).

[18] Splitting the wedge into the tax and social contribution rates of workers and the social contribution rate paid by employers, as suggested by Parker and Robson (2000), does not seem to change the results substantially. In an exercise, that for reason of space we do not report, we find the parameter on the wedge of workers to show the same behaviour as the total wedge in Table 7, while the social contributions rate of employers turns out to be not significant.

Table 7
OLS and DOLS estimates and cointegration tests

Dependent variable, log of the self-employment rate	(1) OLS	(2) OLS	(3) DOLS
	Unbalanced panel 25 countries	Balanced panel 19 countries	Balanced panel 19 countries
Per capita GDP	−0.002 (0.763)	−0.003 (0.599)	−0.002 (0.364)
Public sector size	−0.021 (0.006)	−0.027 (0.000)	−0.048 (0.000)
Wedge	−0.010 (0.000)	−0.012 (0.000)	−0.024 (0.000)
CI×Wedge	0.012 (0.000)	0.014 (0.001)	0.041 (0.000)
Unemployment rate	0.018 (0.000)	0.021 (0.000)	0.017 (0.000)
Country dummies	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes
Country specific time trend	Yes	Yes	Yes
Number of observations	488	418	361
Cointegration Tests on model in column 2			
Maddala Wu Test (H0: no cointegration) (Dicky fuller)		83.19 (0.000)	
Maddala Wu Test (H0: no cointegration) (Phillips Perron)		82.89 (0.000)	

P-values in brackets.
CI is a dummy denoting countries with a higher than average CPI in Corruption perception index.

to be quite similar to the estimates in Table 7.[19] These results seem to provide evidence for the presence of a long-run relationship linking the self-employment rate to the size of the public sector and the tax and social contributions wedge. However, given the small crosscountry dimension of the panel, we cannot rule out the possibility of spurious regression (Phillips and Moon, 2000), if the variables we consider are not stationary.

We therefore select a balanced panel of 19 countries, present in the sample during the whole period (22 years), and test for the presence of unit-roots. Table 8 reports the results of panel unit roots tests. According to the Maddala and Wu (1999) test, we cannot reject the null of non-stationarity for any of the variables we analyse, while Im et al. (2003) test rejects the null only for the unemployment rate. Given this evidence, we also ran a cointegration test applying two versions of the Maddala and Wu test to the residuals of the OLS estimate, restricting the sample to the 19 countries for which data cover the whole sample period. The estimates we obtain in this sample are virtually the same obtained on the entire unbalanced panel (Table 8, column 2), and both the tests we performed rejected the null of no cointegration. Given, however, that the OLS estimate of the cointegration vector can be biased in finite sample due to the nuisance parameters associated with the serial correlation properties of the data, and the t-statistics are not valid, we also run a Dynamic OLS estimate of our model.

Nelson and Sul (2002) panel DOLS estimator extends to the panel context the estimator originally proposed by Stock and Watson (1993); it allows for individual time effects and trends, common time effects and disparate short run dynamics. The

[19] Like in the pooled regression, splitting the total wedge between the employees' and the employers' wedge,the employers wedge turns out to be not significant (see Footnote 17).

Table 8
Panel unit root tests

	Maddala Wu Test Philips Perron version (H0: no stationary)	Im Pesaran Shin Test (H0: no stationary)
Log (self-employment rate)	24.51 (0.96)	1.02 (0.84)
Per capita GDP	11.65 (1.00)	3.58 (1.00)
Public sector size	18.64 (0.99)	0.36 (0.64)
Wedge	23.32 (0.97)	−0.058 (0.48)
Unemployment rate	17.32 (0.97)	−3.18 (0.01)

P-values in brackets.

DOLS estimator includes leads and lags of the first differences of regressors for each individual to correct for nuisance parameters, allowing for heterogeneity in their parameter estimates.[20] Results with the DOLS estimator are qualitatively similar to those obtained with OLS, but the magnitude of the estimates for the public sector size, the wedge and the interaction term are much larger (Table 8, column 3). Moreover, combining the wedge parameter and the interaction term, the estimate of the impact of the wedge on self-employment in countries with a high corruption index turns out to be positive, while it was almost nil in the OLS case. We do not want to overstate the meaning of these differences as we analyse a quite small panel; instead we consider as encouraging the fact that this results are consistent with the theoretical predictions of the model and are not in contrast with the OLS estimates.

Moving on to regulation variables and on the replacement rate, in Table 9 we report the results of pooled regressions. Controlling for per capita GDP, only the replacement rate is significant and has the negative expected sign. Once we control for both public sector size and unemployment rate, product market regulation and replacement rate are close to be significant at the 10% level, and they are both significant when jointly introduced in the regression.

Thus like Robson (2003) we find the Employment protection index to be not significant in a multivariate context,[21] while the relationship between the self-employment rate and both the replacement rate and the product market regulation seems to be more robust. However, these variables are no longer significant when we include the Corruption perception index among the regressors (Table 9, column 9), which is highly correlated with both of them.[22] Therefore, even if the roles of product market regulation and the

[20] Note how this requires projecting each regressor on the leads and lags of the first differences of all the regressors included in the regression. This implies that given the relative short time dimension of the panel, we had to limit ourselves to consider only the first lead and lag, and to include in the regression only the variables selected in our preferred model.

[21] The results are virtually the same when we perform a random effect regression in a two period panel using both the late 1980s and late 1990s releases of the EPL index, like in OECD (1999). While the product market regulation index and the replacement rate turns out to be significant, the EPL index does not.

[22] Moreover, the replacement rate turns out to be not significant in a fixed effect panel model like that in column 1 of Table 8, where we include taxation and country-specific time trend.

Table 9
The role of regulation variables and of the replacement rate

Dependent variable: log of self-employment rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Per capita GDP	−0.069	−0.073	−0.085	−0.052	−0.059	−0.072	−0.062	−0.077	−0.055
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Product market regulation	0.179			0.247			0.316	0.464	0.072
	(0.290)			(0.103)			(0.000)	(0.009)	(0.382)
Employment protection		0.042			0.061			−0102	
		(0.586)			(0.322)			(0.139)	
Replacement rate			−0.014			−0.010	−0.009	−0.009	−0.003
			(0.000)			(0.122)	(0.041)	(0.049)	(0.279)
Public sector size				−0.032	−0.030	−0.024	−0.026	−0.027	−0.011
				(0.000)	(0.000)	(0.005)	(0.002)	(0.000)	(0.086)
Unemployment rate				0.019	0.015	0.013	0.021	0.014	0.009
				(0.059)	(0.140)	(0.311)	(0.041)	(0.133)	(0.286)
Corruption perception index									0.144
									(0.000)
R^2	0.54	0.52	0.54	0.72	0.68	0.64	0.73	0.75	0.80
Number of observations	444	444	352	444	444	352	352	352	352
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

P-values in brackets (standard errors adjusted for clustering).

replacement rate seem to be more robust than that of the employment protection index, these results seem to be not conclusive.

5. Conclusions

Self-employment rates differ in a substantial and persistent way across countries. We have shown that industry distribution of employment plays a minor role in explaining such large disparities and we have argued that institutional variables, together with still strong differences in capital endowment are the most likely factors behind differences in self-employment rates. We have analysed the empirical link between self-employment rates and a set of institutional variables that have been proposed as being related to the share of self-employed workers, among them the size of the public sector. The role of this variable had not been thoroughly analysed in a cross-country perspective before, and we have shown it to have a negative significant impact on self-employment rates.

Moreover, we have developed a simple model that studies the potential role of tax evasion opportunities in shaping the incentives workers face when choosing their job. According to the model, provided that self-employed income is more sensitive to individual effort than paid-employment salary, a tax increase hurts self-employed workers more than employees; therefore, unless self-employment offers sufficiently higher tax evasion opportunities, a higher tax rate reduces the incentive to enter self-employment. On the contrary, if the tax evasion opportunities of self-employed workers are sufficiently high, a tax increase will encourage growth in self-employment. According to the model, higher tax evasion opportunities have a positive and unambiguous impact on self-employment irrespective of the tax level.

Our empirical analysis seems to support these conclusions. Our proxy for the tax evasion opportunities, the Corruption perception index, is positively related to self-employment and our pooled estimates show the correlation with this indicator to be quite robust to the inclusion of suitable controls. In addition, the tax and social contribution rate shows the expected asymmetric impact the model predicts.

As to labour and product market regulation, we find that the relationship between employment protection legislation and self-employment does not hold in a multivariate context. Somewhat more robust seems to be the positive relationship with the product market regulation and the negative one with the unemployment benefit replacement rate. However, their impact is sensitive to the model specification and to the controls included in the regressions.

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