(Tax evasion) power to the people: does "early democratization" increase the size of the informal sector?

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Abstract: This paper examines the political economy forces that lead to the creation of the informal sector in an economy. Our analysis treats unofficial economy as an endogenous outcome that may be produced by the conflict for redistribution between different groups of agents. The crucial factor in our analysis is whether the extension of voting franchise takes place before the consolidation of a strong state characterized by solid institutions (this is what we call "early democratization"). When this happens, distributional conflict affects the quality of institutions since the political elites have an incentive to decide weaker institutions which allows them to mitigate the tax burden fallen on their income. In the empirical section, we examine whether countries that experienced "early democratization" are characterized by relatively larger informal sectors. Our findings provide strong empirical evidence in favor of the implication driven by our theoretical model.

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1. Introduction

A significant part of the economic activity, in both developing and developed countries, is taking place in the informal sector. Based on recent estimates of Schneider et al. (2010) informal economic activity –in most developing countries- exceeds the 50% of the total economic activity. The existence of a large informal sector generates several malfunctions in the operation of the markets as well as in the performance of the public sector.

Starting from Rauch (1991), there is a highly influential theoretical and empirical literature examining in depth alternative determinants of informal activity. Giles and Tedds (2002), Cuff et al. (2011) and Cebula (1997) examine the effect of taxation on the size of the informal sector; Johnson et al. (1998), Fortin et al. (1997) and Straub (2005) focus on the effect of market regulation whereas Chong and Gradstein (2007), Dessy and Palage (2003) and Rosser et al. (2000) examine the impact of income inequality on informality. Finally, Friedman et al. (2000), Dabla-Norris et al. (2008), Dreher et al. (2009) focus on the institutional quality and examine how poor institutions (e.g. more bureaucracy, greater corruption, weak legal environment) are associated with a larger unofficial economy.

On the other hand, another strand of the literature recognizes that the existence of informal economy affects the size and the scope of income redistribution between the rich and the poor (see e.g. Roine, 2006; Traxler, 2009; 2012; Matsaganis and Flevotomou, 2010). However, to the best of our knowledge, there is no paper combining these two parallel research agendas by treating the size of the informal economy as an endogenous outcome of distributional conflict between different groups of agents.[1] Specifically, there is no study examining the political economy

[1] The central finding of Roine, 2006 and Traxler, 2009 and 2012 is that in the presence of tax evasion, the tax system may be less redistributive than if everyone reported truthfully. Moreover if the tax

forces that produce incentives to generate a large unofficial economy in order to mitigate unfavourable redistribution of income from some groups to some others.

The present paper seeks to place the spotlight on the potential political economy forces that lead to the creation of an informal sector. Our analysis treats unofficial economy as an endogenous outcome that may be produced –under certain political circumstances- by distributional conflict between different groups. The crucial factor in our analysis is whether the extension of voting franchise (to the poorer segment of the population) takes place before the consolidation of a strong state characterized by solid institutions. This is what we call "early democratization."

Our theoretical argument goes as follows. Extension of voting franchise increases the political power of the relatively poor share of the population and this unavoidably leads to increased demand for redistribution from high to low incomes (see e.g. Lindert, 1994; Aidt et al. 2006; Aidt and Jensen 2009). When this distributional conflict takes place before the consolidation of a firm institutional structure, the political elite have an incentive to establish low quality institutions which allows them to mitigate the tax burden fallen on their income.[2] According to this rationale, lower institutional quality (and correspondingly larger unofficial economy), although it implies losses in terms of productivity, appears to be the optimal choice for some groups of agents as it mitigates the extent of unfavorable income redistribution.[3]

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evasion technology is such that the rich evade more than the poor, these models predict redistribution from the middle class towards both the poor and the rich.

[2] In contrast, in the presence of a strong state characterized by solid institutions the above theoretical argument does not hold and the distributional conflict results to larger public spending and changes of the tax structure in favor of the low income agents. Lindert (1994) estimates the impact of the franchise extension on the timing and the spread of social programs in Western Europe during the period 1880-1930. Aidt et al. (2006) estimates the impact of the franchise extension on the scope of government spending in Western Europe during the period 1860-1938. Finally, Aidt and Jensen (2009) study the effect of the extension of the voting franchise on the size of government spending and the tax structure in ten Western European countries over the period 1860-1938.

[3] In this respect, our paper could be indirectly related with the approach that considers inefficient institutions to be the outcome of *conflict* between groups (see e.g. Acemoglu and Robinson 2000a; 2006 and Acemoglu, 2006). According to this view, the economic institutions are not always chosen by the whole society, but by the groups that control political power. These groups will choose the

In Section 2, we build a standard model where the formal sector coexists with an informal one as in Cuff et al. (2011). The proposed model has the following features. We consider an economy with two types of agents: low and high skilled workers. Each low skilled worker is endowed with a fixed amount of effective labor and decides whether he will supply it or not in the labor market. On the other hand, each high skilled worker is endowed with θ_j units of effective labor and decides to supply them either in the formal or the informal sector of the economy. Private agents maximize their utility by taking tax policies and the quality of institutions as given. Before any economic choice is made a national government chooses the tax rates on low skilled (t_w) and on high skilled (t_e) workers optimally by treating the quality of institutions as given. Finally, before any economic and political choices a *political elite* decides the quality of the institutions (and the corresponding size of the informal sector) to maximize the utility of its own members.[4] In doing so, it takes into account the outcomes of all the subsequent stages and the possible states of the world in the later stages of the game.

Our theoretical results are as follows. When tax policies are chosen subject to universal suffrage there is a redistribution effect that leads to tax burden transfer from the rich to the poor. This redistribution effect appears to be decreasing in the quality of institutions. Therefore, when in the first stage of the game the political elite decides the quality of institutions finds it optimal to choose a relatively lower quality of institutions (and a corresponding larger informal sector) so as to mitigate the tax burden fallen on high skilled income. In contrast, when tax policies are chosen under restricted voting rights (i.e. the poor are excluded from voting), the redistribution

economic institutions that maximize their own benefit, and the economic institutions that result may not coincide to those that maximize total income.

[4] Following the rationale of the relevant literature (see, for example, Acemoglu and Robinson, 2000b; Lizzeri and Persico, 2004) in our model, we define the political elite to be those individuals with the highest income.

effect vanishes and the political elite decides the highest possible quality of institutions- i.e., the one that maximizes the productivity of the economy.

In Section 3, we examine the empirical validity of our theoretical model. According to our analysis, countries that experienced "early democratization" (that is they proceeded to extensive voting franchise before the consolidation of a firm institutional framework) should be characterized by relatively larger informal sectors. In order to obtain a measure for the extent of the voting rights and the corresponding degree of political competition in the first years after the year of independence of a state, we construct two alternative variables. Namely, the "competitiveness of participation" (i) in the first five years and (ii) in the first ten years after the year of independence.

Then we proceed to the estimation of an empirical model where the dependent variable is the shadow economy measure developed by Schneider et al. (2010) and key explanatory variables are the "early democratization" measures described before. After several sensitivity analyses across a number of different specifications, our empirical findings suggest that the relationship between "early democratization" and the size of informal economy is indeed positive and statistically significant, thus confirming our theoretical proposition.

2. The Model

2.1 The economy and sub-game equilibrium

Consider an economy populated by two types of agents: low skilled (unskilled) workers (a share *b* of the total population) and high skilled (skilled) workers (a share *1-b* of the total population). Each unskilled worker is endowed with fixed units of effective labor (*w)* and decides whether he will supply it or not in the labor market. On the other hand, each high- skilled worker *j* is endowed with θ_j units of effective labor and decides whether he will supply them to the formal or the informal sector of the economy. We assume that the economy produces a single homogeneous good under a constant marginal product technology, where one unit of effective labor is transformed to one unit of output. The labor market works in a competitive way, and thus labor earns its marginal product, i.e. the return to each unit of effective labor is *1*.

The national government sets a unit tax t_w on low skilled and t_e on high skilled workers in order to finance the provision of a public good- *g*. The way government choices are made is determined by the (exogenously determined) political regime type. We assume that there are two alternative political regimes: democracy, where government choices are made through universal voting and oligarchy, where government choices are made by a subset of the population- the elite. In the latter case we assume that the elite include those high-skilled workers with units of effective labor, and consequently income, above a threshold level θ' (i.e., the richest part of the population).

However before any economic and political choices are made, the institutional setting of the economy must be determined. We assume that this is determined by the wishes of the elite.

The sequence of events is as follows. First, the political elite decides once-and-for-all the quality of the institutions. In turn, the national government chooses the tax policy in order to finance the provision of the transfers by taking the quality of the institutions as given. Finally, private agents make their own decisions. Namely, each low skilled workers decides whether he will provide his effective labor or not and each high- skilled workers decides whether he will be employed in the formal or the informal sector of the economy.

We will solve the game backwards. Thus, we first solve the last stage. Private agents maximize their utility by taking tax policies and the quality of institutions as given. The solution to this stage will give the sub-game equilibrium which is for any feasible tax policy and institutional quality.

In the second stage, we solve for national tax policy. Namely, the national government chooses the tax rates on workers (t_w) and on entrepreneurs (t_e) optimally by taking into account the sub-game equilibrium and by treating the quality of institutions as given. The government choice depends on the political regime; with an exogenous probability σ, voting rights are assigned to the entire population (i.e. fully representative democracy) and tax policy is chosen so as to satisfy the majority of the population. On the other hand, with a probability $1-\sigma$ the regime will be oligarchic and tax policy is chosen so as to satisfy the preferences of the franchised political elite.[5]

Finally, in the first stage the political elite choose the quality of the institutions to maximize the utility of its own members. In doing so, it takes into account the outcomes of all subsequent stages and the possible states of the world in the later stages of the game. The solution to this problem will give the equilibrium institutional quality.

[5] In section 2.4 we also discuss the effects of making σ endogenous to the economic policy.

2.1.1 Low- skilled workers

Each unskilled worker is endowed with one unit of labor which he can supply in the labor market and has the following utility function:

$$u_i^w = (w - t_w - \varphi_i)l + g \quad (1)$$

where w is the effective units of labor of each unskilled worker, t_w is the tax levied on workers, φ_i is the disutility of labor and l is a variable that equals to one if the worker chooses to participate in the labor market and equals to zero otherwise. With the assumed technology of production, w is also the income each low skilled worker. We assume that φ_i is distributed randomly across workers following a uniform distribution in the [0,1] range. Therefore, a worker i will choose to participate in the labor market if $w - t_w - \varphi_i > 0$. Then there is a cutoff level of φ, denoted by $\hat{\varphi}$, for which workers will be indifferent between working and not working, i.e. $\hat{\varphi} = w - t_w$. Following the distribution assumptions about φ_i, total labor supply of low skilled workers is given by:

$$L_s = \frac{b}{2}(w - t_w) \quad (2)$$

2.1.2 High skilled workers

Each high skilled worker is endowed with θ_j units of labor. We assume that θ_j is uniformly distributed in the [1-ψ, 1+ψ] range, with $0<\psi<1$, denoting the degree of income inequality among the skilled, with higher ψ implying greater inequality and $1-\psi \geq w$. The latter assumption guarantees that skilled workers will always earn more than unskilled workers.[6]

[6] Then the low skilled workers have always lower income that the high skilled, therefore in the rest of the paper we use the term poor and low- skilled interchangeably.

Skilled workers decide whether they will supply their labor in the formal or in the informal sector of the economy. A worker will supply its labor in the formal sector if he enjoys higher returns than in the informal sector. We assume that there is a direct benefit, in terms of productivity from being in the formal sector. This benefit is positively related to the quality of institutions, *e*. We conceive the benefit of better institutions to be due to better legal protection of those in the formal sector, use of social services, etc. Moreover we assume that this benefit is increasing in individual ability, i.e., higher individual productivity is related to larger benefits from better institutions. However, being in the formal sector has the additional cost of having to pay taxes t_e.

On the other hand, workers in the informal sector avoid tax payments but also do not enjoy the benefits of being formal. The above can be summarized by assuming the utility of a non evading workers as:

$$u_j^{ne} = \theta_j - t_e + e\theta_j + g \tag{3}$$

and the utility of a tax evading one as:

$$u_j^{e} = \theta_j + g \tag{4}$$

By comparing (3) and (4), a worker will choose informality and tax evasion when

$$\theta_j < \frac{t_e}{e} \tag{5}$$

According to (5), individuals with intermediate level of income, i.e., intermediate skilled workers, choose to evade the payment of taxes. Tax evading individuals then are in the middle of the income distribution, as taxes are borne only by low skilled (bottom of the income distribution) and high skilled workers. This pattern of tax evasion assumed here is consistent with systematic evidence that show that tax evasion is more pronounced for the middle of the income distribution (e.g., see Tedds, 2010; Fiorio and D' Amuri, 2005).

As θ_j varies randomly across individuals there exists a value of θ_j denoted as $\hat{\theta}$, for which the individual is indifferent between evading taxes and declaring his income, which is given by

$$\hat{\theta} = \frac{t_e}{e} \tag{6}$$

Then using the probability distribution function of the uniform distribution *Ω(θ)* and the definition of $\hat{\theta}$, the total number of legal firms are:

$$(1-b)\int_{\hat{\theta}}^{1+\psi} \Omega(\theta)d\theta = (1-b)\frac{1}{2\psi}\left(1+\psi-\frac{t_e}{e}\right) \tag{7}$$

2.1.3 National government's budget constraint

The government levies taxes t_w on low skilled and t_e on high skilled worker's income in order to finance the provision of a public good *g,* the quantity of which which is assumed to be exogenous. Government operates under the following balanced budget rule:

$$g = t_w bL_s + t_e(1-b)\int_{\hat{\theta}}^{1+\psi} \Omega(\theta)d\theta \tag{8}$$

Substituting (2) and (7) into (8) we get the following government's budget constraint:[7]

$$g = b(w-t_w)t_w + \frac{1-b}{2\psi}\left(1+\psi-\frac{t_e}{e}\right)t_e \tag{9}$$

2*.1.4 Sub-game equilibrium (for given tax policy and quality of institutions)*

[7] In order to guarantee that our model has a well defined real solution we assume that $8g < bw^2$ (see Equation (13) for *e=0*)

Sub-game equilibrium is summarized by equations (2), (6), (7) and (9). In this equilibrium: (i) all private agents maximize utility; (ii) all constraints are satisfied; (iii) all markets clear. This is for given tax rates t_w and t_e and quality of institutions e.

2.2 Determination of national tax policies

National tax rates t_w and t_e can be determined in two alternative political regimes: an oligarchic regime, where only the rich has voting rights, and a democratic one, where all individuals have equal voting rights. We examine equilibrium policy in turns in each alternative political regime.

2.2.1 Optimal Taxation in the case of a fully representative democracy

In a democratic setting we assume that the tax rates τ_w and τ_e are determined through a probabilistic voting mechanism.[8] Assume that there are two political parties A and B, each one proposing a policy vector $T=(t_w, t_e)$. The utility gain of a voter if party A wins the election instead of party B is $u[t_w^A, t_e^A, g]- u[t_w^B, t_e^B, g]$. Instead of assuming that agents vote for each party with probability one each time this difference is positive (as in the median voter model), probabilistic voting theory supposes that this vote is uncertain. More precisely, the probability that a person votes for party A is given by $F(u[t_w^A, t_e^A, g]- u[t_w^B, t_e^B, g])$ where F is an increasing and differentiable cumulative distribution function.[9]

Since the vote share of each party varies continuously with the proposed policy platform, probabilistic voting leads to smooth aggregation of all voters' preferences,

[8] From (3) and (4), the ranking of true utilities may not correspond to the ranking of after tax utilities, as there is the possibility of tax evasion (Brock, 2009; Traxler, 2009). Moreover the tax choice is two-dimensional. For these reasons we assume that tax choices are made though probabilistic voting. De la Croix and Doepke (2009) also apply probabilistic voting in order to tackle a similar problem of non-single peaked/ crossing preferences.

[9] The idea behind probabilistic voting is that voters care about non- observable variables to the policy choices, like ideology, voter turnout, character of the candidates, influence of campaign advertising etc. (see Coughlin, 1992; Hinich and Munger, 1997, p.171- 177).

instead of depending solely on the preferences of the median voter. Party A maximizes its expected vote share given the expected vote share of party B. Party B acts symmetrically, and in equilibrium we have $t_w=t_w^A=t_w^B$, $t_e=t_e^A=t_e^B$. The maximization problem of each party implements the maximization of the following weighted social welfare function[10]:

$$W = b\int_0^{\hat{\varphi}} \frac{1}{2}(w - t_w - \varphi + g)d\varphi + b\int_{\hat{\varphi}}^1 \frac{1}{2} g d\varphi + \\ + (1-b)\left[\int_{1-\psi}^{\hat{\theta}} \frac{1}{2\psi}\left(\theta_j + g\right)d\theta + \int_{\hat{\theta}}^{1+\psi} \frac{1}{2\psi}\left[\theta_j(1+e) - t_e + g\right]d\theta\right] \tag{10}$$

subject to the government budget constraint (9). Solving the above expression we get:

$$W = \frac{b}{4}(w - t_w)^2 + \frac{1-b}{4\psi}\left[\left(\frac{t_e}{e}\right)^2 - (1-\psi)^2 + (1+e)\left[(1+\psi)^2 - \left(\frac{t_e}{e}\right)^2\right] + 2t_e\left(\frac{t_e}{e} - 1 - \psi\right)\right] + g \tag{11}$$

A fully representative democracy is characterized by extensive voting rights for all types of agents (i.e. low skilled workers and high skilled) and consequently equal political power for all. In this case t_w and t_e are chosen to maximize (11) subject to (9). In doing so, the quality of institutions e is taken as given. As Appendix A1 explains by dividing the two first order conditions of the optimization problem gives:

$$\frac{t_e^D}{t_w^D} = \frac{(1+\psi)e}{w} \tag{12}$$

Equation (12) implies that higher e (i.e. better quality of institutions) results into stronger redistribution from rich (high skilled workers) to poor (low skilled workers)

[10] Probabilistic voting then, by assuming that each party seeks to its expected vote share given the expected vote share of the other party, is equivalent to maximization of a weighted Benthamite social welfare function (Ledyard, 1984; Coughlin, 1986; Mueller, 2003, p. 253- 259).

via relatively higher taxes. This is because better institutions imply a higher cost for tax evasion and thus the government can easier redistribute from skilled to unskilled workers. We consider this to be the redistributive effect of the institutional quality. By combining (12) with the government budget constraint (9) we get take the following solution for the tax rates:

$$t_e^D = \frac{(1+\psi)e}{2}\left[1-\left(1-\frac{8g\psi}{b\psi w^2+(1-b)(1+\psi)e}\right)^{1/2}\right] \tag{13}$$

$$t_w^D = \frac{w}{2}\left[1-\left(1-\frac{8g\psi}{b\psi w^2+(1-b)(1+\psi)e}\right)^{1/2}\right] \tag{14}$$

Equation (13) implies that better quality of institutions (i.e., a higher *e*) generate two opposing effects on t_e. Firstly, there is the redistribution effect highlighted above- that leads to higher t_e. On the other hand, better institutions also imply direct effects on the revenue raising ability of the government- the tax base effect. As can be easily verified from the government budget constraint (9) an increase in *e* directly increases government revenues by increasing the number of non-evading individuals. This latter effect creates a negative effect of *e* on t_e.

On the other hand, equation (14) implies that the effect of increasing *e* on t_w is always negative: better institutional quality results into lower labor taxation because in this case there is solely the tax base effect.

2.2.2 Optimal Taxation when voting rights are restricted to the richer subgroup of the population (oligarchy)

When the voting rights are restricted to the richer sub-group of total population (i.e. skilled workers) t_w and t_e are chosen to maximize (11) subject to (9) where b=0. In

doing so, the quality of institutions e is taken as given.[11] The solution of the optimization problem gives a corner solution where all taxes are borne only by unskilled workers, i.e.,

$$t_w^O = \frac{1}{2}\left[w - \left(w^2 - \frac{4g}{b} \right)^{1/2} \right] \tag{15}$$

$$t_e^O = 0 \tag{16}$$

Equations (15) and (16) imply that when voting rights are restricted to the skilled workers, tax policy is chosen so as to maximize the utility of this part of the population and not of the majority. Therefore, optimal t_e is equal to zero and the provision of public good is financed solely through labor income taxation t_e.

The comparison between the two regimes can be summarized by the following proposition:

Proposition 1: *Given the quantity of the public good g and the quality of the institutions e: (i)* $t_e^D > t_e^O$ *and* $t_w^D < t_w^O$ *since in the case of universal suffrage there is a redistribution effect that exert a positive effect on entrepreneurial income tax rate and negative effect on labor income tax rate. (ii) Ceteris paribus the redistribution effect deteriorates with the quality of the institutions e.*

[11] Since individuals pay per unit taxes (i.e. tax payments do not depend on income, but only vary between groups) there is no distributional conflict within the elite about the structure of taxation, therefore all elite members vote alike, and there is no need to define in more detail the way in which decisions are made when elite holds all the political power.

2.3 Determination of institutional quality

We now turn to the first stage of the game, in which the political elite, decides optimally the quality of the institutions *e* in order to maximize the utility of its own members. Following the rationale of the relevant literature (see, for example, Acemoglu and Robinson, 2000b; Lizzeri and Persico, 2004; Acemoglu, 2006) we define the political elite to be those individuals with the highest income (i.e. the top skilled workers). The political elite decide the quality of institutions by taking into account the previous stages of the game.

Since the political regime is uncertain when *e* is chosen, the elite maximize the expected indirect utility under the two alternative states:

$$\bar{V} = (1-\sigma)\bar{u}(t_e^O) + \sigma\bar{u}(t_e^D) \tag{17}$$

where $\bar{V}$ denotes the expected indirect utility of the decisive elite member. We define this individual to have ability $\bar{\theta}$. Substituting (3), (13), (16) into (17), yields:

$$\bar{V} = \bar{\theta}(1+e) + g - \sigma\frac{(1+\psi)e}{2}\Delta(e) \tag{18}$$

where $\Delta(e) \equiv \left[1-\left(1-\frac{8g\psi}{b\psi w^2+(1-b)(1+\psi)e}\right)^{1/2}\right]$

Maximizing (18) with respect to *e* we get:

$$\bar{\theta} = \sigma\frac{1+\psi}{2}\Delta(e)\left[1+\frac{e}{\Delta(e)}\frac{\partial\Delta(e)}{\partial e}\right] \tag{19}$$

with $\frac{\partial\Delta}{\partial e} = -\frac{1}{2}\left(1-\frac{8g\psi}{b\psi w^2+(1-b)(1+\psi)e}\right)^{-1/2}\frac{8g\psi(1-b)(1+\psi)}{\left[b\psi w^2+(1-b)(1+\psi)e\right]^2}$

Equation (19) states that in equilibrium the marginal benefit of *e* (the left hand side of (19)) equals the marginal cost of *e* (the right hand side of (19)). In our model, the

marginal benefit from better institutions consists of the positive effect of better institutions on productivity-see Equation (3). On the other hand, the marginal cost is the redistribution effect minus the increase in government revenues that come as a result of reducing tax evasion (i.e., the tax base effect).

If the tax base effect dominates the redistribution effect, clearly equation (19) cannot be satisfied with equality, and the constraint of $e \leq 1$ implies that the equilibrium value of e will be 1. On the other hand, if the redistribution effect dominates the tax revenue effect the maximization problem will have an internal optimum.[12]

From (19) one can easily derive the effect of a higher probability of democracy σ on the quality of institutions. This is summarized in the following proposition.

Proposition 2*: In equilibrium, the quality of institutions is lower and the size of the informal sector is larger the higher the value of* σ.

A higher σ, i.e., higher probability of democracy, increases the marginal cost of good institutions (the left hand side of (19)). As the marginal benefit does not depend on σ, this results into a lower equilibrium value of e. Intuitively, when tax policies are chosen subject to universal suffrage there is a redistribution effect that leads to higher tax burden on high skilled income. Since, this redistribution effect is decreasing in the quality of institutions the political elite finds it optimal to choose a relatively lower quality of institutions so as to mitigate the tax burden fallen on high skilled income. On the other hand, when tax policies are chosen under restricted voting rights (i.e., the

[12] As this is the most interesting case throughout the rest of the paper we will assume that the redistribution effect dominates the tax revenue effect. The above discussion can also highlight the main contribution of the paper: it introduces a redistribution effect of democracy which depends on the quality of institutions. If this effect is small (relative to the positive tax revenue effect), qualitatively it is the same as assuming it to be zero.

poor are excluded from voting), the redistribution effect does not hold and therefore the political elite finds it optimal to decide the highest possible quality of institutions. Given the effect of σ on e, the effect of σ on $\hat{\theta}$ and consequently on the size of the informal sector is directly determined by equation (6) and (7).

It must be emphasized that in our model the political elite chooses low institutional quality although its members lose in terms of productivity and at the same time they do not evade taxes.[13] However it chooses a low level of e in order to place a constraint to the government, in the form of an informal sector, which limits the degree of redistribution. In other words, inefficient institutions in our model arise due to a commitment problem: the democratic government cannot commit to a low level of redistribution and the political elite correct this by setting a low e.

2.4 Extensions and Discussion

The previous section illustrated how extended suffrage may lead to highly distributive policies which in turns do not facilitate the creation of good institutions. In this section we will try to discuss some implications of the basic model.

In our setting, bad institutions is the "cost" that the elite has to incur in order to limit the power of the poor to redistribute income in their favor in a democracy. So far we have assumed that the probability of having democracy, σ, is exogenous. However, a large growing, literature starting from Acemoglu and Robinson (2000b) shows that political regimes and polity transitions are endogenous to the economic policy. A central feature of this literature is that the higher the distance between democratic and oligarchic policies, the more likely it is that a revolution will take place that will impose democracy. Following this rationale we can easily assume that

[13] In equation (18) we have implicitly assumed that $\overline{\theta} > \hat{\theta}$. Had we defined the political elite to be on the tax evading group (i.e., $\overline{\theta} < \hat{\theta}$) our result would be rather trivial: the elite would choose low e in order to evade taxes.

σ depends on the difference between t_w^O and t_w^D: if unskilled workers expect to pay very high taxes in an oligarchy they will revolt and establish a democratic government. To simplify things we assume that the probability of a successful revolt is determined by

$$\sigma(e) = \beta\left(t_w^O - t_w^D\right)^2$$

where $0<\beta<1$ is a positive constant, which summarizes the response of differences on the tax rates of workers between democracy and oligarchy on the probability of a transition to democracy. A higher value of β implies that the poor are very sensitive to deviations from the tax rate they would pay under democracy, and thus very willing to organize, revolt and replace the oligarchic regime. As a consequence, a ceteris paribus increase in β implies higher probability of a democratic transition. Also note that from Proposition 1, $t_w^O > t_w^D$.

The structure of the game is as follows: firstly, the elite determine the quality of institutions. Then the poor decide whether they will revolt against the elite and establish democracy. Consequently, the government (oligarchic or democratic) sets the tax rates. Finally all economic decisions are made. [14]

With these assumptions the structure of the model presented before remains unchanged, with the only exception being the indirect utility of the elite at the first stage of the game which now is

$$\overline{V} = \overline{\theta}(1+e) + g - \beta\left(t_w^O - t_w^D\right)^2 \frac{(1+\psi)}{2} e\Delta(e) \qquad (20)$$

Maximizing with respect to e yields the first order condition

[14] Given the timing of events the elite does not have an incentive to use the tax rate on workers in order to reduce the probability of a regime transition.

$$\bar{\theta} = \beta\left(t_w^O - \frac{w}{2}\Delta(e)\right)^2 \frac{1+\psi}{2}\Delta(e)\left[-\frac{we}{\left(t_w^O - \frac{w}{2}\Delta(e)\right)}\frac{\partial\Delta(e)}{\partial e} + \left(1 + \frac{e}{\Delta(e)}\frac{\partial\Delta(e)}{\partial e}\right)\right] \quad (21)$$

A simple comparison of equations (21) and (19), shows that the marginal cost of *e* has one additional term (i.e. the first term inside the square brackets). We can call this political replacement effect (Acemoglu and Robinson, 2006): an increase in *e* reduces the tax rate in the democracy and thus increases the difference between t_w^O and t_w^D, increasing the probability of replacement of the elite by a democratic government. Therefore when σ is assumed to be endogenous, equilibrium *e* is lower, than in the case of an exogenous σ. Moreover an increase in β, i.e., when individuals are more sensitive to deviations from the democratic tax rate and hence there is a high probability of a democratic transition, results, as in the previous section, to a lower equilibrium *e*. Therefore we can conclude that the result of Proposition 2 still hold in the case of an endogenous σ.

It is then interesting to examine what happens if the quality of institutions is chosen by the unskilled. To our knowledge, in all countries, the initial political power rested in the hands of a rich elite rather than to the hands of the poor workers. Therefore this latter assumption is far from realistic. However, it interesting to examine its consequences from a theoretical point of view. In this case, the result of the previous section is reversed: good institutions are the outcome when extended suffrage is expected to persist, and bad institutions is the outcome when political power is expected to shift towards the rich.[15] In this respect, what is crucial in our model is the expected duration of political power at the stage of institution building. If

[15] If the workers also set policy in an oligarchy, then the results of the previous section still hold.

the political power of the elite is transitory, then bad institutions will be chosen in order to avoid expropriation by those that will gain power and set government policy.

The above findings rest on the idea that democratic institutions may also lead to extreme redistribution and expropriation of the rich by the poor and thus there is no incentive for the rich to invest in good institutions. Thus, in the presence of universal suffrage we have a clear commitment problem: if the poor workers could commit that they would not exercise their political power and vote for high taxation, the rich elite would create a sound institutional environment. This analysis suggests that bad institutions are a way for the elite to block extreme redistribution in favor of those that will come to hold the political power in the future.

3. Empirical Analysis

In this section we empirically examine the main implications of our theoretical model; namely, the effect of early democratization on the quality of institutions and the corresponding degree of tax evasion within an economy. More precisely, we investigate whether the degree of democracy (i) in the first 5-years and (ii) in the first 10-years after the year of independence of a state, is positively correlated to the size of the shadow economy as suggested by our theoretical model. To this end, we proceed by estimating the following econometric model employing the data described in detail in the next subsection.

3.1 Data and Empirical Methodology

The empirical model used to study the relation between the informal economy and the political regime type in the first years after the year of independence is as follows,

$$Shadow\_econ_i = \alpha_0 + \beta_1 early\_democr_i + \beta_k controls_i + geographical\ dummies_i + u_i \quad (22)$$

where *Shadow_econ* in country *i* is the dependent variable and represents the size of the informal sector. Based on the theoretical model, our key explanatory variable is *early_democr* in country *i*, which represents the extent of the voting rights and the corresponding degree of political competition in the first years after the year of independence of a state.[16] Finally, we employ the core of controls employed by Chong and Gradstein (2007) as determinants of informality, geographical dummies and a stochastic term u_i. We build a cross section dataset of 117 –developed and developing- countries. The dependent and explanatory variables are discussed below. Explicit definitions, descriptive statistics and sources for the variables employed are provided in Appendix B.

To estimate Eq. (1) we employ as dependent variable the shadow economy measure developed by Schneider et al. (2010) (denoted as *Shadow_econ*). *Shadow_econ* measures the size of the informal economy as a share of GDP and –in our sample -ranges from a minimum value of 8.6 (in the case of Switzerland) to a maximum of 68.1 (in the case of Bolivia). According to Schneider et al. (2010) shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities in order to avoid: 1) payment of income, value added or other taxes, 2) payment of social security contributions and 3) having to meet certain legal labor market standards.

In order to obtain a measure for the extent of the voting rights and the corresponding degree of political competition in the first years after the year of independence of a state, we construct two alternative variables (denoted as *early_democr_5* and *early_democr_10)*. The primary source for both of these variables is the "competitiveness of participation" index of the Polity IV Project

[16] See below for more details on this.

database which measures "the extent to which alternative preferences for policy and leadership can be pursued in the political arena".[17] *Early_democr_5* is constructed in order to reflect the "competitiveness of participation" in the first five years after the year of independence of a state whereas *early_democr_10* measures the "competitiveness of participation" in the first ten years after the year of independence. Therefore, countries that were characterized by relatively stable political groups, which regularly were competing for political influence in the first years after the year of national independence, obtain higher values in both these variables, whereas countries that were characterized by despotic monarchies and totalitarian party systems in their first years obtain relatively lower values.

To ensure robust econometric identification, we use a number of control variables in the estimated equations. Following the rationale of the relevant literature (see, e.g., Friedman et al., 2000; Chong and Gradstein, 2007), we employ a set of controls similar to that employed by Chong and Gradstein (2007) as determinants of shadow economy. More precisely, we control for the overall level of productivity and wealth in the economy by employing the log of real GDP per capita over the period 1990-2004 (denoted as *gdppercap*); the average annual growth rate over the period 1990-2004 (denoted as *growth*); the Deininger and Squire (1997) Gini coefficient over the period 1990-2004 (denoted as *DS_Gini*) and the international market openness (denoted as *openness*) over the same time period. Data for all these variables are taken from the World Development Indicators (WDI) (2011).

In addition, in some specifications we account for the effect of the political regime at the present time by employing the democracy index of Polity IV (denoted as *democracy*); the level market regulation (denoted as *mark_regulation*) and the legal

[17] According the Polity IV Project database definitions, "Competitiveness of participation" is coded on a five-category scale with lower values denoting no significant oppositional activity outside the ranks of the regime and the ruling party and higher values denoting relatively stable and enduring, secular political groups that regularly compete for political influence at the national level.

origins of each country (*legor_uk*). Data for *democracy* are obtained by Polity IV Project database (2010), whereas data for *mark_regulation* and *legor_uk* are taken from Djankov et al. (2002) and La Porta et al. (1999), respectively. Finally, we account for the effect of several socioeconomic pressures at work in a society by employing the variable "socioeconomic conditions" of the International Country Risk Guide (2009) Database (denoted as *socioecon_cond*).

3.2 Results

In the following subsections we discuss the results obtained by working as above. These are reported in Tables 1 and 2.

3.3.1 The effect of early democratization on the quality of institutions. Basic Results.

We start by estimating equation (1) presented in section 3.1, using the data and the empirical methodology outlined in the previous section. The results are reported in Table 1.

[Table 1, here]

In columns (1) to (5), Table 1, *Shadow_econ* is regressed on *early_democr_5* as well as on a set of control variables (i.e. *gdppercap, mark_regulation, growth, DS_gini socioecon_cond)*. Note that Table 1 presents *t*-statistics based on clustered standard errors (see, e.g., Bertrand, Duflo and Mullainathan, 2004). As can be easily verified, *early_democr_5* bears a positive and significant coefficient which remains qualitatively intact in all five alternative specifications. This result indicates that extensive voting rights and higher degree of political competition in the first five years after the year of their independence are positively correlated with larger shares

of informal economy at the present time. Moreover the estimated magnitude of the effect is not negligible: countries that experienced fully competitive political regimes are expected to have 7.5% higher share of shadow economy compared to those which experience despotic monarchies and totalitarian party systems at the early stages of political development. This finding appears to be in accordance with the implications driven by our theoretical model where lower quality of institutions (and consequently larger shares of informal economy) serves as a means to mitigate the redistribution effect, which is stronger in societies characterized by extensive voting franchise.

As far as the rest of the explanatory variables are concerned, we observe that *gdppercap, growth* and *socioecon_cond* enter with negative and highly significant coefficients in most of the specifications whereas *mark_regulation* and *DS_gini* bear in contrast positive and significant ones. Our empirical results appear to be in line with previous findings of the relevant empirical literature (see e.g. Friedman et al., 2000; Straub, 2005; Chong and Gradstein, 2007). Namely, richer countries have better-run administrations and consequently lower degrees of tax evasion (see e.g. Friedman et al., 2000) whereas economies with heavy market regulation, larger inequalities and bad socioeconomic conditions are characterized by larger shares of shadow economy (see e.g. Straub, 2005; Chong and Gradstein, 2007).

In columns (6) to (10), Table 1, *Shadow_econ* is regressed on *early_democr_10* and on the same set of controls following identical estimation strategy. As can be easily verified our results regarding the effect of *early_democr_10* remain qualitatively identical to those presented in columns (1) to (5). The coefficient on *early_democr_10* is again positive and significant at a level of 95 percent in most of the specifications highlighting the positive impact of extensive voting franchise in the first ten years after the years of independence on the size of informal economy. Concerning the rest of the controls our results remain qualitatively intact. Specifically,

gdppercap and *growth* enter again with a negative and statistically significant coefficient in most of the specifications, whereas *mark_regulation* and *DS_gini* bear positive and significant coefficients.

3.3.2 The effect of early democratization on the quality of institutions. Sensitivity Analysis.

In Table 2, we inquire into the robustness of our baseline results by investigating whether the positive effect of early democratization on the size of informal economy survives under alternative estimation strategies and different set of controls. To this end, in columns (2) and (8) we re-estimate the equations presented in columns (1) and (7) respectively by excluding the geographical dummies from our set of controls.[18] Similarly, in columns (3) and (9) we re-estimate the equations presented in columns (1) and (7) respectively by including –in addition- colonial dummies in our set of controls so as to take into account the colonial history of each specific country.

[Table 2 here]

Moreover, in columns (4) to (6) and (10) to (12) we extend our set of explanatory variables by additionally including the variables *legor_uk* [columns (4) and (10)], *democracy* [columns (5) and (11)] and *Fuel_export,* and *openness* [columns (6) and (12)]. As can be easily verified our empirical findings remain qualitatively intact. *Early_democr_5* and *early_democr_10* enter again with positive and highly significant coefficients in most of the specifications whereas our empirical findings regarding the rest of the explanatory variables remain similar to those presented in Table 1.

[18] Note that the estimations presented in columns (1) and (7) of Table 2 are identical to those presented to columns (5) and (10) of Table1.

4. Conclusions

The present paper aimed to illuminate the political economy forces that may lead to the creation of a sizeable informal sector. Our analysis treats unofficial economy as an endogenous outcome that may be produced –under certain political circumstances- by distributional conflict between different groups. According to this view, extension of voting franchise increases the political power of the relatively poor share of the population and this unavoidably leads to increased conflict for redistribution. When this conflict takes place before the consolidation of a strong institutional structure, the political elite have an incentive to establish low quality institutions which allows them to mitigate the tax burden fallen on their income.

The results of our paper could be related with the literature suggesting that initial economic structure affects crucially the potential success or failure of a new democracy. For example, Moore (1966) relates the share of smallholders in agriculture or of large bourgeoisie in cities at the time of democratization with the stability and the effects of the new political regime. Similarly, Acemoglu and Robinson (2005) and Persson and Tabellini (2009) interrelate the emergence and the success of democratic regime with the initial factor endowments and the initial utility that citizens derive from the democracy itself respectively.[19] In this respect, our results could be seen as a first attempt to examine the effects of the initial political conditions and timing of democratization on the size of the informal sector. Accordingly the size of the unofficial economy is treated as an endogenous outcome of the political economy forces that are determined by these conditions.

[19] These results are also consistent with another strand of the literature which interrelate the success of the democratic regime with the ability of the candidates (parties) to make credible political commitments at the time of democratization (see e.g. Keefer and Vlaicu, 2007; Robinson and Verdier, 2002; Robinson and Torvik, 2005). Shefter (1994) proceeds in an analytical description of the political development in Europe and the United States by examining the initial ability of parties to invest in credible commitments and to expand their share of voters in this way.

In the empirical Section, we inquire into the validity of our theoretical predictions by estimating an empirical model where the dependent variable is the shadow economy measure developed by Schneider et al. (2010) and key explanatory variables are measures of "early democratization." After extensive sensitivity analysis across a number of different specifications, our empirical findings suggest that the relation between "early democratization" and the size of the informal economy is indeed positive and statistically significant, thus confirming our theoretical proposition.

Table 1: The effect of early democratization on the quality of institutions. Basic Results.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
early_democr_5	1.292**	1.554**	1.505**	1.529**	1.339**					
	(2.106)	(2.357)	(2.475)	(2.459)	(2.221)					
early_democr_10						1.013*	1.237*	1.257**	1.325**	1.304**
						(1.670)	(1.930)	(2.138)	(2.173)	(2.181)
gdppercap	-5.996***	-5.476***	-2.844*	-3.250**	-6.042***	-5.952***	-5.454***	-2.764*	-3.182**	-6.048***
	(-6.758)	(-6.409)	(-1.947)	(-2.393)	(-4.109)	(-6.673)	(-6.319)	(-1.880)	(-2.323)	(-4.115)
mark_regulation		0.765**	0.561*	0.579*	0.499		0.725**	0.522	0.543*	0.468
		(2.382)	(1.701)	(1.747)	(1.564)		(2.267)	(1.612)	(1.677)	(1.516)
socioecon_cond			-2.210***	-1.515**	-0.523			-2.260***	-1.545**	-0.520
			(-2.891)	(-2.002)	(-0.604)			(-2.964)	(-2.032)	(-0.599)
growth				-1.106*	-1.040				-1.138*	-1.087*
				(-1.812)	(-1.621)				(-1.855)	(-1.683)
DS_gini					0.356**					0.367**
					(2.468)					(2.539)
Geographical Dummies	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
obs	117	116	116	116	100	117	116	116	116	100
R^2	0.46	0.49	0.53	0.55	0.63	0.45	0.48	0.53	0.54	0.63

Notes: 1). *t-statistics* are reported below the estimated coefficient. **2)**. *,**,*** denote statistical significance at 10%, 5%, 1%. **3**). All presented equations are estimated with geographical dummies

Table 2: The effect of early democratization on the quality of institutions. Sensitivity Analysis.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
early_democr_5	1.339**	1.459**	1.236*	1.274**	1.250**	1.361**						
	(2.221)	(2.432)	(1.930)	(2.088)	(2.049)	(2.205)						
early_democr_10							1.304**	1.421**	1.210*	1.226*	1.220**	1.335**
							(2.181)	(2.373)	(1.857)	(1.979)	(2.002)	(2.163)
gdppercap	-6.042***	-4.645***	-6.022***	-6.156***	-6.333***	-6.173***	-6.048***	-4.634***	-6.023***	-6.155***	-6.342***	-6.175***
	(-4.109)	(-4.062)	(-3.922)	(-4.183)	(-3.737)	(-4.209)	(-4.115)	(-4.058)	(-3.915)	(-4.175)	(-3.759)	(-4.222)
mark_regulation	0.499	0.643**	0.432	0.591*	0.433	0.460	0.468	0.613*	0.398	0.555*	0.403	0.424
	(1.564)	(2.038)	(1.313)	(1.836)	(1.311)	(1.457)	(1.516)	(1.979)	(1.254)	(1.766)	(1.261)	(1.385)
growth	-1.040	-1.561**	-1.026	-1.126*	-0.986	-0.968	-1.087*	-1.601**	-1.065	-1.167*	-1.040	-1.007
	(-1.621)	(-2.501)	(-1.569)	(-1.755)	(-1.383)	(-1.416)	(-1.683)	(-2.532)	(-1.621)	(-1.804)	(-1.442)	(-1.473)
DS_gini	0.356**	0.179	0.322**	0.350**	0.328*	0.367**	0.367**	0.192	0.332**	0.362**	0.341**	0.379**
	(2.468)	(1.551)	(2.326)	(2.408)	(1.989)	(2.457)	(2.539)	(1.657)	(2.375)	(2.479)	(2.053)	(2.530)
socioecon_cond	-0.523	-0.523	-0.554	-0.488	-0.383	-0.434	-0.520	-0.531	-0.554	-0.486	-0.365	-0.435
	(-0.604)	(-0.597)	(-0.617)	(-0.564)	(-0.419)	(-0.481)	(-0.599)	(-0.602)	(-0.614)	(-0.559)	(-0.398)	(-0.482)
legor_uk				2.245						2.135		
				(0.866)						(0.811)		
democracy					-0.018						-0.016	
					(-0.060)						(-0.053)	
Fuel_export						-0.002						0.001
						(-0.050)						(0.021)
openness						-0.017						-0.018
						(-0.804)						(-0.829)
Geographical Dummies	*yes*	*no*	*yes*	*yes*	*yes*	*yes*	*yes*	*no*	*yes*	*yes*	*yes*	*yes*
Colonial Dummies	*no*	*no*	*yes*	*no*	*no*	*no*	*no*	*no*	*yes*	*no*	*no*	*no*
obs	100	100	100	100	93	100	100	100	100	100	93	100
R^2	0.63	0.60	0.63	0.63	0.63	0.63	0.63	0.60	0.63	0.63	0.63	0.63

Notes: 1). *t-statistics* are reported below the estimated coefficient. **2)**. *,**,*** denote statistical significance at 10%, 5%, 1%. **3**). Equations (2) and (8) are estimated without geographical dummies **4**). Equations (3) and (9) are estimated by including colonial dummies in the set of explanatory variables.

Appendix A

The two first order conditions for the maximization program are:

$$(w - t_w) = \lambda(w - 2t_w) \tag{A.1}$$

and

$$\frac{t_e}{e} - (1+\psi) = \lambda\left(\frac{2t_e}{e} - 1 - \psi\right) \tag{A.2}$$

Then equations (A.1) and (A.2) together with the government budget constraint (9) can be used to solve for λ, t_e, t_w.

Dividing (A.1) by (A.2) we get:

$$\begin{aligned} &\frac{w - t_w}{\frac{t_e}{e} - (1+\psi)} = \frac{w - 2t_w}{2\frac{t_e}{e} - (1+\psi)} \Leftrightarrow \\ &w\frac{t_e}{e} - 2t_w\frac{t_e}{e} - (1+\psi)w + 2(1+\psi)t_w = 2w\frac{t_e}{e} - (1+\psi)w - 2t_w\frac{t_e}{e} + (1+\psi)t_w \end{aligned} \tag{A.3}$$

Rearranging terms in (A.3), we get equation (12) in text.

Equation (A.3) shows what determines the distribution of the tax burden between high-skilled and low-skilled workers, for a given level of *g*. In other words, it highlights the redistributive forces of taxation.

Appendix B: Data sources and descriptive statistics

Variable	Description	Obs.	Mean	Std. Dev.	min	max	Source
Shadow_econ	Shadow Economy as a share of GDP	118	33.28	13.50	8.6	68.1	Schneider et al. (2010)
early_democr_5	Competitiveness of participation in the first five years after independence	117	2.26	1.40	0.00	5.00	Own calculations based on Polity IV Project Database (2010)
early_democr_10	Competitiveness of participation in the first ten years after independence	117	3.41	1.00	1.00	5.00	Own calculations based on Polity IV Project Database (2010)
gdppercap	Logarithm of GDP per capita	118	7.85	1.59	4.41	10.55	World Bank Development Indicators (2011)
mark_regulation	Procedures to start up a business	117	8.74	3.21	1.55	17.7	Djankov et al (2002)
growth	Economic growth	118	3.18	2.11	-3.19	9.72	World Bank Development Indicators (2011)
DS_gini	Deininger and Squire Gini coefficient	101	40.71	10.29	22.65	74.33	World Bank Development Indicators (2011)
socioecon_cond	Socioeconomic Conditions	118	5.69	2.46	0.00	11.00	ICRG (2009)
legor_uk	Dummy Variable taking the value of one if a country use British Civil Laws.	118	0.28	0.45	0.00	1.00	La Porta et al (1999)
democracy	Democracy Index	109	3.85	6.20	-10	10	Polity IV Project Database (2010)
Fuel_export	SITC 3(minerals and fuels) exports as a % of total merchandise exports.	117	19.91	29.30	0.003	97.35	World Bank Development Indicators (2011)
openness	Imports plus Exports (%GDP)	118	63.90	47.28	16.26	397.41	World Bank Development Indicators (2011)

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