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FACULTY OF LAW, ARTS, AND SOCIAL SCIENCES
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EMIGRATION & POLITICAL INSTITUTIONS IN SENDING COUNTRIES

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Thesis for the degree of Doctor of Philosophy

May 2013

To Mimmo, Eliana, Eugenio, Germana,
Daniela, Bepi, Teresa and Riccardo

UNIVERSITY OF SOUTHAMPTON
ABSTRACT
FACULTY OF LAW, ARTS, AND SOCIAL SCIENCES
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EMIGRATION & POLITICAL INSTITUTIONS IN SENDING COUNTRIES
by Mauro Testaverde

Does emigration lead to institutional gains in the countries of origin? So far this question has found little space in the economic literature, the main focus of which has been on the economic implications of migration. To investigate this relationship, I propose a microfounded theoretical framework based on the two-class model presented in Acemoglu and Robinson (2001) and find that emigration increases the chances of democratization through the reduction in income inequality it promotes. In particular, dictatorial regimes are more likely to undertake a democratic transition as a result of the emigration of the non-ruling group.

Delving further into the results, I introduce within the model a third group of agents, i.e. the middle class. The main finding is that low- and high-skilled migration affect the democratization process by altering the relative size and economic power of the skilled middle class. This conceptual framework is then used as a guide to correctly identify the empirical specification. Using a dataset covering 122 countries in the period 1975-2005 and dynamic panel estimation techniques, I find support for such hypotheses.

To further our understanding on the connection between international migration and domestic institutions, I also explore whether remittance inflows play a role in shaping political regimes within the newly-developed theoretical model. The main prediction is that remittances may potentially affect institutional quality by alleviating the reliance of the non-ruling group on income redistribution. However, the empirical results do not seem to suggest that remittance receipts have an effect on political development.

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Declaration of Authorship

I, Mauro Testaverde, declare that the thesis entitled "Emigration & Political Institutions in Sending Countries" and the work presented in it are both my own and have been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

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3. Where I have consulted the published work of others, this is always clearly attributed;

4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;

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7. None of this work has been published before submission.

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Acknowledgments

Abbreviations

CES	Constant Elasticity of Substitution
CLI	Freedom House Civil Liberties Index
D-GMM	Difference Generalized Method of Moments
EHII	Expected Household Income Inequality
FDI	Foreign Direct Investment
FE	Fixed Effects
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IV	Instrumental Variable
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PRI	Freedom House Political Rights Index
PWT	Penn World Tables
SAR	Special Administrative Region
S-GMM	System Generalized Method of Moments
UK	United Kingdom
USA	United States of America

Introduction

This thesis studies the link between emigration and home country institutions. To investigate this relationship, I propose a microfounded theoretical model based on Acemoglu and Robinson (2001) and find that emigration increases the chances of democratization through the reduction in income inequality it promotes. In particular, dictatorial regimes are more likely to undertake a democratic transition as a result of emigration of the non-ruling group. I then further delve into these results and introduce a third group of agents in the model, i.e. the middle class. The main finding is that low- and high-skilled migration affect the democratization process by altering the relative size and economic power of the skilled middle class. This conceptual framework is also used as a guide to correctly identify the empirical specification. In a dynamic-panel setting, we find support for such hypotheses.

I also study whether remittance inflows play a role in shaping political regimes. Using the same theoretical apparatus to shed light on this mechanism, the main prediction of the model is that remittances may potentially affect institutional quality by alleviating the reliance of the non-ruling group on income redistribution. However, the empirical results do not seem to suggest that remittance receipts have an effect on political development.

The economic impact of international migration has been the subject of analysis of numerous research papers, however, the same attention has not been focused on the political implications of emigration and in particular the effect that international migration has on domestic political institutions has not been explored. So far few studies have tried to answer this question, mainly addressing the issue from an empirical point of view. Although such analyses differ for sample, time period, and estimation techniques used, they all provide evidence in support of a beneficial impact of emigration on home country political institutions. Several channels have been indicated as potential mechanisms driving this effect. However no comprehensive theoretical framework has been used yet as a guide to interpret these findings.

In the first chapter of this thesis, I propose a theoretical foundation to explain the relationship between migration and the quality of governments in the countries of origin. Based on Acemoglu and Robinson (2001), the model predicts that political

regimes emerge as the result of a conflict between groups with different preferences: a rich elite and a relatively poor group. While the former are averse to democracy because of the income redistribution it implies, the latter are averse to autocracy because under this political regime redistribution is denied. In this setting, I find that emigration of the non-ruling group increases the chances of democratization through the reduction in income inequality it promotes. In particular, democratization becomes more likely because, the poor being less numerous, (i) emigration increases the expropriation payoff of a successful revolution, and (ii) by raising the wages of non-migrants, it reduces income inequality between the rich and the poor, dampening the poor redistribution demands under democratization, and thereby, increasing the elite's opportunity cost of repression.

These predictions are then tested using a dataset covering 122 countries in the period 1975-2005 and dynamic panel estimation techniques. The empirical evidence is found to be in line with the theoretical model. In particular, we find that, once the distribution of income is held constant, emigration no longer plays a direct role in shaping political institutions.

In an attempt to further understand the connection between international migration and domestic institutions, in Chapter 2 I focus on the effect of remittance receipts on institutional development. Within the two-class model proposed by Acemoglu and Robinson (2001), I find that by increasing citizens' income, remittances reduce the reliance of this group on public spending and hence the level of redistribution optimal for them. Such a mechanism has two implications: (i) redistribution in the form of democratization or of simple concessions becomes less costly for a ruling elite as opposed to repression; and (ii) since redistribution becomes less needed by the poor, trying to buying off this group by merely offering public transfers of tax revenue without giving up power turns out to be more difficult for the ruling group. As a result, the probability of a democratic transition is likely to increase.

The theoretical model is also used as a guide for the empirical estimation. In line with the theoretical predictions, the results show that the distribution of income is an important predictor of institutional quality and that its omission would result in model misspecification. However, using a sample of 110 countries spanning the period 1980-2005, we find that once we correctly specify the model, remittances do not significantly impact (nor directly or indirectly) political institutions.

Given the anecdotal and empirical evidence stressing the importance of the role played by middle classes in democratic transitions, in the last chapter I extend the theoretical model to account for the presence of this third group in society. I find that whether the quality of home countries institutions is enriched or impoverished from migration of different types of workers depends on the impact of these outflows on the relative size and economic power of the skilled middle class. Specifically, the model predicts that the effect of both types of emigration on political quality is ambiguous *a priori*. Low-skilled emigration impacts institutional development: (i) positively by increasing the relative size of the middle class, and (ii) negatively by reducing its rel-

ative income. The impact of high-skilled migration works through the same channels, but in the opposite direction.

Using the same empirical framework and dataset as in the first chapter, we find that the magnitude and statistical significance of both types of emigration vanishes when we control for the relative size and income of the middle class. Such results provide support to the hypothesis according to which emigration impacts political development by altering the economic power of the different groups in the population.

By proposing a new framework to analyze the link between international migration and political institutions, this thesis lends itself as a potential tool to the study of other dimensions of the relationship in question. For instance, there is anecdotal evidence showing that emigrants while abroad lobby foreign governments to play a role in the political development of their home countries. Given that these behaviors may further affect institutional quality, modeling them within this framework could lead to the deepening of our knowledge on the link between emigration and source countries' institutions.

Chapter 1

Emigration, Redistribution & Democracy in Sending Countries

Does migration lead to institutional gains in origin countries? So far this question has found little space in the economic literature, whose main focus has been on the economic implications of migration. At least since Bhagwati and Hamada (1974) published their seminal paper, scholars have focused on whether the loss of human capital due to emigration (*brain drain*) harmed growth in domestic economies or fostered it through positive feedback effects (*brain gain*). However, the emigration flows registered in the last decades have been massive, with rates as high as 36.1%, 21.5% and 20.8% in 2010 for countries such as Jamaica, Moldova and Portugal, which are not even in the top 10 among the emigration countries[1]. Such flows are likely to have driven substantial changes in the population structure and, in turn, in several dimensions of societies at origin. For this reason, the present study intends to broaden the focus of the migration literature, so as to include another crucial aspect of sending societies, namely institutional quality. In addition, there is now a large body of studies[2] identifying institutional quality as an important determinant of growth. As long as emigration has an impact on political institutions, it can therefore have important consequences for source countries' development.

This work offers a theoretical foundation, backed up by the data, to explain the relationship between migration and the quality of governments in origin countries. The theoretical structure presented here is based on Acemoglu and Robinson (2001), according to which political regimes emerge as the result of a conflict between groups with different preferences: a rich elite and a relatively poor group. The rich are averse to democracy because it imposes income redistribution; the poor instead are averse to autocracy because it denies such redistribution. While, institutions allocate *de jure* political power, i.e. the power given by law, control over economic resources determines *de facto* political power, i.e. the capacity of imposing the preferred polit-

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[1] World Bank (2011).

[2] See Acemoglu et al. (2001), Acemoglu et al. (2002a) and Acemoglu et al. (2005a), among the others.

ical option by using brute force. Political transitions occur whenever the non-ruling group has gained so much *de facto* power that it is no longer feasible for the ruling group to hold *de jure* power without being threatened by the opponents. As a result a ruling elite accepts to give up power and democratize only if it is threatened by the rest of the population, and concessions are not enough to buy the opponents off.

My focus is on a small open economy in which labour can be traded internationally. Following the studies by Chiquiar and Hanson (2005) and Mckenzie and Rapoport (2007), who document that the richest fraction of the population is the least likely to migrate, I find that after sovereign borders are opened, there is a variation in the relative scarcity of the population belonging to different social groups and this affects the rents that they earn. The increase in the wages of the workers after emigration is in line with the findings in the literature[3], and as in Mishra (2007) this implies a fall in the income gap between the emigrating (mobile) and non-emigrating (fixed) groups (factors). As a result, the amount of redistribution set by the poor when democracy is in place is lower. The main implication is that democracy, being less redistributive after emigration, becomes relatively less costly for the ruling group compared to other political regimes. Such changes imply that the probability of democratization in order to stop revolution increases.

The literature mainly addresses the issue empirically, identifying a positive relationship between emigration and quality of political institutions in source countries. Docquier et al. (2011), using dynamic panel estimation, present evidence of a positive influence of emigration on institutional quality for a sample of developing countries independent at the time of entry in the analysis, which spans the time period 1975-2005. Li and McHale (2009), in turn, focus on the effect of skilled emigration on both economic and political institutional quality at home. The main findings of their cross-sectional analysis support the hypothesis of a beneficial effect of skilled emigration on home country political institutions, but not on economic institutions. Spilimbergo (2009) addresses a slightly different aspect: the relationship between democracy and foreign education. What emerges from his empirical analysis based on dynamic panel estimation covering the last 60 years is that only education acquired in democratic countries fosters democracy at home.

The results of two studies based on micro-data are in line with these findings. Batista and Vicente (2010) using data from a household survey in Cape Verde find that both return and current migrants have a positive impact on the demand for political accountability, sensibly higher for the former and for those in countries with strong institutional quality. Mahmoud et al. (2011) test the effect of emigration on political values and voting decisions in Moldova during the elections in 2009. They obtain results supporting the hypothesis of a causal relationship between westward migration and the reduction of consensus for the Communist party, so that it is possible for them to conclude that emigrants remit political change.

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[3]Gagnon (2011), Bouton et al. (2009), Hanson (2007), Borjas (2007), Aydemir and Borjas (2006), Boyer et al. (1993).

In my work emigration increases the chances of democratization through the reduction in income inequality it promotes. Democratization is more likely because, the poor being less numerous, (i) emigration increases the expropriation payoff of a successful revolution, and (ii) by raising the wages of non-migrants, it reduces income inequality between the rich and the poor, dampening the poor redistribution demands under democratization, and thereby, increasing the elite's opportunity cost of repression. The relative size and income of the faction of the population without political power are then the key elements driving political changes.

In the empirical section, we use income inequality as a proxy of the size and economic power of the poor group. In accordance with the predictions of the theoretical model, we find that we cannot correctly estimate the effect of emigration on institutional quality without including income inequality in the set of explanatory variables. This represents a novelty with respect to previous studies. In addition, following Docquier et al. (2011) the use of dynamic-panel regressions helps us overcome problems in the estimation such as unobserved heterogeneity, endogeneity of some explanatory variables and persistence of the dependent variable.

Once we hold constant the distribution of income in the society, we find that emigration no longer plays a direct role in shaping political institutions. These results are robust to an array of different sensitivity tests. The importance of our findings is also attributable to the novelty of the approach adopted: instead of using the empirical evidence as a guide to understand the channel of transmission from emigration to political change, we start from a micro-founded model that explains the long-run determinant of political transitions and empirically find support to these predictions.

The remainder of the paper is organized as follows. Section 1.1 presents the theoretical model explaining the relationship between emigration and quality of governance at home. Section 1.2 tests empirically the predictions of the model and examines the robustness of the results, and the last section concludes.

1.1 Theoretical Model

I extend the model presented by Acemoglu and Robinson (2001), allowing for people to move internationally. The theoretical contribution of this paper compared to the original model by Acemoglu and Robinson (2001) is the introduction of emigration, denoted by ϵ. In the remainder of the theoretical section, I discuss the impact of ϵ on the political end economic variables of the original model.

The economy is populated by individuals belonging either to a rich elite or a poor group, where the latter is higher in population numbers. The time horizon is infinite and all agents apply the discount factor $\beta \in (0, 1)$. Three possible political regimes can arise: democracy, autocracy or socialism.

1.1.1 Economic Structure

There is a continuum of $1 - \epsilon$ agents in the economy, where $\epsilon \geq 0$ denotes the fraction of population who may choose to migrate. A number δ of individuals form a rich elite, while the remaining $1 - \delta - \epsilon$ are relatively poor. Notice that in line with the findings in Chiquiar and Hanson (2005) and Mckenzie and Rapoport (2007)[4] in this model only non-rich agents are allowed to migrate.

The unique final consumption good y is produced from capital (K) and labor (N). Each member of the elite owns $\frac{K}{\delta}$ units of capital, while citizens are endowed with one unit of labor each. As a result of such distribution of endowments $N = 1 - \delta - \epsilon$, so that the production function can be written as $y = K^{\theta} (1 - \delta - \epsilon)^{1-\theta}$, where $0 < \theta < 1$ represents the share of output owned by the elite.

Markets are assumed to be competitive, therefore factors are paid their marginal product. Taking the final good y as the numeraire, it is possible to write the incomes of the two groups as:

$$y^p = \frac{1 - \theta}{1 - \delta - \epsilon} y \tag{1.1}$$

$$y^r = \frac{\theta}{\delta} y. \tag{1.2}$$

The fact that $y^p < \bar{y} < y^r$ translates into the following restrictions on the parameters:

$$\frac{1 - \theta}{\frac{1 - \delta - \epsilon}{1 - \epsilon}} < 1 \tag{1.3}$$

$$\frac{\theta}{\frac{\delta}{1 - \epsilon}} > 1 \tag{1.4}$$

Expressions (1.3) and (1.4) imply that the fraction of total product owned by the poor (rich) is lower (higher) than the fraction of population belonging to this group. When borders are open, this ratio increases because a smaller share of the poor, $\frac{1-\delta-\epsilon}{1-\epsilon}$, divide among themselves the same proportion, $1 - \theta$, of total output. Hence, after emigration, each citizen commands relatively more economic resources than before emigration.

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[4]According to these authors, the upper tail of the income redistribution is the least likely to leave the country.

From equations (1.1) and (1.2), we can see that after emigration the rents of the elite decrease, whereas wages increase[5] in line with the empirical evidence according to which a 10% increase in emigration leads to an approximately 4% rise in the average wage (Mishra (2007), Borjas (2007), Bouton et al. (2009) and Aydemir and Borjas (2006))[6]. Such movements in the prices of factors of production are due to changes in their relative scarcities in the home economy: following emigration, the reduction in the amount of labor makes such factor relatively scarcer than before. For this reason, workers experience a rise in their pay. The same mechanism works in the opposite direction for capital[7]. Notice, however, that even if income inequality between single members of the two groups declines, this does not correspond to a change in relative inter-group inequality, as the parameter θ which captures the effect remains unchanged[8].

1.1.2 Political Structure

1.1.2.1 Individual Behavior

Political institutions are identified by the redistribution policy they adopt. There are two instruments to implement such policies: a positive tax rate τ proportional to income and a lump-sum transfer T, equal for all agents. Also, associated with taxation there is a distortion, captured by the term $c(\tau)y$, where $c(\cdot)$ is a twice continuously differentiable function with: i.) $c(0) = 0$, ii.) $c'(\cdot) > 0$, iii.) $c''(\cdot) > 0$ and iv.) $c'(0) = 0$, v.) $c'(1) = 1$[9].

The government budget constraint then implies:

$$TR = \delta\tau y^r + (1 - \delta)\,\tau y^p - c(\tau)y = (\tau - c(\tau))y \tag{1.5}$$

and hence the lump-sum transfer that is redistributed to each agent irrespective of the group they belong to is $T = \frac{TR}{1-\epsilon}$.

Individuals choose their optimal tax rate, so as to maximize their indirect utility,

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[5]For the income of the citizens rewrite (1.1) as $(1 - \theta)\left(\frac{K}{1-\delta-\epsilon}\right)^{\theta}$ and set $\epsilon = 0$. For the income of the elite, notice that equation (1.2) corresponds to $\theta\left(\frac{1-\delta-\epsilon}{K}\right)^{1-\theta}$.

[6]In Hanson (2007) this estimate ranges from 6% to 9% and in Gagnon (2011) it is approximately equal to 10%.

[7]According to Mishra (2007), following emigration, the gain to the workers is estimated to be of the order of 5.9% of the GDP, while the loss of the fixed factor owners account to for approximately 6.4% of GDP.

[8]Note the absolute inter-group inequality decreases after emigration. Indeed, total income of the rich-total income of the poor=$\theta y - (1 - \theta)y = 2(\theta - 1)y$. Since less is produced with migration, i.e. $\frac{\partial y}{\partial \epsilon} < 0$, then absolute inter-group inequality gets reduced.

[9]Imposing these conditions implies that there is no distortion when the tax rate is zero (i.), distortions are increasing (ii.) and strictly convex (iii.) in τ, marginal distortions are small for low level of τ (iv.) and large for high levels of the tax rate (v.).

which is equal to consumption and given by:

$$V\left(y^i|\tau^i\right) = \left(1 - \tau^i\right) y^i + T \tag{1.6}$$

Each agent will choose her optimal tax rate in order to maximize the expression in (1.6). Imposing the first order conditions, for $\tau^i > 0$ we obtain:

$$-y^i + \left(1 - c'\left(\tau^i\right)\right) \frac{y}{1 - \epsilon} = 0 \Rightarrow \frac{y^i}{\frac{y}{1-\epsilon}} = 1 - c'(\tau^i) \tag{1.7}$$

When the median voter is a poor agent, i.e. $i = p$, condition (1.7) implies:

$$\frac{1 - \theta}{\frac{1-\delta-\epsilon}{1-\epsilon}} = 1 - c'(\tau^p) \tag{1.8}$$

Equation (1.8) entails that τ^p is uniquely identified and decreasing in $\frac{1-\theta}{\frac{1-\delta-\epsilon}{1-\epsilon}}$. The idea behind this is simple: since the median voter is a poor agent, the more resources she commands, the smaller the redistribution (hence τ^p) she needs in democracy[10].

Notice that it is also possible to have corner solutions, i.e. $\tau^i = 0$. In that case the first order conditions would be of the form:

$$-y^i + \left(1 - c'\left(\tau^i\right)\right) \frac{y}{1 - \epsilon} < 0 \Rightarrow \frac{y^i}{\frac{y}{1-\epsilon}} > 1 - c'(\tau^i). \tag{1.9}$$

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[10]Formally, it is possible to show this by using the implicit function theorem. Define:

$$F(\theta, \delta, \tau^p, \epsilon) = 1 - \frac{1 - \theta}{\frac{1-\delta-\epsilon}{1-\epsilon}} - c'(\tau^p) = 0.$$

The derivative of τ^p with respect to ϵ will then be given by $\frac{\partial \tau^p}{\partial \epsilon} = -\frac{F_\epsilon}{F_{\tau^p}}$, where

$$F_\epsilon = -\left(1 - \theta\right) \frac{\delta}{\left(1 - \delta - \epsilon\right)^2} < 0$$

and:

$$F_{\tau^p} = -c''\left(\tau^p\right)$$

As a result we have:

$$\frac{\partial \tau^p}{\partial \epsilon} = -\frac{1 - \theta}{c''\left(\tau^p\right)} \frac{\delta}{\left(1 - \delta - \epsilon\right)^2} < 0.$$

Equation (1.9) is useful when it comes to studying the optimal tax rate of the elite, i.e. $i = r$. Indeed, since elite members are relatively richer $\left(y^r > \frac{y}{1-\epsilon}\right)$ and distortion is increasing in the tax rate $(c'(\cdot) > 0)$, equation (1.9) implies $\tau^r = 0$.

1.1.2.2 Political Regimes

The tax structure depends on the political regime (S_t^p) of the country. Under democracy $(S_t^p = D)$ all individuals vote on a proportional tax rate (τ^D), and since we assume singled-peaked preferences over a one-dimensional domain, the tax implemented is the one chosen by the median voter who is a poor agent, i.e. $\tau^D = \tau^p$. In autocracy $(S_t^p = A)$, taxes are set by the elite. Under socialism $(S_t^p = S)$, the poor expropriate all the income from the rich and divide it among themselves, thus, there is no taxation.

Regime transitions happen through revolutions or democratization. However, revolution takes place only when the conditions are favorable, that is, when its cost is not too high. Following Acemoglu and Robinson (2001), I assume that the threat of revolution can be either high $(S_t^s = H)$ or low $(S_t^s = L)$, where S_t^s represents the social state at time t. The probabilities associated with these two different social states are respectively q and $1-q$. This reflects the transitory nature of *de facto* political power.

The society starts with the elite in power. Ideally, such group would set a tax rate equal to zero. However, because of the inegalitarian nature of this regime, the opponents would be willing to overthrow the ruling class. In particular, when $S_t^s = H$ workers can mount a violent revolution. In order to prevent this scenario the elite may either repress the rest of the population, extend the franchise or redistribute a certain amount of income without giving up power.

If the elite decides to repress, it always succeeds and in this circumstance all agents lose a fraction κ of their income. If the franchise is extended, the elite loses its *de jure* political power and everyone obtains the same voting rights. The tax rate implemented will be therefore that chosen by the median voter who belongs to the poor group, given that poor agents are the majority. Finally, if the elite redistributes without giving up power, it will do so only when social state is H, while when $S_t^s = L$ it will set again its optimal tax rate $\tau^r = 0$.

The poor, in turn, can decide to mount a revolution if $S_t^s = H$, in which case it always succeeds. After a revolution socialism establishes: the poor take control of the society and of its resources, while the rich are left with nothing. However, during revolution workers incur a cost μ, which reflect the amount of resources destroyed after the revolt as well as the severity of the collective action problem faced by the revolutionary group[11]. The payoff of the poor in this time period is therefore $\frac{1-\mu}{1-\delta-\epsilon}y$, where μ represents the cost of revolution. As in Acemoglu and Robinson (2001), I

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[11]Glaeser et al. (2007) stress the link between education and socialization, arguing that education reduces the cost of exchanging information. For this reason countries with a flatter distribution of education can be though of as having a lower value of μ.

assume that socialism is an absorbing state. The lifetime utility of the worker would then be equal to $\frac{1-\mu^S}{(1-\delta-\epsilon)(1-\beta)}y$, while members of the elite would get a payoff of zero.

Whenever $S_t^s = L$, revolution is too costly ($\mu^L = 1$) and hence it does not occur. If emigration takes place every period, i.e. $\epsilon > 0$, the lifetime utility resulting from revolution is higher[12], because there are less people in the country claiming a share of the proceeds from revolution.

The timing of the events is such that at the beginning of period 0, a fraction $\epsilon > 0$ of poor agents leave the country. Then the following moves take place within each period:

1. The social state S_t^s is revealed[13].

2. The elite can either extend the right to vote, promise redistribution or repress.

3. (a) If the elite has chosen repression, the stage game ends with payoffs $(1 - \kappa)y^i$, $i = r, p$, where κ is the cost of repression.

   (b) If the elite has decided to extend the franchise, democracy is established and the median voter sets a tax rate $\tau^D = \tau^p$.

   (c) If the elite has decided to make concessions, it sets a tax rate $\hat{\tau} \leq \tau^p$ in order to prevent revolution.

4. (a) If the median voter has set the tax rate $\tau^D = \tau^p$ the stage game ends with payoffs

$$(1 - \tau^p)y^i + (\tau^p - c(\tau^p))\frac{y}{1-\epsilon} = y^i + \tau^p\left(\frac{y}{1-\epsilon} - y^i\right) - c(\tau^p)\frac{y}{1-\epsilon}$$

   $i = r, p$.

   (b) If the elite has set a tax rate $\hat{\tau} \leq \tau^p$

   i. The citizens revolt and the game ends with payoffs $\frac{1-\mu}{1-\delta-\epsilon}y$ for the poor and 0 for the rich, where μ is the cost of revolution.

   ii. The poor accept non-democracy with redistribution and the game ends with payoffs $y^i + \hat{\tau}\left(\frac{y}{1-\epsilon} - y^i\right) - c(\hat{\tau})\frac{y}{1-\epsilon}$.

Since within the same group members are homogeneous, I can treat the rich elite and the poor group as two players of a dynamic game. The focus will be on pure strategies Markov perfect equilibria.

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[12]It is possible to verify this by rewriting the return of revolution as $\frac{1-\mu}{1-\beta}\left(\frac{K}{1-\delta-\epsilon}\right)^\theta$.

[13]The role of uncertainty on the social state is central for the model. S_t^s captures the fact that only in some circumstances the poor group is able to mount a revolution and overthrow the elite. The reader might correctly think that the emigration decision depends on the social state and then the timing of the game should be different, i.e. ϵ decided after the social state is revealed. If the poor migrates after the social state is revealed, this would affect the incentives towards different political actions of the members of the poor groups who are still in the origin country. However, in either case the ruling elite moves first and has perfect information on the social state and on the preferences of the poor. For this reason, even if the poor migrates once S_t^s is known, the elite, by virtue of the fact that it moves first, will modify its strategy accordingly and the dynamics of the game will not be affected.

1.1.2.3 The equilibrium

I now characterize the *Markov perfect equilibrium* of this game in which strategies depend only on the current state of the game. The strategy of the elite is referred to as σ^r and consists of the actions $\{\omega, \phi, \tau^N\}$. $\omega : \{L, H\} \to \{0, 1\}$ denotes the repression decision when the political state is $S_t^p = A$, with $\omega = 1$ corresponding to repression and $\omega = 0$ to non-repression. $\phi : \{L, H\} \to \{0, 1\}$ represents the decision to extend the franchise when $S_t^p = A$, where $\phi = 1$ indicates that the franchise has been extended. $\tau^N : \{L, H\} \to [0, 1]$ is the tax rate at which redistribution is promised, when $\phi = 0$. The strategy of the poor is denoted by σ^p and consists of the actions $\{\rho, \tau^D\}$. $\rho : \{L, H\} \times \{0, 1\}^2 \times [0, 1] \to [0, 1]$ represents the revolution decision and depends on the social state S_t^s, as well as on ω, ϕ and τ^N, with $\rho = 1$ corresponding to revolution. Finally, $\tau^D \in [0, 1]$ represents the tax rate set by the median voter if the franchise has been extended, i.e. when $S_t^p = D$. Then a *Markov perfect equilibrium* is a strategy combination denoted by $\{\tilde{\sigma}^r, \tilde{\sigma}^p\}$ such that $\tilde{\sigma}^r$ and $\tilde{\sigma}^p$ are mutually best responses for all S_t^s and S_t^p.

1.1.3 Analysis

The analysis of the game starts by considering the incentives of the poor towards revolution under a non-democratic regime. If revolution takes place, socialism establishes forever, thus, each citizen gains a return equal to $\frac{1-\mu}{(1-\delta-\epsilon)(1-\beta)}y$. On the other hand, if they accept autocracy, such political regime will be in power until the end of the world, giving them a return equal to $\frac{y^p}{1-\beta}$. The decision of mounting a revolt will, therefore, be taken only if revolution pays the citizens off more than autocracy. i.e. if $\theta > \mu$[14].

In line with Alesina and Perotti (1996) who find a positive relationship between the share of income owned by the non-ruling group and political stability, this expression tells us that when inter-group inequality is high it is more likely for the poor to revolt. When the social state is L, the cost of revolting is $\mu^L = 1$ therefore revolution does not take place. As a result, the revolution constraint never binds and the elite does not need to take any precautionary action in that time period. Notice that the above inequality, referred to as the revolution constraint, does not depend on migration flows.

Given that if the poor revolt the elite is expropriated of its income, the rich group may want to persuade the rest of the population not to choose such an option by promising redistribution at a tax rate $\hat{\tau} \le \tau^p$. To choose whether to revolt or not, the poor compare the return of revolution to the return of redistribution given by $\frac{y^p + (1-\beta(1-q))\left(\hat{\tau}\left(\frac{y}{1-\epsilon}-y^p\right)-c(\hat{\tau})\frac{y}{1-\epsilon}\right)}{1-\beta}$[15]. The term $1 - \beta(1 - q)$ represents the probability of

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[14]This derives from the comparison between the payoffs corresponding to *No concessions* and *Revolution* in Table 1.1 under the column *Poor*, i.e. $\frac{1-\mu}{(1-\delta-\epsilon)(1-\beta)}y > \frac{y^p}{1-\beta} = \frac{1-\theta}{(1-\delta-\epsilon)(1-\beta)}y$.

[15]These payoffs are equal to the expressions presented in Table 1.1, under the column *Poor* and the rows *Revolution* and *Concessions*.

being tomorrow in the high-threat state. Since the current political state is autocracy and people discount future by β, such probability is indeed given by 1 minus the probability of being tomorrow in the low-threat state ($\beta(1-q)$).

Nevertheless, it may happen that redistribution does not stop revolution even if the elite promises to redistribute at the poor's optimal tax rate $\hat{\tau} = \tau^p$. In that case the elite has to either extend the franchise or to repress the poor to prevent a revolt. To summarize these alternative scenarios, it is possible to define a threshold value μ^*, in correspondence of which the return of revolution and that of redistribution at the highest tax rate, $\hat{\tau} = \tau^p$, are equal

$$\mu^* = \theta - (1 - \beta(1-q))\left[\tau^p\left(\frac{1-\delta-\epsilon}{1-\epsilon} - (1-\theta)\right) - \frac{1-\delta-\epsilon}{1-\epsilon}c(\tau^p)\right]. \qquad (1.10)$$

Thus, when $\mu > \mu^*$, revolution is relatively costly for the poor and there exists a tax rate $\hat{\tau} \in (0, \tau^p]$ that the elite can promise to set in order to prevent revolution; whereas, when $\mu \leq \mu^*$ the elite cannot stop a revolution by redistributing, hence, it has either to democratize or to repress[16].

Notice that in principle emigration has both a direct and an indirect effect on μ^*: the latter works through changes in the optimal tax rate τ^p, while the former captures changes in population composition summarized by the term $\frac{1-\delta-\epsilon}{1-\epsilon}$. The comparative statics of μ^* with respect to ϵ are informative of the overall effect of emigration on the threshold of revolution:

$$\frac{\partial \mu^*}{\partial \epsilon} = -(1 - \beta(1-q))$$

$$\left[\frac{\partial \tau^p}{\partial \epsilon}\left(\left(\frac{1-\delta-\epsilon}{1-\epsilon} - (1-\theta)\right) - \frac{1-\delta-\epsilon}{1-\epsilon}c'(\tau^p)\right) + \frac{\partial\left(\frac{1-\delta-\epsilon}{1-\epsilon}\right)}{\partial \epsilon}(\tau^p - c(\tau^p))\right].$$

As a direct implication of the envelope theorem the term that multiplies $\frac{\partial \tau^p}{\partial \epsilon}$ is equal to zero. This means that a change in the optimal tax rate does not have any impact on μ^*. The reason lies in the fact that τ^p is chosen so that the median voter's indirect utility is maximized both before and after emigration, therefore the redistribution implied is always optimal for the poor group.

The second term in square brackets, representing the effect working through changes in population structure, is then the only impact that emigration has on μ^*. Since $\frac{\partial\left(\frac{1-\delta-\epsilon}{1-\epsilon}\right)}{\partial \epsilon}$ is negative, while $(\tau^p - c(\tau^p))$ is positive[17], the overall effect is positive, meaning that an increase in emigration makes revolution more likely to be chosen

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[16]In other words, μ^* is such that the second and third payoffs under the column *Poor* of Table 1.1 are equal for $\hat{\tau} = \tau^p$.

[17]This term is positive because it represents total net tax revenue as a proportion of total income.

over redistribution, i.e. μ^* goes up. Intuitively, when poor agents emigrate, for a given tax rate the payoffs of both revolution and redistribution go up, because there are less people in the country with whom those who stay have to share these returns. However, while the proceeds from revolution are only shared among members of the poor group, for a given tax rate total tax revenue are shared between both rich and poor members. Hence migration increases the revolutionary payoff to the poor by more than it increases the payoff from redistribution.

In the same way as above, it is possible to derive some conditions to establish whether democracy can prevent revolution. Following Acemoglu and Robinson (2001), I consider only cases in which democracy is sufficient to stop revolution; this corresponds to imposing the following assumption

Assumption 1.1.1 *For every poor agent, the return to democracy is greater than the return of revolution*[18]

Now, I consider the choices of the elite. If the poor decide to revolt despite the promise of redistribution of the rich, i.e. $\mu \leq \mu^*$, the elite will choose only between democracy and repression. Instead, if citizens decide to accept redistribution, i.e. $\mu > \mu^*$ the choice will be between this option and repression. Which regime will be chosen in the pairs democracy-repression and redistribution-repression depends on the relative costs of the alternative regimes for the rich. It is, therefore, important to understand what is the return of repression for the elite. In line with Acemoglu and Robinson (2001), I restrict my attention to situations in which the elite represses every time the threat of revolution is high, $S_t^s = H$. The resulting payoff is then $\frac{y^r - (1 - \beta(1-q))\kappa y^r}{1-\beta}$.

Table 1.1 summarizes the payoffs discussed so far.

TABLE 1.1: Payoffs of the Two Groups Under Alternative Regimes

	Poor	Rich
No concessions	$\frac{y^p}{1-\beta}$	$\frac{y^r}{1-\beta}$
Revolution	$\frac{(1-\mu)y}{(1-\delta-\epsilon)(1-\beta)}$	0
Concessions	$\frac{y^p + (1-\beta(1-q))\left(\hat{\tau}\left(\frac{y}{1-\epsilon} - y^p\right) - c(\hat{\tau})\frac{y}{1-\epsilon}\right)}{1-\beta}$	$\frac{y^r + (1-\beta(1-q))\left(\hat{\tau}\left(\frac{y}{1-\epsilon} - y^r\right) - c(\hat{\tau})\frac{y}{1-\epsilon}\right)}{1-\beta}$
Democracy	$\frac{y^p + \tau^p\left(\frac{y}{1-\epsilon} - y^p\right) - c(\tau^p)\frac{y}{1-\epsilon}}{1-\beta}$	$\frac{y^r + \tau^p\left(\frac{y}{1-\epsilon} - y^r\right) - c(\tau^p)\frac{y}{1-\epsilon}}{1-\beta}$
Repression	$\frac{y^p - (1-\beta(1-q))\kappa y^p}{1-\beta}$	$\frac{y^r - (1-\beta(1-q))\kappa y^r}{1-\beta}$

Similarly to the case of revolution, I define threshold values which make the elite indifferent between the aforementioned political choices. In particular, $\hat{\kappa}$ will be the cost of repression which equalizes the returns of redistribution and repression[19], and $\tilde{\kappa}$ the correspondent cost which makes the elite indifferent between repression and

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[18]This assumption corresponds to the following restriction on the parameter $\mu \geq \theta - \left[\tau^p\left(\frac{1-\delta-\epsilon}{1-\epsilon} - (1-\theta)\right) - \frac{1-\delta-\epsilon}{1-\epsilon}c\left(\tau^p\right)\right]$.

[19]These are the third and fifth payoffs in the column *Rich* of Table 1.1.

democracy[20]

$$\hat{\kappa} = \frac{1}{\theta} \left(C(\hat{\tau}) \frac{\delta}{1-\epsilon} - \hat{\tau} \left(\frac{\delta}{1-\epsilon} - \theta \right) \right) \tag{1.11}$$

$$\tilde{\kappa} = \frac{1}{\theta \left(1 - \beta \left(1 - q \right) \right)} \left(C(\tau^p) \frac{\delta}{1-\epsilon} - \tau^p \left(\frac{\delta}{1-\epsilon} - \theta \right) \right) \tag{1.12}$$

Whenever κ is lower than the threshold in (1.11) or (1.12), repression is relatively not costly for the elite and, therefore, it will be chosen as the preferred political outcome. If κ is greater than the threshold in equation (1.11) (equation (1.12)) redistribution (democracy) will be chosen.

As already seen for the threshold of revolution, the effect of emigration on these critical values is both direct and indirect. Positive net migration outflows lead to a reduction of the tax rate set in democracy (autocracy) by the median voter (elite) and, since $\frac{\partial \tilde{\kappa}}{\partial \tau^p} > 0$ ($\frac{\partial \hat{\kappa}}{\partial \hat{\tau}} > 0$), this makes repression more costly. The reason for this result is simple: a lower tax rate makes democracy (redistribution) less redistributive and, hence, less costly for the elite relative to repression.

The direct effect of emigration works through the term $\frac{\delta}{1-\epsilon}$, which represents the relative scarcity of the people in the rich group. As a fraction of the poor leaves the country and at a given tax rate, the lump-sum transfer received by each rich agent is higher. The burden of democracy (redistribution) in this situation is then lower for the rich. For this reason democracy (redistribution) becomes less costly compared to repression.

Formally, it is possible to show this by considering the following partial derivatives:

$$\frac{\partial \hat{\kappa}}{\partial \epsilon} = \frac{1}{\theta} \left[\frac{\partial \hat{\tau}}{\partial \epsilon} \left(\frac{\delta}{1-\epsilon} c'(\hat{\tau}) - \left(\frac{\delta}{1-\epsilon} - \theta \right) \right) + \frac{\partial \left(\frac{\delta}{1-\epsilon} \right)}{\partial \epsilon} \left(c(\hat{\tau}) - \hat{\tau} \right) \right] \tag{1.13}$$

$$\frac{\partial \tilde{\kappa}}{\partial \epsilon} = \frac{1}{\theta \left(1 - \beta \left(1 - q \right) \right)} \left[\frac{\partial \tau^p}{\partial \epsilon} \left(\frac{\delta}{1-\epsilon} c'(\tau^p) - \left(\frac{\delta}{1-\epsilon} - \theta \right) \right) + \frac{\partial \left(\frac{\delta}{1-\epsilon} \right)}{\partial \epsilon} \left(c(\tau^p) - \tau^p \right) \right]. \tag{1.14}$$

Both the first and the second term inside the square brackets in equations (1.13) and (1.14) are negative, implying that emigration reduces the two thresholds of repres-

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[20]Fourth and fifth payoffs in the column *Rich* of Table 1.1.

sion[21].

Similarly to Acemoglu and Robinson (2001), we now have the following result[22].

Proposition 1.1.2 *Suppose Assumption 1.1.1 holds. Then, there is a unique Markov perfect equilibrium $\{\tilde{\sigma}^r, \tilde{\sigma}^p\}$ in the game, such that:*

1. *If $\theta \leq \mu$, the revolution constraint does not bind and the elite stays in power without taking any action.*

2. *If $\theta > \mu$, the revolution constraint binds and the following political regimes can arise:*

   (a) *If $\mu \geq \mu^*$ and $\kappa \geq \hat{\kappa}$, the elite redistributes in state $S_t^s = H$ to prevent revolution.*

   (b) *If $\mu \geq \mu^*$ and $\kappa < \hat{\kappa}$, or, $\mu < \mu^*$ and $\kappa < \tilde{\kappa}$, the elite uses repression in social state H.*

   (c) *If $\mu < \mu^*$ and $\kappa \geq \tilde{\kappa}$, the elite democratizes when $S_t^s = H$.*

The proposition shows that the elite decides to extend the franchise when repression is relatively costly ($\kappa \geq \tilde{\kappa}$) and redistribution is not enough to prevent revolution ($\mu < \mu^*$). The theoretical contribution of this paper lies in the comparative statics implications of the equilibrium.

Figure 1.1, borrowed from Acemoglu and Robinson (2006), displays such effects. The horizontal axis shows inter-group inequality θ, while in the vertical axis the cost of repression κ is displayed. When inequality is low $\theta < \mu$, the revolution constraint is not binding and the elite can stay in power without taking any action (Political Status Quo: No concessions). Deriving θ^* from (1.10), we can state that for levels of inequality in the range $[\mu, \theta^*]$ the elite is able to stop revolution by redistributing income without giving up power (Political Status Quo: Concessions). Finally, for high levels of inter-group inequality ($\theta > \theta^*$) revolution will not be stopped by redistribution and democratization is the only non-violent option (Democracy).

However, the elite can resort to violence if this alternative is relatively less costly compared to redistribution or democracy (Repression). It will do so, when $\kappa < \hat{\kappa}$ or when $\kappa < \tilde{\kappa}$. These threshold values are the upwards-sloping straight lines depicted in the central and right-hand regions of Figure 1.1. The fact that such lines are increasing in the level of inequality follows from Equations (1.13) and (1.14), while $\tilde{\kappa} > \hat{\kappa}$ is due to the fact that democracy is more redistributive than concessions.

Emigration impact such equilibrium by altering the key parameters of the model, i.e. μ^*, $\tilde{\kappa}$ and $\hat{\kappa}$. Given that $\frac{\partial \mu^*}{\partial \epsilon} > 0$ and then $\frac{\partial \theta^*}{\partial \epsilon} < 0$, revolution becomes more attractive for the poor relative to redistribution. This implies that it is more difficult for

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[21]The derivative of $\hat{\tau}$ with respect to ϵ is negative because after emigration the elite can promise redistribution at a lower tax rate. The term $\left(\frac{\delta}{1-\epsilon}c'(\hat{\tau}) - \left(\frac{\delta}{1-\epsilon} - \theta\right)\right)$ is positive because $c'(\cdot)$ is positive and $\theta < \frac{\delta}{1-\epsilon}$. The second term inside the square brackets is negative for the same reasons discussed in the discussion of the comparative statics of μ^*.

[22]Proof in Appendix A.1.

the elite to prevent a revolution by simply redistributing and without democratizing (the area representing *Political Status Quo: Concessions* shrinks compare to the area representing *Democracy*).

FIGURE 1.1: Political Institutions Pre- and Post-Emigration
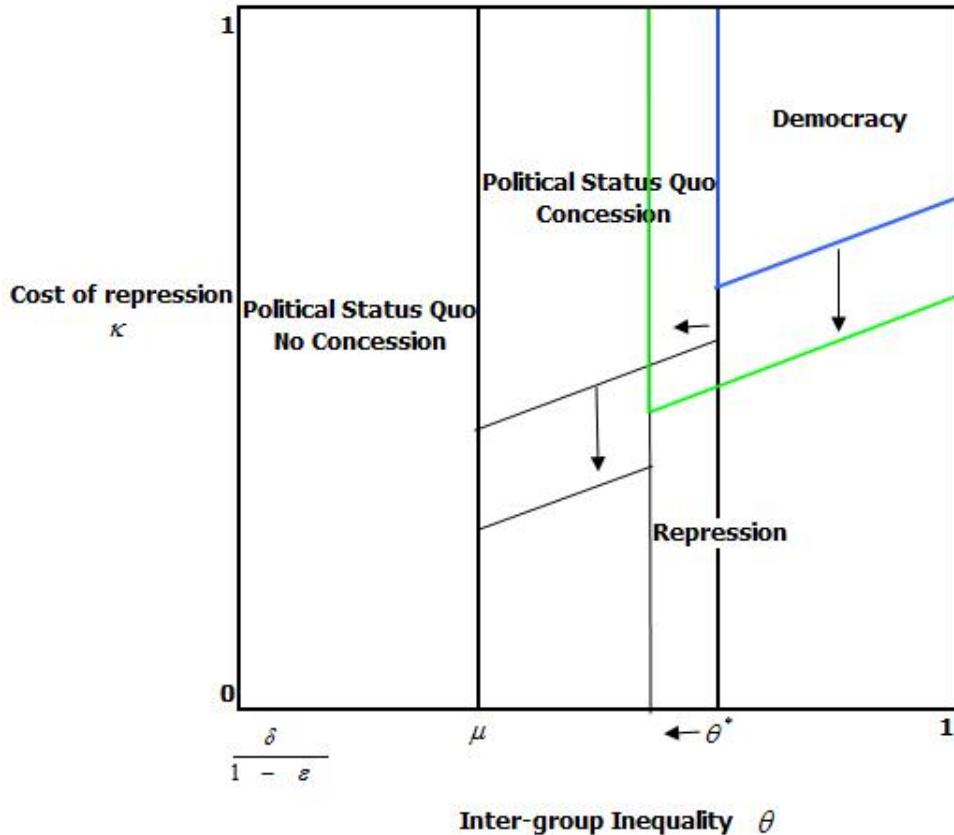
At the same time, following emigration the poor demands less redistribution and then both concessions and democratization become relatively less costly than repression, i.e. $\frac{\partial \hat{\kappa}}{\partial \epsilon} < 0$ and $\frac{\partial \hat{\kappa}}{\partial \epsilon} < 0$ respectively. Graphically these effects are represented by a shift downward of the upward sloping lines in the central and right-hand areas of the graph. In particular, it is possible to see that the areas delimiting *Political Status Quo: Concessions* and *Democracy* are now larger compared to the corresponding area representing *Repression*.

The overall result of such changes represents the main contribution of this paper, i.e. the area denoting *Democracy* after emigration (delimited by the green line) is larger than the corresponding area representing *Democracy* before emigration (delimited by the blue line)[23].

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[23]Emigration increases the probability of democratization as long as emigration outflows are such that the group affected by them does not become richer than the group that holds the power, i.e. $(1-\theta) < \left(\frac{1-\delta-\epsilon}{1-\epsilon}\right)$ or $\epsilon < \left(1 - \frac{\delta}{\theta}\right)$.

1.2 Empirical Evidence

The main prediction of the theoretical model is that emigration increases the chances of democratization through the reduction in income inequality it promotes. In particular, democratization becomes more likely because, the poor being less numerous, (i) emigration increases the expropriation payoff of a successful revolution, and (ii) by raising the wages of non-migrants, it reduces income inequality between the rich and the poor, dampening the poor redistribution demands under democratization, and thereby, increasing the elite's opportunity cost of repression.

The previous section shows that emigration's effect on democracy works through both a direct and an indirect channel. The former $\left(\frac{1-\delta-\epsilon}{1-\epsilon} \downarrow, \frac{\delta}{1-\epsilon} \uparrow \right)$ reflects a change in the population structure, in particular an increase in the relative scarcity of less wealthy agents[24]; the latter ($\tau^p \downarrow$) is the result of a narrowing of the income gap between the rich and the poor. Both effects are likely to be captured by a reduction in income inequality. Hence, the main testable implication of the theoretical model is whether the negative effect of inequality on political institutions comes from emigration.

1.2.1 Econometric Model

The core of the empirical analysis is based on dynamic panel regressions as already done in previous studies on democracy and education by Acemoglu et al. (2005b), Bobba and Coviello (2006) and Castello-Climent (2008), and in the work on emigration and political institutions by Spilimbergo (2009) and Docquier et al. (2011). The basic specification is as follows:

$$
\begin{aligned}
Democracy_{i,t} \;=\; & \beta_0 Democracy_{i,t-5} + \beta_1 Emigration_{i,t-5} \\
& + \beta_2 IncomeInequality_{i,t-5} + \beta_3 Population_{i,t-5} \\
& + \beta_4 EducationInequality_{i,t-5} + \eta_i + \zeta_t + \epsilon_{i,t}
\end{aligned}
\tag{1.15}
$$

where i is the country and t the time period.

All the explanatory variables are lagged five years. The lagged dependent variable is included among the explanatory variables to capture persistence in democracy. The main variable of interest is $Emigration_{i,t-5}$, the lagged value of the total emigration rate. The parameter β_1 measures whether emigration has an effect on democracy once inequality is controlled for. We expect this coefficient not to be statistically significant if income inequality captures both the direct and indirect effect of emigration described above. The coefficient β_2 measures the direct effect of income inequality,

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[24]This is a direct consequence of the fact that the elite does not migrate.

which is likely to be negative[25].

The coefficient β_3 captures the influence of population size on institutional development. This variable is negatively correlated to emigration (larger countries experience less emigration) and is commonly considered endogenous in previous studies on democracy[26]. As a result, its exclusion would bias our coefficient of interest. We include education inequality among the regressors to proxy for the cost of revolution μ and repression κ. As shown in the previous section, these are fundamental parameters which determine the equilibrium described in Proposition 1.1.2. Glaeser et al. (2007) show that education reduces the costs of interaction, reason for which we believe that in societies with a more equal distribution of education it is more difficult for the ruling group to repress and easier for the revolting class to coordinate. As a result, we expect β_4 to be negative.

Moreover, all regressions have time (ζ_t) and country (η_i) fixed effects so as to control respectively for underlying common trends of democracy in all the countries and for unobservable heterogeneity. Notice that the use of a panel estimation ensures that the results are robust to all country-specific time invariant determinants of institutional quality found in the cross-section studies, such as ethnic composition, religion, legal origins, colonial history and geographical characteristics.

In order to estimate dynamic-panel model like the one in equation (1.15), there are two main issues to address: the presence of unobserved effects, and the endogeneity of at least one (the lagged dependent variable) regressor. The two most common estimation strategies used to overcome these problems in dynamic panel models are known as difference and system Generalized Method of Moments (GMM) estimators. The difference GMM estimator, proposed by Arellano and Bond (1991), takes the first difference of the linear dynamic panel regression to remove the individual-specific, unobserved effect. Under the assumption of sequential exogeneity[27] and of zero serial and cross-correlation of the idiosyncratic error term $\epsilon_{i,t}$, past levels of the dependent variable (or any pre-determined variable) can be used as instruments for the current first differences of the correspondent variable[28]. However, in presence of persistent explanatory variables, Blundell and Bond (1998) show that past levels are weak instruments for the correspondent differenced variables, and this leads to a large estimation bias.

This problem is particularly severe when it comes to estimating equation (1.15), because both democracy and emigration differ significantly across countries but do not show the same pattern within countries over time. To overcome this problem, I use the system GMM estimator proposed by Blundell and Bond (1998), obtained by aug-

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[25]According to Figure 1.1 and Acemoglu and Robinson (2006) there is a U-shaped relationship between democracy and income inequality, but there is no empirical evidence in support of this hypothesis.

[26]Barro (1999), Acemoglu et al. (2005b) and Bobba and Coviello (2006), among the others.

[27]This assumption requires that the idiosyncratic error term has mean zero conditional upon the current set of information and the unobserved effect.

[28]Under the above stated assumptions the following moment conditions hold $E[Z_{i,t-s}\Delta\epsilon_{i,t}] = 0$ for $t = 3, ..., T; s \geq 2$; where $Z_{i,t-s}$ is any predetermined variable.

menting the level equation with an additional moment condition[29] which ensures that the variable in levels can be instrumented by the lagged first differences of the corresponding explanatory variables.[30] In order to control the validity of these conditions this paper uses the Hansen and Sargan test of overidentifying restriction and tests the null hypothesis of zero second order correlation in the error term. Additionally, I test the validity of the moment conditions associated with specific subsets of instruments using the Hansen difference test.

Following the literature[31], in the analysis the lagged dependent variable as well all the control variables of interest are considered predetermined and instrumented with internal instruments. One-period and further lags are used according to the specification[32].

1.2.2 Data

The baseline sample is an unbalanced panel of 122 countries spanning from 1980 to 2005 (dependent variable) with five-year lags. Information on the quality of political institutions is expressed using the Political Right provided by Freedom House. This indicator is based on answers to a list of questions belonging to three different groups: electoral process, political pluralism and participation, and the functioning of government. The index ranges from 1 to 7, where higher scores denote less democratic institutions, but as in previous studies[33], I follow the transformation in the range $[0,1]$ proposed by Barro (1999), where 1 denotes the most-democratic institutions.

My main explanatory variable -*total emigration rate*- is taken from Defoort (2008). Using census data of the six main OECD host countries[34], the author constructs emigration stocks and rates by skill starting from 1975 until 2000 with five-year lags. Overall, almost 75% of the total South-North immigration flows are monitored[35].

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[29] $E[\Delta Z_{i,t-s}(\eta_i + \epsilon_{i,t})] = 0$ for $t = 4, ..., T$.

[30] Monte Carlo simulations show that this estimator performs better than the others if the moment conditions on which it is based are valid.

[31] Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b), Castello-Climent (2008) and Bobba and Coviello (2006).

[32] Under each table, the note specify the number of lags used as instruments for the corresponding predetermined variables.

[33] Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b) and Castello-Climent (2008).

[34] USA, Canada, Australia, Germany, UK and France.

[35] Being based on immigration flows in six OECD countries, one of the main limitations of these data is that they do not capture the totality of emigration flows. In addition, since migration to these destinations is mainly skilled, unskilled emigration is likely to be underestimated. Two alternative data sources are available to construct data on emigration. Docquier and Marfouk (2006) collect data on immigration in the OECD countries as a whole for 1990 and 2000. However, given that data are available for only two years, it is not possible to use them in the dynamic panel framework adopted in this paper. Another source is the newly released *Global Bilateral Migration Database* by Ozden et al. (2011) that covers worldwide migration in 1960, 1970, 1980, 1990 and 2000. However, such data are not available by skill level and therefore would lead to results that are not comparable to those presented in the last chapter of this thesis. In addition, the study on emigration and political institution by Docquier et al. (2011) uses the dataset constructed by Defoort (2008), therefore, for comparability reasons, the regressions presented in this chapter are based on the same data. In Tables A.2 and A.3 of the Appendix A.3, it is shown that the same results are obtained when the baseline regressions are replicated by using the *Global Bilateral Migration Database*.

Income inequality is measured using the estimated household income inequality (EHII) index computed by Galbraith and Kum (2005)[36]. Such measure is derived from the econometric relationship between a measure of inter-sectoral pay inequality produced by the University of Texas Inequality Project and based on data published by the United Nation Industrial Development Organization, and the Gini coefficients proposed by Deininger and Squire (1996). The advantage of the EHII index lies in the fact that it offers a broader and more consistent coverage compared to other measures of inequality, which are often too sparse and not comparable across countries.

The Gini coefficient for education is constructed following the procedure outlined in Castello and Domenech (2002) on the basis of the data provided by Barro and Lee (2010). Investment share of GDP, real GDP per capita and population size are taken from the Penn World Tables Version 7.0 by Heston et al. (2011), while the source of the remaining control variables is the World Bank World Development Indicators 2011[37].

Table 1.2 presents summary statistics, while Table 1.3 and Table 1.4 show the sample coverage.

TABLE 1.2: Summary Statistics

	Obs.	Mean	Std.Dev	Min	Max
Political Rights	525	0.63	0.35	0	1
Tot Emigration	461	0.04	0.07	0.01	0.33
Log Population	461	9.13	1.68	4.55	13.94
Income inequality	396	41.70	6.61	25.89	62.32
Education inequality	525	37.01	21.92	5.15	93.53

TABLE 1.3: Years Covered in the Sample

Year	Observations	Frequency
1980	84	16.00
1985	94	17.90
1990	93	17.71
1995	92	17.52
2000	98	18.67
2005	64	12.19

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[36]If data in the sample years are not available, I use data on the year before (preferred) or the year after.

[37]In Appendix D.1, I discuss how different data sources are harmonized in order to ensure that changes in countries' borders do not affect the results.

TABLE 1.4: Countries in the Sample

Country	Obs.	Country	Obs.	Country	Obs.
Afghanistan	4	Greece	5	Pakistan	5
Albania	2	Guatemala	5	Panama	6
Algeria	5	Haiti	3	Papua New Guinea	4
Argentina	4	Honduras	5	Paraguay	1
Armenia	1	Hungary	6	Peru	3
Australia	6	Iceland	5	Philippines	5
Austria	6	India	6	Poland	6
Bangladesh	5	Indonesia	6	Portugal	6
Barbados	5	Iran	6	Qatar	4
Belgium	5	Iraq	4	Romania	3
Belize	1	Ireland	6	Russian Federation	2
Benin	2	Israel	6	Rwanda	3
Bolivia	6	Italy	6	Saudi Arabia	1
Botswana	4	Jamaica	4	Senegal	6
Brazil	2	Japan	6	Sierra Leone	1
Bulgaria	6	Jordan	6	Singapore	6
Burma (Myanmar)	3	Kenya	6	Slovak Republic	2
Burundi	4	Korea, Rep.	6	Slovenia	2
Cameroon	6	Kuwait	6	South Africa	6
Canada	6	Kyrgyzstan	2	Spain	6
Central African Republic	4	Latvia	1	Sri Lanka	5
Chile	6	Lesotho	1	Swaziland	5
China	2	Liberia	1	Sweden	6
Colombia	6	Libya	2	Syria	5
Congo, Rep. of the	2	Lithuania	2	Tanzania	6
Costa Rica	4	Luxembourg	6	Thailand	5
Cote d'Ivoire	3	Malawi	5	Togo	3
Croatia	2	Malaysia	6	Tonga	4
Cuba	3	Malta	6	Trinidad and Tobago	6
Cyprus	6	Mauritius	6	Tunisia	4
Denmark	5	Mexico	6	Turkey	6
Dominican Republic	3	Moldova	2	Uganda	4
Ecuador	6	Mongolia	2	Ukraine	1
Egypt	5	Morocco	6	United Arab Emirates	2
El Salvador	4	Mozambique	3	United Kingdom	6
Fiji	5	Namibia	1	United States	6
Finland	6	Nepal	3	Uruguay	6
France	5	Netherlands	6	Venezuela	5
Gabon	3	New Zealand	5	Zambia	4
Gambia, The	2	Nicaragua	3	Zimbabwe	5
Ghana	4	Norway	6	Total	525

1.2.3 Results

Equation (1.15) is estimated using four different estimation techniques: pooled OLS, fixed effects OLS, difference and system GMM. The results in the first two columns of Table 1.5 are instructive because they suggest the range within which the true estimate of β_0 will lie, i.e. $(0.268, 0.721)$[38]. Indeed, in dynamic models pooled OLS regressions overestimate the coefficient on the lagged dependent variables, while fixed effects OLS with small T produce estimates that are biased downward and inconsistent.

We can therefore assess the reliability of the estimation in columns (3) and (4), obtained respectively with difference and system GMM, by comparing the estimated coefficients on $Democracy_{t-5}$ with these bounds. It is possible to see that the weak

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[38]The procedure consisting in comparing the performance of a GMM estimator with alternative estimators whose biases in a dynamic panel setting are well known is called Bounding Procedure and has been proposed by Bond et al. (2001) and then followed by Bobba and Coviello (2006) and Docquier et al. (2011).

instrument problem severely affects the difference GMM estimates. In fact, the coefficient on $PoliticalRights_{t-5}$ is very close to that in column (2), which is known to be downward biased.

For this reason, starting from the estimation presented in column (4) the equation in difference is augmented by introducing the level equation. However, the validity of S-GMM hinges upon the exogeneity of the additional moment conditions imposed. The Hansen and Difference Hansen test show that such conditions hold, i.e. we fail to reject the null hypothesis of instruments exogeneity. Further evidence in this direction is given by the fact that the coefficient on the lagged dependent variable lies within the expected range.

The results so far suggest that the estimation included in column (4) appears to be our preferred specification. As expected, democracy turns out to be very persistent over time, with a coefficient of 0.641 in line with those found in the previous literature[39]. In addition, as in Castello-Climent (2008), the distribution of education among the population matters for institutional quality: one standard deviation increase in education inequality leads to a reduction by 0.26 points in the long term value of democracy[40]. This finding backs up the prediction of the model according to which democracy is more likely to arise when it is easier to revolt for the poor and more costly to repress for the dominant group[41]. Contrarily, population size does not seem to have an effect.

The key results of our empirical analysis are those concerning income inequality and emigration rate. As discussed in the previous section, the relative size and earnings of the poor groups are crucial determinants of political transitions. In particular, fewer and wealthier workers are more likely to drive societies towards democratization.

The effect of emigration on domestic institutions works indirectly through this channel. By reducing the number of poor agents and at the same time inducing an increase in the rents of members of the same group left behind, emigration has a positive impact on institutional development. Subsequently, it is not surprising that we do not find a causal link from emigration to institutional change once we hold constant the distribution of income in the economy. This result represents a novelty with respect to Docquier et al. (2011) in which emigration outflows are shown to have a positive impact on quality of governance.

Furthermore, income inequality enters the regression with a negative coefficient equal in size to that of education inequality. However the effect is not statistically significant in this case, probably for the contemporaneous presence of the two measures of inequality that are highly correlated with each other[42].

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[39]Bobba and Coviello (2006), Spilimbergo (2009), Castello-Climent (2008) and Docquier et al. (2011).

[40]The long run effect is given by the formula $\frac{\beta_4}{1-\beta_0}$.

[41]According to Gleaser et al. (2007) a more equal distribution of education help the poor solve their collective action problem, which in our model translates in a lower cost of revolution μ and in a higher cost of repression κ.

[42]In support of this hypothesis, Castello-Climent (2008) finds a larger effect of the income Gini index when education inequality is not included.

TABLE 1.5: Emigration and Political Institutions: Main Regressions

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM
PRI_{t-5}	0.721***	0.268***	0.313***	0.641***	0.818***	0.876***	0.816***	0.614***
	(0.038)	(0.065)	(0.110)	(0.068)	(0.052)	(0.045)	(0.062)	(0.066)
$LogPop_{t-5}$	0.002	-0.134	0.226	0.029	0.030	0.029**	0.033**	0.009
	(0.005)	(0.145)	(0.214)	(0.023)	(0.019)	(0.013)	(0.016)	(0.015)
$Educ.Gini_{t-5}$	-0.002***	-0.001	0.004	-0.004***	-0.002			-0.003***
	(0.001)	(0.003)	(0.005)	(0.001)	(0.001)			(0.001)
$EHII_{t-5}$	-0.002	0.002	0.002	-0.004				-0.006**
	(0.001)	(0.002)	(0.005)	(0.003)				(0.003)
$Emigration_{t-5}$	0.105	-0.179	-0.159	0.212	0.297	0.473**	0.534**	-0.067
	(0.106)	(0.788)	(0.520)	(0.385)	(0.272)	(0.189)	(0.227)	(0.299)
$TertiaryEduc_{t-5}$							0.003	
							(0.002)	
$PRIhost_{t-5}$								0.115
								(0.095)
Observations	525	525	396	525	778	953	778	525
N. countries	122	122	112	122	141	180	141	122
N. instr.			65	91	74	57	74	107
AR(2) test			0.552	0.869	0.664	0.850	0.659	0.830
Hansen test			0.745	0.228	0.053	0.061	0.053	0.314
Diff. Hansen test				0.175	0.112	0.181	0.098	0.149

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first three lags.

To test whether income inequality really plays a key role in shaping political regimes, in column (5) we look at the effect of the exclusion of this variable from the set of explanatory variables. As a consequence of this change, the Hansen test rejects the null hypothesis of exogeneity of the instruments, i.e. the model is not correctly specified when income inequality is not considered as a determinant of institutional quality. We take this as further evidence supporting the predictions of our theoretical analysis[43].

To further corroborate this findings, in column (6) I run the same regression excluding both measures of inequality. As expected, once we do not hold constant the distribution of income and education, emigration enters the regression with a positive and significant coefficient[44]. Nevertheless, the exclusions of these measures results once again in an incorrect specification of the model.

Finally, in column (7) I replicate the main specification presented by Docquier et al. (2011) in which the education Gini index is substituted by the share of tertiary educated to proxy for resident human capital. In this specification, emigration is still significant, showing that the results are not driven by an education effect. However the exclusion of a measure of income inequality results once again in model mis-

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[43]The reader might think that emigration is not significant in column (4) due to potential multicollinearity problems deriving from the contemporaneous inclusion of total emigration rates and income inequality in the regression. However, the fact that the model is correctly specified only when $EHII_{t-5}$ is in the set of regressors as well as a correlation as low as 0.09 between the two variables suggest that multicollinearity is not a concern in this estimation.

[44]Tables A.1 and A.3 in Appendix A.3 show that the same results are obtained if we keep constant the number of observations used for the estimations in columns (4), (5) and (6).

specification. All these results suggest that the main channel of transmission from emigration to political institutions is represented by changes in the domestic distribution of income.

1.2.3.1 Robustness Tests

The evidence according to which emigration affects institutional quality through changes in income inequality needs to be robust to an array of sensitivity checks. First I control for a large set of explanatory variables identified in the literature as determinants of democracy. In this way I want to show that the findings of this paper are not due to relevant omitted variables. Secondly, I restrict the instrument set to check whether the results are affected by instrument proliferation. Finally, I consider alternative samples to assess whether the link between emigration and political institution hinges on the specific characteristics of the country chosen for the analysis.

Starting from column (8) in Table 1.5, I check whether the results are driven by the omission of some important explanatory variables. In fact, if some determinants of democracy related to inequality or emigration are omitted from the analysis, this could result in a biased coefficient on our variable of interest. In light of the results found by Mahmoud et al. (2011) and Batista and Vicente (2010), I start by studying whether the democratic level of the destination countries has an impact on domestic institutional quality. Following Spilimbergo (2009), I construct an index of democracy in host countries as a weighted average of the freedom house index in the countries of destination, the weights being the corresponding bilateral flows[45]. After the inclusion of this variable income inequality turns significant, giving further support to the prediction of our model.

The link between political institution and economic development has been the subject of several studies. Among the most recent findings, Acemoglu et al. (2009) shows that once omitted variables are accounted for there is no causal effect from GDP per capita to political institutions, while Heid et al. (2011) in a dynamic panel setting attest a positive relationship between the two variables. In column (1) of Table 1.6, it is possible to see that GDP per capita enters the regression with a non significant coefficient and does not have any impact on the other estimates.

As in Barro (1999) and then in Castello-Climent (2008) urbanization is included in column (2) to proxy for two possible channel that could be at work. Since cities are associated with a less disperse population, it is possible to think as higher urbanization as a proxy for the cost of revolution μ. However, for the same reason, more urbanized cities are easier to control for the elite resulting in a lower cost of repression κ. The inclusion of this variable does not affect our results.

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[45]In order to construct this index, I use the newly released *Global Bilateral Migration Database 1960-2000* by Ozden et al. (2011). For the years for which the data was not available I use interpolation.

TABLE 1.6: Emigration and Political Institutions: Additional Control Variables

VARIABLES	(1) S-GMM	(2) S-GMM	(3) S-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM
PRI_{t-5}	0.635***	0.622***	0.664***	0.651***	0.616***	0.677***	0.621***	0.676***
	(0.054)	(0.062)	(0.060)	(0.064)	(0.063)	(0.060)	(0.060)	(0.072)
$LogPop_{t-5}$	0.020	0.020	0.026	0.022	0.032***	0.039***	-0.001	0.042*
	(0.015)	(0.020)	(0.020)	(0.017)	(0.012)	(0.014)	(0.020)	(0.023)
$Educ.Gini_{t-5}$	-0.003**	-0.003**	-0.004***	-0.004***	-0.004***	-0.003***	-0.005***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$EHII_{t-5}$	-0.002	-0.004	-0.003	-0.004	-0.006*	-0.001	-0.004	-0.002
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$Emigration_{t-5}$	0.230	0.399	0.161	0.062	0.188	0.468	-0.225	0.709
	(0.310)	(0.357)	(0.383)	(0.319)	(0.291)	(0.339)	(0.455)	(0.460)
$GDPPC_{t-5}$	0.027							
	(0.022)							
$Urbanization_{t-5}$		0.002						
		(0.001)						
$Investment_{t-5}$			0.002					
			(0.002)					
$Trade_{t-5}$				0.000				
				(0.000)				
$Inf.Mortality_{t-5}$					0.000			
					(0.001)			
$LifeExp_{t-5}$						-0.000		
						(0.003)		
$GDPPCGrowth_{t-5}$							-0.004*	
							(0.003)	
$Remittances(\%GDP)$								-0.001
								(0.003)
Observations	514	525	514	501	524	525	492	366
N. countries	119	122	119	119	122	122	117	103
N. instr.	108	108	108	108	108	108	108	108
AR(2) test	0.584	0.854	0.577	0.989	0.878	0.823	0.773	0.715
Hansen test	0.342	0.274	0.321	0.476	0.378	0.290	0.535	0.622
Diff. Hansen test	0.138	0.169	0.631	0.249	0.234	0.152	0.270	0.876

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first three lags.

Following the previous literature[46], three variables measuring living standards are included in columns (3), (5) and (6). Once again the results are not affected. In column (4) we consider the share of imports plus exports of GDP. Since openness to trade is correlated to migration and at the same time it is has been found to have a positive impact on democracy by Lopez-Cordova and Meissner (2005), its exclusion could result in omitted variable bias. No such effect is found.

In column (7) I include GDP per capita growth to proxy for possible economic shocks. As seen in the theoretical section, times of crisis could be associated with a higher threat of revolution $S^s = H$, making democratic transition more likely. The estimate coefficients on this variable is significant with the expected sign, but no major changes occur to the other variables. Finally in the last columns I include remittances as percentage of GDP. While being undoubtedly correlated with migration, Abdih et al. (2010) show that remittances are associated with an impoverishment of institutional quality, reason for which excluding this variable could bias our estimates. Our results are also robust to the inclusion of remittances in column (8).

In order to avoid problems associated with instruments proliferation pointed out by Roodman (2007), in Table 1.7 I restrict the set of instruments to the first two lags of all the explanatory variables. A high number of instruments, indeed, could result in sample bias and wrongly support of positive results. Furthermore, the Hansen test on instrument validity could be inflated and present high pass rate even in presence of endogenous instruments. Table 1.7 shows that the results remain substantially unchanged when we use fewer instruments.

Finally, Table 1.8 and 1.9 show the results obtained running the regression for different sets of countries. Since the number of countries should be at least as large as the number of instruments in order to avoid the aforementioned instrument proliferation problems, I restrict the instrument set as pointed out in Roodman (2007). Therefore, for each subsample I instrument the endogenous variables by using a collapsed instrument matrix and the first own two lags. In column (1) to (4) I report the estimates for the baseline sample. Column (3) and (4) in Table 1.8 corresponds to columns (4) and (5) in Table 1.7 and are included only for comparison purposes.

The results obtained in columns (1) and (2) of Table 1.8 are in line with the previous findings: the distribution of income and education are predictors of democracy and when these variables are accounted for emigration does not have any impact. Also, income inequality is a crucial variable in this model, since its exclusion leads to a model misspecification as shown by the Hansen test in column (2). The difference in Hansen test casts some doubts on the validity of additional moment conditions associated with S-GMM. However, the low p-value is probably due to the relatively small number of instruments used.

Columns (5) to (8) use the sample of developing countries in 2010 according to the World Bank definition. By doing do, we want to check whether the results presented

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[46]Barro (1999) and Castello-Climent (2008).

TABLE 1.7: Emigration and Political Institutions: Restricted Instrument Set

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM
PRI_{t-5}	0.721***	0.268***	0.334***	0.656***	0.798***	0.810***	0.864***	0.618***
	(0.038)	(0.065)	(0.129)	(0.086)	(0.058)	(0.066)	(0.051)	(0.074)
$LogPop_{t-5}$	0.002	-0.134	0.357	0.039	0.033	0.034*	0.038**	0.013
	(0.005)	(0.145)	(0.224)	(0.028)	(0.021)	(0.017)	(0.017)	(0.017)
$Educ.Gini_{t-5}$	-0.002***	-0.001	0.008	-0.003**	-0.002			-0.003**
	(0.001)	(0.003)	(0.005)	(0.001)	(0.001)			(0.001)
$EHII_{t-5}$	-0.002	0.002	0.003	-0.004				-0.005
	(0.001)	(0.002)	(0.006)	(0.003)				(0.003)
$Emigration_{t-5}$	0.105	-0.179	0.040	0.501	0.313	0.577**	0.579**	0.024
	(0.106)	(0.788)	(0.792)	(0.481)	(0.343)	(0.262)	(0.228)	(0.283)
$TertiaryEduc_{t-5}$						0.003		
						(0.002)		
$PRIhost_{t-5}$								0.178
								(0.117)
Observations	525	525	396	525	778	778	953	525
N. countries	122	122	112	122	141	141	180	122
N. instr.			50	76	62	62	48	90
AR(2) test			0.432	0.856	0.677	0.668	0.868	0.787
Hansen test			0.462	0.299	0.023	0.027	0.016	0.190
Diff. Hansen test				0.210	0.020	0.037	0.039	0.062

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first two lags..

in the previous sections are driven by countries with a certain level of economic development. It is possible to see the same pattern as in the previous columns of this table.

In columns (1) to (4) of Table 1.9, I examine this relationship considering only countries that enter the period as dictatorship. I follow the classification proposed by Papaioannou and Siourounis (2005), driven by the assumption of the theoretical model according to which countries' initial political regime is non-democratic. Also, considering this sample, I address the problem of reverse causality between democracy and inequality, so that I can infer on whether within dictatorial states an increase in emigration leads to a change in inequality which improves political institutions. Interestingly enough, now the specification which adopts the collapsed instrument matrix gives results closer to those in the previous specifications, while when two lags are used the model seems to be misspecified.

To understand why this happen, we need to look at the number of countries and instruments we consider in these specifications. Since the sample is considerable smaller in this case, when we use only two lags as instruments the number of instruments is larger than the number of countries, and this produced invalid estimates. On the other one, this time collapsing the instrument matrix we produce a more ad-

TABLE 1.8: Emigration and Political Institutions: Alternative Samples

VARIABLES	(1) Baseline Collapse	(2) Baseline Collapse	(3) Baseline 2 Lags	(4) Baseline 2 Lags	(5) Developing Collapse	(6) Developing Collapse	(7) Developing 2 Lags	(8) Developing 2 Lags
PRI_{t-5}	0.560***	0.791***	0.656***	0.798***	0.523***	0.721***	0.593***	0.695***
	(0.096)	(0.066)	(0.086)	(0.058)	(0.129)	(0.067)	(0.076)	(0.063)
$LogPop_{t-5}$	0.016	0.049	0.039	0.033	-0.027	0.007	0.015	-0.006
	(0.041)	(0.043)	(0.028)	(0.021)	(0.068)	(0.037)	(0.024)	(0.032)
$Educ.Gini_{t-5}$	-0.004**	-0.002	-0.003**	-0.002	-0.005**	-0.001	-0.003**	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
$EHII_{t-5}$	-0.007*		-0.004		0.001		0.005	
	(0.004)		(0.003)		(0.005)		(0.004)	
$Emigration_{t-5}$	0.499	0.377	0.501	0.313	-0.819	0.260	0.349	0.116
	(0.588)	(0.634)	(0.481)	(0.343)	(1.286)	(0.385)	(0.638)	(0.457)
Observations	525	778	525	778	333	543	333	543
N. countries	122	141	122	141	85	98	85	98
N. instr.	36	30	76	62	36	30	76	62
AR(2) test	0.867	0.665	0.856	0.677	0.827	0.649	0.818	0.654
Hansen test	0.245	0.035	0.299	0.023	0.306	0.248	0.598	0.067
Diff. Hansen test	0.043	0.005	0.210	0.020	0.065	0.020	0.291	0.027

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and in columns in columns (1), (2), (5) and (6) instrumented using a collapsed instrument matrix, while in columns (3), (4), (7) and (8) they are instrumented for their own first two lags.

TABLE 1.9: Emigration and Political Institutions: Alternative Samples (cont'd)

VARIABLES	(9) Dictatorship Collapse	(10) Dictatorship Collapse	(11) Dictatorship 2 Lags	(12) Dictatorship 2 Lags	(13) Non oil Collapse	(14) Non oil Collapse	(15) Non oil 2 Lags	(16) Non oil 2 Lags
PRI_{t-5}	0.454***	0.814***	0.530***	0.746***	0.586***	0.762***	0.590***	0.765***
	(0.103)	(0.051)	(0.097)	(0.061)	(0.099)	(0.074)	(0.083)	(0.062)
$LogPop_{t-5}$	-0.066	0.026	0.018	0.032	0.016	0.019	0.028	0.019
	(0.072)	(0.031)	(0.025)	(0.023)	(0.034)	(0.041)	(0.032)	(0.023)
$Educ.Gini_{t-5}$	-0.008***	-0.002	-0.005***	-0.001	-0.003*	-0.003*	-0.004***	-0.003**
	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
$EHII_{t-5}$	-0.010*		-0.003		-0.007**		-0.005	
	(0.006)		(0.004)		(0.003)		(0.003)	
$Emigration_{t-5}$	1.760	0.250	1.776**	0.526	0.444	-0.147	0.238	0.059
	(1.088)	(0.410)	(0.799)	(0.328)	(0.486)	(0.568)	(0.490)	(0.343)
Observations	303	496	303	496	463	679	463	679
N. countries	74	86	74	86	109	124	109	124
N. instr.	36	30	76	62	36	30	76	62
AR(2) test	0.424	0.200	0.306	0.182	0.402	0.395	0.410	0.409
Hansen test	0.228	0.119	0.525	0.231	0.534	0.115	0.513	0.062
Diff. Hansen test	0.335	0.002	0.822	0.425	0.141	0.012	0.484	0.056

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and in columns (9), (10), (13) and (14) instrumented using a collapsed instrument matrix, while in columns (11), (12), (15) and (16) they are instrumented for their own first two lags.

equate number of instrumenting variables. The results show that the previous effect is still valid.

Finally, in the last four columns of Table 1.9 I exclude from the analysis oil-exporting countries, which as shown in Ross (2001) often follow different democratization patterns[47]. Omitting these countries the results are even stronger than in the baseline specification. The coefficients have the expected signs and statistical significance, with income inequality showing a large effect. At the same time, the difference in Hansen test suggests that there is no model misspecification.

1.3   Conclusion

Recent empirical studies document a positive impact of emigration on home countries' political institutions. However, they do not provide a theoretical model to explain the underlying mechanism leading to this effect. This paper closes this gap in the literature, by providing a theoretical framework explaining the channels through which emigration affects governance at home. Starting from the model of political transition proposed by Acemoglu and Robinson (2001) and assuming that emigration of people who hold the power does not occur, I show that positive net migration outflows entail changes in population structure such that relatively less people belong to the non-ruling group. Since they are the owners of a factor of production that is scarcer, the rent they will now receive is higher. This translates into a decrease of income inequality, which, together with an increased risk of a violent rebellion mounted by the population, favors the arising of democratic regimes.

The contribution of this paper is also empirical, because it adds another piece of evidence to the existing literature supporting the hypothesis of a beneficial effect of emigration on institutional quality in origin countries. Indeed, the aforementioned mechanism is backed up by empirical evidence and robust to issues pertaining omitted variables, sample selection, or a narrow definition of the crucial variables of the model.

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[47]A country is classified as oil-exporting if its fuel-based export over GDP is among the top 20 in the classification adopted by Ross (2001).

Chapter 2

Remittances & Political Institutions: Blessing or Curse?

The evolution of workers' remittance flows in the last decades is probably one of the most evident signals of the increasing relevance between international migration and the welfare of developing countries. In 2010, remittance inflows in the developing world reached $335 billion, and in 2009 they were three times larger than official development assistance and almost of the same size as FDI. In high emigration countries such as the Philippines, El Salvador and Lebanon such flows were respectively thirteen, five and two times higher than net FDI inflows in 2008 and accounted for 12%, 16% and 22% of total GDP in 2009[1]. It is then easy to understand that what in principle are only *private, unrequited transfers of money from migrants to the family members they leave behind*[2] have attracted a growing attention in the economics literature as well as in the policy debate.

Contemporaneously to improvements in remittance data collection, a growing body of literature has focused its attention on their macroeconomic effects. The findings emerging from these works provide mixed evidence on the association between remittances and growth. Some authors document empirical support in favor of a positive impact of remittances on economic development[3]. They argue that these flows boost GDP growth through channels such as human capital formation and productive investment[4]. On the other hand, evidence supporting possible Dutch Disease effects of remittances[5] raised concerns about their detrimental effects.

The link between remittances and institutional quality has instead been overlooked by the economic literature. This trend is surprising because apart for the importance of the relationship *per se*, institutional quality has been shown to be an important

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[1]World Bank (2011).
[2]Chami et al. (2008).
[3]World Bank (2006b).
[4]Giuliano and Ruiz-Arranz (2009) and Catrinescu et al. (2009), among the others
[5]Amuedo-Dorantes and Pozo (2004) and Lartey et al. (2008).

determinant of economic development by a large body of studies[6]. If remittances had an impact on government quality, then this channel could be seen as a further mechanism of transmission from remittances to economic growth.

The only academic work focusing on the impact of remittances on the quality of political institutions in recipient countries is the study by Abdih et al. (2010). These authors show that countries with higher remittances to GDP ratios experience a deterioration of their political institutions. In particular, they find a positive impact of remittances on corruption and a negative effect on both government effectiveness and the extent to which the rule of law is respected. From a theoretical point of view, they show that, by allowing beneficiary households to buy goods that otherwise would be publicly provided, remittances reduce the incentives of this group to hold the government accountable.

In this paper we try to shed light on the relationship between remittance receipts and institutional quality adopting a two-fold approach. First, we want to provide theoretical foundations on this link within a model that focuses on the determinants of political institutions. In particular, we want to study whether remittances have an impact on the intrinsic characteristics that shape institutional quality. In order to accomplish this goal we use the framework proposed by Acemoglu and Robinson (2001).

The advantage of this model lies in the fact that it allows us to identify the determinants of political institutions and then disentangle the impact of remittances working through direct channels from that working through indirect channels. In line with Abdih et al. (2010), we find that by increasing citizens' income, remittances reduce the reliance of this group on public spending and hence the level of redistribution optimal for them.

Potentially such mechanism could have two implications: (i) redistribution in the form of democratization or of simple concessions becomes less costly for a ruling elite relative to repression; and (ii) since redistribution becomes less needed by the poor, trying to buying off this group by merely offering public transfers without giving up power turns out to be more difficult for the ruling group. As a result, the probability of a democratic transition should increase.

The second part of our approach consists in using the theoretical model as a guide for the empirical estimation. In line with the theoretical predictions, we find that education and income inequality are important predictors of institutional quality and that then their omission would result in model misspecification. However, using a sample of 110 countries spanning the period 1980-2005, we find that once we correctly specify the model, remittances do not significantly impact (nor directly or indirectly) political institutions.

The use of panel data represents a novelty in the literature studying the link between remittances and political development. The nature of this data allow us to overcome

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[6]See Acemoglu et al. (2001), Acemoglu et al. (2002a) and Acemoglu et al. (2005a), among the others.

possible shortcomings deriving from cross-section estimations. As pointed out in Docquier et al. (2011), finding the right empirical specification for the determinants of political institutions in a cross-section context is not an easy task. By controlling for unobserved heterogeneity and therefore for all time-invariant variables affecting institutional quality, panel estimation help overcome this problem. In addition, the dynamic model adopted in the paper helps address problems associated with persistent dependent variables, lack of valid external instruments and endogeneity of the explanatory variables.

The balance of this paper is organized as follows. Section 2.1 presents the theoretical model which links remittances to political transition. Section 2.2 tests the predictions of the model and examines the robustness of the results, and the last section concludes.

2.1 Theoretical Model

In this section we provide an extension to the model of political transition proposed by Acemoglu and Robinson (2001), in order to account for the effect of remittances on the likelihood of a political change. In this context, a political change is intended as a transition from a non-egalitarian to an egalitarian regime. The crucial difference between the two is that while the former, referred to as autocracy or dictatorship, does not recognize political rights, the latter, called democracy, does.

The theoretical contribution of this paper compared to the original model by Acemoglu and Robinson (2001) is the introduction of remittances, denoted by R. In the remainder of the theoretical section, I discuss the impact of R on the political end economic variables of the original model.

Agents in the economy belong to either a rich or a poor group, the latter being more numerous. For simplicity, there is only one good in the economy, which can be purchased using earned income and/or remittances,[7] or can be provided publicly. The time horizon is infinite and all agents apply the discount factor $\beta \in (0, 1)$.

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[7] Chami et al. (2003) provide evidence showing that remittances have a different behavior compared to capital flows. In Appendix B.1 it is shown how the prediction of the model changes if remittances are used for investment in physical capital rather than for consumption. The main result is that by aligning the interests of the workers with those of the capitalist elite, remittance receipts reduce the likelihood of a violent resolution of the conflict between the two groups. Since in this model elites democratize to prevent to be overthrown by their opponents, the inflow of remittances is likely to reduce the probability of a democratic transition.

2.1.1 Economic Structure

The economy is populated by a continuum 1 of individuals[8]. A fraction $\delta < 1/2$ belongs to the rich group, also referred to as the elite, while the remaining $1 - \delta$ are the poor, or the citizens . The unique final consumption good is produced combining a fixed factor K, which we call capital, and labor N. Individuals within the same group are homogeneous and endowed in the following way: every rich agent owns $\frac{K}{\delta}$ units of capital; citizens only have one unit of time that they devote to labor.

The production function is summarized as follows:

$$y = K^\theta (1 - \delta)^{1-\theta}$$

where θ and $1 - \theta$ are the fractions of total income owned respectively by the elite and the poor[9].

As a result of assuming perfect competition, we can write the rents of labor and capital as the values of their marginal products:

$$w = p\frac{1 - \theta}{1 - \delta}y \tag{2.1}$$

$$r = p\frac{\theta}{K}y. \tag{2.2}$$

where p the price of output.

From expressions (2.1) and (2.2) and from the distribution of endowments it follows that we can write the incomes accruing to the members of the two groups as:

$$y^p = \frac{wN}{1 - \delta} = p\frac{1 - \theta}{1 - \delta}y \tag{2.3}$$

$$y^r = \frac{rK}{\delta} = p\frac{\theta}{\delta}y \tag{2.4}$$

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[8]Without loss of generality, in this paper we do not consider the effect of emigration on political institutions. Even if conceptually it is impossible to imagine remittances without emigration, in this model the impact of remittances on institutions turns out to be independent from that of emigration. This allows me to analyze such mechanisms separately. However, it is interesting to notice that remittances reinforce the effect of emigration on institutional development by further reducing the income gap between the elite and the opponent group.

[9]Given the distribution of endowments, we can substitute N with $1 - \delta$ in the production function.

while the zero-profit conditions allow us to express aggregate supply as:

$$y = (1 - \delta) w + rK \tag{2.5}$$

Now we introduce remittances in nominal terms, denoted by R. Without loss of generality, remittances are assumed to be received in the same amount by all members of the poor group. Even if this may not be strictly the case in reality, remittances can easily be thought of as having positive externalities on the whole poor group as documented by Orozco and Lapointe (2003)[10].

Since the elite does not benefit of such transfers, the income of its members is unaltered ($y^r = y_R^r$). The same does not apply for citizens, whose new income is:

$$y_R^p = y^p + \frac{R}{1 - \delta}. \tag{2.6}$$

The immediate consequence of restricting remittances to be only consumed is that such inflows will translate in increases in aggregate demand:

$$d = (1 - \delta) w + R + rK. \tag{2.7}$$

The result of imposing the equilibrium condition demand - equation (2.7)- equal to supply - equation (2.5) is then an increase in the price of output p. Since the relevant variables in this paper are real rather than nominal, in what follows we normalize the p to be equal to one.

2.1.2 Political Structure

Political states (S^p) are classified on the the basis of the extent to which they recognize political rights. Under democracy (S^p=D) every individual has the right to vote irrespective of the class she belongs to. In particular, members of both the rich and the poor groups are eligible to express their own preference on the level of fiscal redistribution. Contrarily, in autocratic regimes ($S^p = A$) the franchise is limited to members of the elite, whose preference over redistribution is different from that of their opponents.

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[10]Assuming that the poor group is the only recipient of remittances in a two-class model implies a decrease in income inequality. The literature provides mixed evidence on this relationship. In particular, Mckenzie and Rapoport (2007) show that the impact of remittances on income inequality is non-linear, while scholars including Adams and Cuecuecha (2010) and Barham and Boucher (1998) provide evidence indicating a negative effect. The results presented in this paper holds irrespective of the direction of this relationship as long as the income gap between the ruling elite and the pivotal group under democracy is narrowed as a result of remittance inflows.

Given that the majority of individuals are citizens ($\delta < 1/2$), under democracy redistribution takes place at the tax rate chosen by a poor agent[11]. The opposite happens under dictatorship as a result of the fact that citizens are prevented from voting when this regime is in place.

Each individual decides her optimal level of taxation so as to maximize post-tax income. In particular, given a linear tax rate $\tau \geq 0$ and a lump-sum transfer $T \geq 0$ equal for all agents, individual $i's$ post-tax income (where $i = r, p$) is given by $\hat{y}^i = (1 - \tau)y^i + T$. It then follows that τ and T, i.e. the instruments used by the government to redistribute income, are the crucial variables of decision over which the two groups have opposing interests.

The transfer T received by each individual is affected by the presence of a distortion associated with taxation. Denoted by the term $c(\tau)(y + R)$, such distortion is increasing ($c'(\cdot) > 0$) and strictly convex ($c''(\cdot) > 0$) in the tax rate, while it is nil when the tax rate is zero ($c(0) = 0$)[12]. In addition, following Abdih et al. (2010), the amount of tax revenue not used for redistribution is an increasing function of the revenue base $y + R$. This assumption reflects the fact that remittances are substitute for public spending, i.e. after receiving the transfer, poor agents use this additional source of income to buy goods that otherwise wold be publicly provided[13]. As a result, the lump-sum transfer takes the form $T = (\tau - c(\tau))y - c(\tau)R$[14].

Ultimately, the optimization problem agents face is given by:

$$\tau^i = \arg \max_{\tau} \left\{ (1 - \tau^i)y^i + (\tau^i - c(\tau^i))y - c(\tau^i)R \right\}. \tag{2.8}$$

Expression (2.8) points out that the tax rate set for redistribution is the crucial variable over which people will vote. It is possible to learn about its equilibrium level by writing the following first order condition:

$$\frac{y^i}{y} = 1 - c'(\tau^i) - c'(\tau^i)\frac{R}{y}. \tag{2.9}$$

Suppose now $i = r$. Given that $y^r > y$ and $c'(\cdot) > 0$ the left-hand side will always be larger than one, while the opposite is true for the right-hand side. As a result, the inflow of remittances in the country does not affect the decision problem of the elite. Indeed, the tax rate preferred by this group will always be equal to zero ($\tau^r = 0$).

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[11]This follows from assuming single-peaked preferences and then applying the median voter theorem.

[12]These assumptions are in line with the idea according to which high taxes affects people's incentives, such an effect being larger for high level of taxation. For this reason we also assume $c'(0) = 0$, $c'(1) = 1$, following Acemoglu and Robinson (2001).

[13]Note however that being non-taxable inflows as discussed in World Bank (2006a), remittances do not increase the tax revenue.

[14]This follows from the fact that $T = \delta \tau y^r + (1 - \delta) \tau y^p - c(\tau)(y + R) = (\tau - c(\tau))y - c(\tau)R$.

Instead, if $i = p$ condition (2.9) reduces to:

$$\frac{1-\theta}{1-\delta} = 1 - c'(\tau^p) - c'(\tau^p)\frac{R}{y}. \tag{2.10}$$

Equation (2.10) entails τ^p positively related to inter-group inequality θ, and negatively to the share of poor people in the population $1 - \delta$. The first correlation is not surprising, since citizens will ask more redistribution the more inequality there is in the economy. As for the second effect, since members within the same group are homogeneous, the more poor people there will be for the same level of distribution of resources the less it will be available for the single poor agent.

Most importantly, as previously shown by Abdih et al. (2010) the higher the size of remittances relative to total output the lower the tax rate poor people will set when asked to do so in democracy, i.e. remittances crowd out redistribution demands[15]. In other words, by increasing the income of less wealthy agents, remittances reduce the reliance of this group on public spending. As a direct consequence, the amount of redistribution asked in equilibrium is lower following remittance receipts.

In the remainder of this section we will show that the substitutability between remittances and redistribution may affect political transition in recipient countries using the Acemoglu and Robinson (2001) framework.

2.1.2.1 Framework of the game

Political regimes arise as a result of the actions taken by groups with different interests. The society starts with the elite in power ($S_t^p = A$). As already seen, when only members of this group are allowed to vote, their preferences are such that redistribution does not occur, i.e. $\tau^r = 0$. However, in some circumstances the elite might

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[15]Formally, it is possible to show this by using the implicit function theorem. Define:

$$F(\theta, \delta, \tau^p, R) = 1 - \frac{1-\theta}{1-\delta} - c'(\tau^p)\left(1 + \frac{R}{y}\right) = 0.$$

The derivative of τ^p with respect to R will then be given by $\frac{\partial \tau^p}{\partial R} = -\frac{F_R}{F_{\tau^p}}$, where

$$F_R = \frac{-c'(\tau^p)}{y} < 0$$

and:

$$F_{\tau^p} = -c''(\tau^p)\left(1 + \frac{R}{y}\right) < 0$$

As a result we have:

$$\frac{\partial \tau^p}{\partial R} = -\frac{c'(\tau^p)}{c''(\tau^p)(y + R)} < 0.$$

be forced to change its optimal strategy. We denote by $(S_t^s = H)$ the social state in which the elite faces a high threat if it does not adopt a new redistribution policy. Acemoglu and Robinson (2001) argue that such times can arise as a result of harvest failures, international financial or debt crises and wars. In these situations indeed it is easier for the poor to solve their collective action problem and mount a revolution. We attribute a probability q to this social state. On the other hand, with probability $1 - q$ the social state remains unaltered and the threat of being overturned is low for the elite $(S_t^s = L)$.

The options the elite has in the high-threat state are three. It can either recognize voting rights to the whole population and democratize, try to buy off the opponents by making some concessions but without extending the franchise, or use its resources to repress the revolting faction. Each of these actions entails a different subsequent scenario. If the rich group decides to repress, it always succeeds, but as a result of the use of violence all agents lose a fraction κ of their earned income. If democratization is chosen, the elite loses its control over political power and redistribution at the tax rate $\tau = \tau^p$ takes place, irrespective of the social state. Finally, when the ruling group tries to buy off the citizens, redistribution at a certain tax level $\tau^r = \hat{\tau}$ occurs, but the elite keeps the control of the power. This allows its members to set $\tau^r = 0$ next time the social state will be L.

As already mentioned, citizens can decide to mount a violent revolution when $S_t^s = H$. Following such action, the poor take control of the society and of all its resources, while the rich lose all their income. However, as seen previously for repression, using violence implies the disruption of a fraction of total income. We denote the cost associated to revolution by μ[16]. The political state potentially arising in this situation, referred to as socialism and denoted by $S^p = S$, is absorbing. Note, however, that socialism is only a threat state which will never take place because of the precautionary actions taken by the elite.

At time $t = 0$ the elite is in power; then the following moves take place within each period t:[17]

1. The social state S_t^s is revealed.

2. The elite can either extend the right to vote, promise redistribution or repress.

3. (a) If the elite has chosen repression, the stage game ends with payoffs $y_R^i - \kappa y^i$, $i = r, p$, where κ is the cost of repression.

   (b) If the elite has decided to extend the franchise, democracy is established and the median voter sets a tax rate $\tau = \tau^p$.

   (c) If the elite has decided to make concessions, it sets a tax rate $\hat{\tau} \leq \tau^p$ in order to prevent revolution.

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[16]It is possible to think about the state $S^s = L$, as one in which revolution is not considered an option by citizens because its cost is too high ($\mu = 1$).

[17]In what follows we am using the fact that $y_R^p = y^p + \frac{R}{1-\delta}$ and $y_R^r = y^r$.

4. (a) If the median voter has set the tax rate $\tau = \tau^p$ the stage game ends with payoffs

$$y_R^i + \tau^p \left(y - y^i\right) - c(\tau^p)\left(y + R\right)$$

   $i = r, p$.

   (b) If the elite has set a tax rate $\hat{\tau} \leq \tau^p$

      i. The citizens revolt and the game ends with payoffs $\frac{1-\mu}{1-\delta}y + \frac{R}{1-\delta}$ for the poor and 0 for the rich, where μ is the cost of revolution.

      ii. The poor accept non-democracy with redistribution and the game ends with payoffs $y_R^i + \hat{\tau}\left(y - y^i\right) - c(\hat{\tau})\left(y + R\right)$.

Since within the same group members are homogeneous, we can treat the rich elite and the poor group as two players of a dynamic game. The focus will be on pure strategies Markov perfect equilibria.

2.1.2.2   Analysis of the game

In this setting, the rich and the poor group determine their actions on the basis of comparisons between payoffs arising under different political regimes. Table 2.1 summarizes these payoffs. Since the rich move from the initial autocratic regime only in response to a revolutionary threat in the high-threat state $S_t^s = H$, we start the analysis by considering the incentives of the citizens toward revolution.

TABLE 2.1: Payoffs of the Two Groups Under Alternative Regimes

	Poor	Rich
No concessions	$\frac{y_R^p}{1-\beta}$	$\frac{y_R^r}{1-\beta}$
Revolution	$\frac{(1-\mu)y+R}{(1-\delta)(1-\beta)}$	0
Concessions	$\frac{y_R^p+(1-\beta(1-q))(\hat{\tau}(y-y^p)-c(\hat{\tau})(y+R))}{1-\beta}$	$\frac{y_R^r+(1-\beta(1-q))(\hat{\tau}(y-y^r)-c(\hat{\tau})(y+R))}{1-\beta}$
Democracy	$\frac{y_R^p+\tau^p(y-y^p)-c(\tau^p)(y+R)}{1-\beta}$	$\frac{y_R^r+\tau^p(y-y^r)-c(\tau^p)(y+R)}{1-\beta}$
Repression	$\frac{y_R^p-(1-\beta(1-q))\kappa y^p}{1-\beta}$	$\frac{y_R^r-(1-\beta(1-q))\kappa y^r}{1-\beta}$

In order to decide whether or not to revolt, citizens take into account two alternative scenarios. Under the first, the elite stays in power without taking any action (autocracy without concessions). As a result, poor agents would have a lifetime return equal to $\frac{y_R^p}{1-\beta}$. Under the alternative scenario, revolution takes place and socialism establishes forever, giving rise to a lifetime return equal to $\frac{(1-\mu)y+R}{(1-\delta)(1-\beta)}$. From the comparison of these quantities[18], it turns out that revolution will take place only if it

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[18]The comparison is between the payoffs corresponding to *No concessions* and *Revolution* in Table 2.1 under the column *Poor*

pays off more than the initial political regimes, that is, if $\theta > \mu$[19]. Hence, a revolution occurs when its cost is lower than inter-group inequality[20].

As described in the previous subsection, the ruling elite may opt to promise redistribution at a certain tax rate $\hat{\tau}$ to stop revolution. The resulting lifetime payoff for the poor would be $\frac{y_R^p + (1-\beta(1-q))(\hat{\tau}(y-y^p)-c(\hat{\tau})(y+R))}{1-\beta}$, where the term $1 - \beta(1-q)$ represents the probability of being tomorrow in the high-threat state[21]. In order to understand if such offer is enough to dissuade the poor we need to consider this payoff evaluated at the highest tax rate the elite can propose for redistribution, that is $\hat{\tau} = \tau^p$. If such return is still lower than the counterpart arising from revolution[22], then the elite has to opt for another action if it wants to prevent violence.

To summarize these alternative scenarios, it is possible to define a threshold value μ^*, in correspondence with which the return of revolution and that of redistribution at the highest tax rate are equal[23]

$$\mu^* = \theta - (1 - \beta(1-q))\left[\tau^p(\theta-\delta) - (1-\delta)C(\tau^p)\left(1+\frac{R}{y}\right)\right]. \tag{2.11}$$

Thus, when $\mu > \mu^*$, revolution is relatively costly for the poor and there exists a tax rate $\hat{\tau} \in (0, \tau^p]$ that the elite can promise to set in order to prevent revolution. Alternatively, when $\mu \le \mu^*$ this group has to either democratize or to repress if it does not want to be violently overthrown[24].

Expression (2.11) suggests that remittances may affect political institutions through two distinct channels. As already seen in equation (2.10), remittance inflows leads to a decrease in the tax rate chosen by a poor median voter under democracy. Since τ^p enters in equation (2.11), such change could also have an effect on the threshold of revolution μ^*. In addition, R enters directly in equation (2.11) as one of the components of the distortion that affects redistribution.

The comparative statics of μ^* with respect to R summarize the overall effect, i.e. direct and indirect, of remittance inflows on the threshold of revolution:

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[19]Notice that remittance receipts do not have any impact on the revolution constraint because: (i) the decision to revolt is based on the comparison between the payoff deriving from the status quo and that resulting from revolution; however (ii) remittances augment both payoffs by the same amount.

[20]Since in the low-threat state $S_t^s = L$ such cost is $\mu = 1$, it immediately follows that revolution never occurs in this situation.

[21]Since the current political state is autocracy and people discount future by β, the probability of being tomorrow in the high threat state is given by 1 minus the probability of being tomorrow in the low-threat state equal to $\beta(1-q)$.

[22]These payoffs are equal to the expressions presented in Table 2.1, under the column *Poor* and the rows *Revolution* and *Concessions*.

[23]In other words, μ^* is such that the second and third payoffs under the column *Poor* of Table 2.1 are equal for $\hat{\tau} = \tau^p$.

[24]It is also possible to derive the condition under which democracy can prevent revolution: $\mu \ge \theta - \left(\tau^p(\theta-\delta) - (1-\delta)C(\tau^p)\left(1+\frac{R}{y}\right)\right)$. Following Acemoglu and Robinson (2001) we assume this inequality to be always true.

$$\frac{\partial \mu^*}{\partial R} = -(1 - \beta(1-q))$$
$$\left[\frac{\partial \tau^p}{\partial R} \left((\theta - \delta) - (1-\delta) c'(\tau^p) \left(1 + \frac{R}{y} \right) \right) - \frac{(1-\delta) c(\tau^p)}{y} \right].$$

As a direct implication of the envelope theorem the term that multiplies $\frac{\partial \tau^p}{\partial R}$ is equal to zero. This means that a change in the optimal tax rate does not have any impact on μ^*. The reason lies in the fact that as long as τ^p is chosen as solution to equation (2.10) it always gives agents the same amount of utility.

The term $\frac{(1-\delta)c(\tau^p)}{y}$, representing the effect working through changes in the distortion associated with taxation, is then the only impact that remittance receipt has on μ^*. Since all the terms in this fraction are positive, the overall effect is positive too meaning that an increase in remittances makes revolution more likely to be chosen over redistribution. Intuitively, by increasing distortion for the same amount of tax revenue, remittances reduce the benefit of redistribution for poor agents. As a consequence, any attempt of the elite to buy off the opponents by redistributing income is less effective in preventing revolution, i.e. $\frac{\partial \mu^*}{\partial R} > 0$.

Next, we focus on the incentives of the rich toward alternative political regimes. Since democratization entails giving up power forever, the elite would always try to redistribute part of income to the opponents rather than extend the franchise if this is a viable channel. For this reason when $\mu > \mu^*$ concessions and repression are the political options considered. However, when concessions are not enough to stop revolution ($\mu \leq \mu^*$), the alternatives the ruling group has are only democratization and repression. In line with Acemoglu and Robinson (2001), we restrict my attention to situations in which if the elite decides to represses it does so whenever the threat of revolution is high, $S_t^s = H$. The resulting payoff is $\frac{y_R^r - (1-\beta(1-q))\kappa y^r}{1-\beta}$.

As in the previous case for the poor, the option chosen by the elite in equilibrium will be the one providing a higher return. It is then possible to define two threshold values: the first ($\hat{\kappa}$) represents the cost which equalizes the payoff associated with redistribution to that arising from repression[25]; the second ($\tilde{\kappa}$)[26] makes the elite indifferent between using violence and democratizing:

$$\hat{\kappa} = \frac{1}{\theta} \left(\left(1 + \frac{R}{y} \right) \delta c(\hat{\tau}) - \hat{\tau} (\delta - \theta) \right) \tag{2.12}$$

$$\tilde{\kappa} = \frac{1}{\theta(1 - \beta(1-q))} \left(\left(1 + \frac{R}{y} \right) \delta c(\tau^p) - \tau^p (\delta - \theta) \right). \tag{2.13}$$

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[25] These are the third and fifth payoffs in the column *Rich* of Table 2.1.

[26] Fourth and fifth payoffs in the column *Rich* of Table 2.1.

Comparing the actual cost of repression κ to expressions (2.12) and (2.13), it is possible to infer how the elite will move. When $\kappa < \hat{\kappa}$ the opportunity-cost of repression is low enough to induce the elite to use violence rather than promising redistributions. The same option will be chosen over democratization when $\kappa < \tilde{\kappa}$. However, when $\kappa \geq \hat{\kappa}$ and $\kappa \geq \tilde{\kappa}$ repression will be relatively more costly compared to redistribution and democracy, respectively. As a result, the ruling group will not resort to violence and the alternative option will be preferred.

As it was the case for μ^*, it is possible to think of both a direct and an indirect effect of remittances on these two thresholds. However, contrarily to the previous case, these effects have now opposite signs. By increasing distortions, remittance inflows lead rich people to enjoy a lower amount of redistribution for the same tax rate if they choose to democratize. Such mechanism implies a decrease in the opportunity cost of repression ($\frac{\partial \hat{\kappa}}{\partial R} > 0$, $\frac{\partial \tilde{\kappa}}{\partial R} > 0$). At the same time, by increasing citizens' total income, remittances lower the amount of redistribution needed by the poor ($\frac{\partial \tau^p}{\partial R} < 0$), making redistribution and democracy relatively less harmful for the elite ($\frac{\partial \hat{\kappa}}{\partial \hat{\tau}} < 0$, $\frac{\partial \tilde{\kappa}}{\partial \tau^p} < 0$).

Formally, it is possible to show this by considering the following partial derivatives:

$$\frac{\partial \hat{\kappa}}{\partial R} = \frac{1}{\theta} \left[\frac{\partial \hat{\tau}}{\partial R} \left(\left(1 + \frac{R}{y} \right) \delta c'(\hat{\tau}) - (\delta - \theta) \right) + \frac{\delta c(\hat{\tau})}{y} \right]$$

$$\frac{\partial \hat{\kappa}}{\partial R} = \frac{1}{\theta(1 - \beta(1-q))} \left[\frac{\partial \tau^p}{\partial R} \left(\left(1 + \frac{R}{y} \right) \delta c'(\tau^p) - (\delta - \theta) \right) + \frac{\delta c(\tau^p)}{y} \right]$$

As discussed above, while the first term in square brackets (representing the indirect effect of remittances on political institutions) is negative, the second term representing the direct impact is positive[27].

Even if in principle the overall impact of remittances on the elite's political choices is not clear, the indirect effect is likely to be dominant. It is possible to think about at least two reasons why this should be the case. Firstly, the model assumes that the distortions associated to taxation simply represent a diversion of resources from which nobody benefits. However, as shown in Abdih et al. (2010) the ruling group is likely to get possession of these funds, which then would represent for its components an additional source of income rather than a loss of it. Secondly, evidence on the type of consumption financed by remittances suggests that, if present, the distortions caused by these flows do not have a great impact on the rich[28]. Indeed, the wealthiest part of the population is likely not to be the user of the public services crowded out by

---

[27]From equation (2.10), the derivative of $\hat{\tau}$ with respect to R is negative because, following the receipt of remittances, poor agents set a lower tax rate. From equation (2.9), setting $i = r$, the term $\left(\left(1 + \frac{R}{y} \right) \delta c'(\tau^p) - (\delta - \theta) \right)$ is positive and then its product with $\frac{\partial \tau^p}{\partial R}$ is negative. The term $\frac{\delta c(\tau^p)}{y}$ is positive because all its components are positive by definition.

[28]For example, Orozco and Lapointe (2003) document that Home Town Association in Mexico mainly finance education and health facilities.

remittances. As a result, remittances are believed to increase the opportunity-cost of repression.

Similarly to Acemoglu and Robinson (2001), we now have the following result[29]:

Proposition 2.1.1 *There is a unique Markov perfect equilibrium* $\{\tilde{\sigma}^r, \tilde{\sigma}^p\}$ *in the game, such that:*

1. *If* $\theta \leq \mu$, *the revolution constraint does not bind and the elite stays in power without taking any action.*

2. *If* $\theta > \mu$, *the revolution constraint binds and the following political regimes can arise:*

    (a) *If* $\mu \geq \mu^*$ *and* $\kappa \geq \hat{\kappa}$, *the elite redistributes in state* $S_t^s = H$ *to prevent revolution.*

    (b) *If* $\mu \geq \mu^*$ *and* $\kappa < \hat{\kappa}$, *or,* $\mu < \mu^*$ *and* $\kappa < \tilde{\kappa}$, *the elite uses repression in social state H.*

    (c) *If* $\mu < \mu^*$ *and* $\kappa \geq \tilde{\kappa}$, *the elite democratizes when* $S_t^s = H$.

The proposition shows that democracy emerges when redistribution is not a viable channel to stop revolution and repression is relatively costly for the elite. Remittances inflows increase the probability of being in this situation. By increasing citizens' income, remittances reduce the reliance of this group on public spending and hence the level of redistribution optimal for them. Redistribution in the form of democratization or of simple concessions then becomes less costly for the elite relative to repression. At the same time, since redistribution becomes less needed by the poor, trying to buying off this group by merely offering public transfers without giving up power turns out to be more difficult for the ruling group. As a result, democracy is the political outcome more likely to arise.

Figure 2.1, borrowed by Acemoglu and Robinson (2006), displays such effects. The horizontal axis shows inter-group inequality θ, while in the vertical axis the cost of repression κ is displayed. When inequality is low $\theta < \mu$, the revolution constraint is not binding and the elite can stay in power without taking any action (Political Status Quo: No concessions). Deriving θ^* from (2.11), we can state that for levels of inequality in the range $[\mu, \theta^*]$ the elite is able to stop revolution by redistributing income without giving up power (Political Status Quo: Concessions). Finally, for high levels of inter-group inequality ($\theta > \theta^*$) revolution will not be stopped by redistribution and democratization is the only non-violent option (Democracy).

However, the elite can resort to violence if this alternative is relatively less costly than redistribution or democracy (Repression). It will do so, when $\kappa < \hat{\kappa}$ or when $\kappa < \tilde{\kappa}$. These threshold values are the upward sloping lines depicted in the central

---

[29]The equilibrium is characterized as in Section 1.1.2.3. In addition, since Proposition 2.1.1 exactly corresponds to Proposition 1.1.1, Appendix A.1 also proves Proposition 2.1.1.

and right-hand regions of Figure 2.1. The fact that such lines are increasing in the level of inequality follows from Equations (2.12) and (2.13), while $\tilde{\kappa} > \hat{\kappa}$ is due to the fact that democracy is more redistributive than concessions.

It is now possible to visualize the effect of remittances on democracy. After the inflow of such transfers, it is more difficult to stop a revolution mounted by the citizens by promising future concessions, i.e. $\mu^* \uparrow$ or alternatively, $\theta^* \downarrow$ (area *Political Status Quo: Concessions* shrinks relative to *Democracy*). At the same time, repression becomes more costly compared to both redistribution and democracy, implying $\hat{\kappa} \downarrow$ and $\tilde{\kappa} \downarrow$ (area *Repression* shrinks compared to both *Political Status Quo: Concessions* and *Democracy*). As a result, the blue delimited area that represents the configuration of parameters leading to democracy before-remittances, expands after such inflows. The new area in which citizens obtain democracy is delimited by the green line.

FIGURE 2.1: Political Institutions Pre- and Post-Remittances
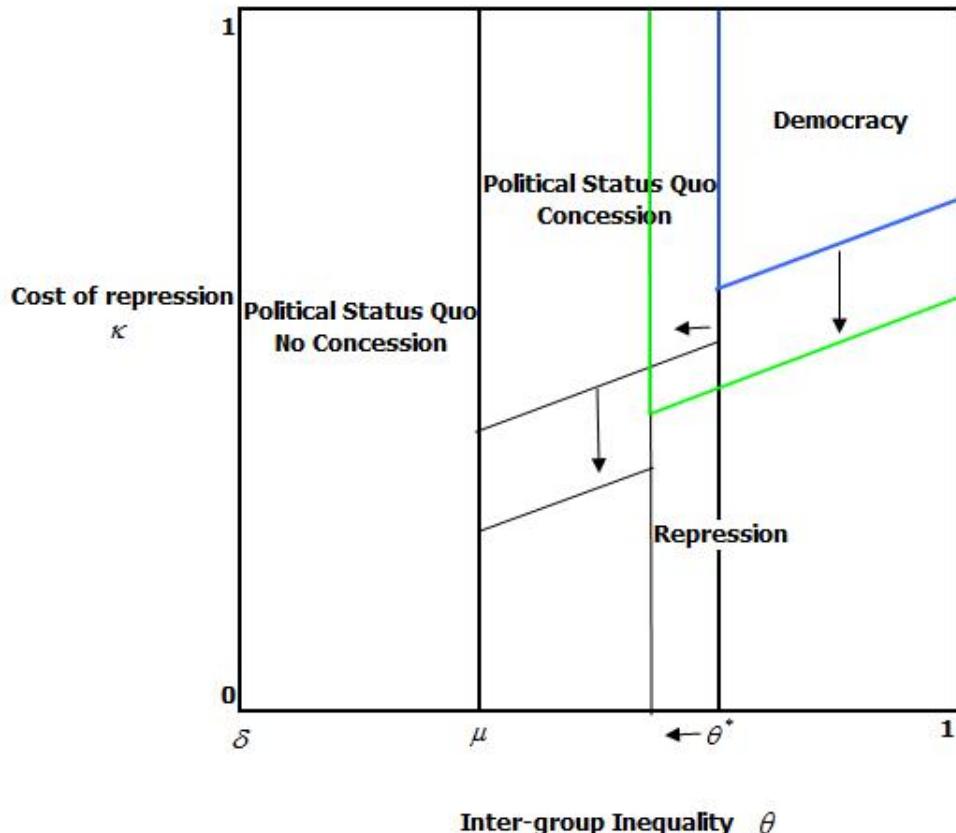
2.2 Empirical Evidence

The model presented in the previous section shows a channel through which remittances may affect political transition. By increasing the income of recipient households, such flows reduce the amount of redistribution needed by the less wealthy agents, i.e. after receiving remittances, the citizens use a lower amount of goods and

services provided publicly[30]. The cost of regimes that imply redistribution of income will then be lower for the elite.

At the same time, more wealthy poor classes are less likely to accept any political regime that does not involve their active participation, i.e. it is more difficult for the elite to convince the opponents not to revolt by simply offering some redistribution of income. Combining these findings, the main prediction of the model is that remittance inflows may increase the probability of a democratic transition. The remainder of this section explores empirically whether the aforementioned mechanism is at work.

2.2.1 Estimation Methodology

The empirical specification we estimate is the following:

$$
\begin{aligned}
Democracy_{i,t} \; = \; & \beta_0 Democracy_{i,t-5} + \beta_1 Remittances_{i,t-5} \\
& + \beta_2 X_{i,t-5} + \eta_i + \zeta_t + \epsilon_{i,t}
\end{aligned}
\tag{2.14}
$$

where i denotes the country and t the time period.

Because of the persistent nature of political institutions we include the lagged dependent variable among the regressors in line with the previous studies on democracy in a panel data context[31]. The variable of interest is $Remittances_{i,t-5}$. The coefficient β_2 captures the influence of other control variables such as education and income inequality, population size and other measures of standards of living. Moreover, all regressions have time (ζ_t) and country (η_i) fixed effects so as to control respectively for underlying common trends of democracy and for unobservable heterogeneity.

The estimation of Equation (2.14) presents two main challenges, i.e. the presence of unobserved effects and the endogeneity of some control variables. In particular, it is likely that remittances could be endogenous to the type of political institutions in a country. For example, low institutional quality could induce more emigration and as a consequence more remittances. To address such issues, we first differentiate equation (2.14) to control for unobserved country-specific effects:

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[30]These results are not necessarily associated with reductions in income inequality. If the median voter belonged to a third class m, such that $y^r > y^m > y^p$, and remittances were only received by members of such class, the model would still predict an improvement of institutional quality even if income inequality could potentially be higher in this situation.

[31]Acemoglu et al. (2005b), Bobba and Coviello (2006), Castello-Climent (2008) Spilimbergo (2009) and Docquier et al. (2011).

$$
\begin{aligned}
Democracy_{i,t} - Democracy_{i,t-5} \; = \; & \beta_0 \left(Democracy_{i,t-5} - Democracy_{i,t-10} \right) \\
& + \beta_1 \left(Remittances_{i,t-5} - Remittances_{i,t-10} \right) \\
& + \beta_2 \left(X_{i,t-5} - X_{i,t-10} \right) \\
& + \left(\zeta_t - \zeta_{t-5} \right) \\
& + \left(\epsilon_{i,t} - \epsilon_{i,t-5} \right).
\end{aligned}
\tag{2.15}
$$

The remaining problems in estimating (2.15) are the endogeneity of some explanatory variables and the correlation between $(\epsilon_{i,t} - \epsilon_{i,t-5})$ and the lagged difference of the dependent variable. Under the assumption of sequential exogeneity[32] and of zero serial and cross-correlation of the idiosyncratic error term $\epsilon_{i,t}$, past levels of the dependent variable (or any pre-determined variable) can be used as instruments for the current first differences of the correspondent variable[33]. Note that sequential exogeneity simply implies that future (unanticipated) shocks to the dependent variable do not influence current levels of pre-determined regressors.

The estimator obtained following the procedure just sketched out is known as the Difference Generalized Method of Moment (D-GMM) estimator. However, in presence of persistent explanatory variables such as democracy in (2.14), Blundell and Bond (1998) show that past levels are weak instruments for the correspondent differenced variables, and this leads to a large estimation bias. To overcome this problem, they introduced the S-GMM estimator obtained by augmenting the first differenced equation with the level equation. The introduction of an additional moment condition[34] then ensures that the variable in levels can be instrumented by the lagged first differences of the corresponding explanatory variables.

The gain in consistency associated to the GMM estimator hinges upon the validity of the moment conditions on which the estimation procedure is based. To make sure such moment conditions to hold, this paper carries out two tests: first, exogeneity of instruments is checked by using the Hansen test of overidentifying restriction; second, the degree of serial correlation in the error term is inspected by testing the null hypothesis of zero second order correlation in the differenced error term $(\epsilon_{i,t} - \epsilon_{i,t-5})$, which corresponds to the hypothesis of zero first order correlation in $\epsilon_{i,t}$.

Following the literature[35], in the analysis the lagged dependent variable as well all the control variables of interest are considered predetermined and instrumented with internal instruments. One-period and further lags are used according to the specifi-

---

[32] This assumption requires that the idiosyncratic error term has mean zero conditional upon the current set of information and the unobserved effect.

[33] Under the above stated assumptions the following moment conditions hold $E[Z_{i,t-s}\Delta\epsilon_{i,t}] = 0$ for $t = 3, ..., T; s \geq 2$; where $Z_{i,t-s}$ is any predetermined variable.

[34] $E[\Delta Z_{i,t-s}(\eta_i + \epsilon_{i,t})] = 0$ for $t = 4, ..., T$.

[35] Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b), Castello-Climent (2008) and Bobba and Coviello (2006).

cation[36].

2.2.2 Data

The sample is an unbalanced panel of 110 countries spanning from 1980 to 2005 (dependent variable) with five-year lags. Information on the quality of political institutions is expressed using three different measures: the Political Right and the Civil Liberties indexes provided by Freedom House, and the Polity composite democracy index, taken from the POLITY IV data set. The first two indicators are based on answers to a list of questions. For the former, such questions belong to three groups: electoral process, political pluralism and participation, and the functioning of government. In the case of the Civil Liberties Index the groups of questions are four: freedom of expression and belief, association and organization rights, rule of law and personal autonomy, and individual rights. Both indicators range from 1 to 7, where higher scores denote less democratic institutions.

The Polity composite democracy index is obtained by subtracting an autocracy from a democracy index, both ranging from 0 to 10. The resulting indicator ranges from -10 to 10, with higher values denoting most democratic institutions. This variable measures three key aspects of political institutions: the ability of political regimes to provide citizens with institutions through which they can choose their preferred political outcome, the presence of constraint on the power of the executive, and the degree of individuals' civil liberties. As in previous studies[37], we follow the transformation of these indexes in the range $[0, 1]$ proposed by Barro (1999), where 1 denotes the most-democratic institutions.

Following Chami et al. (2008), we measure remittances using the entry *workers' remittances* in the current account of the balance of payments. The robustness of the results is then tested using an aggregate measure of remittances that combines *workers' remittances* and *compensation of employees*. The source of this data is the World Bank World Development Indicators Database 2011. Income inequality is measured using the estimated household income inequality (EHII) index computed by Galbraith and Kum (2005)[38]. Such measure is derived from the econometric relationship between a measure of inter-sectoral pay inequality produced by the University of Texas Inequality Project and based on data published by the United Nation Industrial Development Organization, and the Gini coefficients proposed by Deininger and Squire (1996). The advantage of the EHII index lies in the fact that it offers a broader and more consistent coverage compared to other measures of inequality, which are often too sparse and not comparable across countries.

The Gini coefficient for education is constructed following the procedure outlined in

---

[36]Under each table, the note specify the number of lags used as instruments for the corresponding predetermined variables.

[37]Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b) and Castello-Climent (2008).

[38]If data in the sample years are not available, we use data on the year before (preferred) or the year after.

Castello and Domenech (2002) on the basis of the data provided by Barro and Lee (2010). Population size is taken from the Penn World Tables Version 7.0 by Heston et al. (2011), and emigration rates from Defoort (2008). The source of the remaining control variables is the World Bank World Development Indicators Database 2011[39].

Table 2.2 presents summary statistics, while Table 2.3 and Table 2.4 show the sample coverage.

TABLE 2.2: Summary Statistics

	Obs.	Mean	Std.Dev	Min	Max
Political Rights	393	0.66	0.33	0	1
Workers' Remittances (% GDP)	366	0.02	0.04	0.00	0.35
Aggregate Remittances (% GDP)	336	0.03	0.06	0.01	0.64
Log Population	346	9.16	1.67	4.55	13.94
Income inequality	296	42.25	6.61	25.89	62.32
Education inequality	393	36.85	20.93	5.87	91.05

TABLE 2.3: Years Covered in the Sample

Year	Observations	Frequency
1980	37	9.41
1985	79	20.10
1990	81	20.61
1995	75	19.08
2000	74	18.83
2005	47	11.96

---

[39]In Appendix D.1, I discuss how different data sources are harmonized in order to ensure that changes in countries' borders do not affect the results.

TABLE 2.4: Countries in the Sample

Country	Obs.	Country	Obs.	Country	Obs.
Afghanistan	1	Ghana	4	Pakistan	4
Albania	2	Greece	4	Panama	5
Algeria	3	Guatemala	4	Papua New Guinea	3
Argentina	4	Honduras	5	Paraguay	1
Armenia	1	Hungary	4	Peru	3
Australia	2	Iceland	2	Philippines	4
Austria	6	India	6	Poland	4
Bangladesh	4	Indonesia	4	Portugal	6
Barbados	5	Iran	5	Romania	3
Belgium	5	Ireland	6	Russia	2
Belize	1	Israel	3	Rwanda	2
Benin	2	Italy	6	Saudi Arabia	1
Bolivia	5	Jamaica	3	Senegal	6
Botswana	4	Japan	5	Sierra Leone	1
Brazil	2	Jordan	6	Singapore	3
Bulgaria	3	Kenya	6	Slovakia	1
Burundi	2	Korea, Rep.	5	Slovenia	2
Cameroon	5	Kuwait	6	South Africa	2
Central African Republic	3	Kyrgyzstan	2	Spain	6
Chile	4	Latvia	1	Sri Lanka	5
China	1	Lesotho	1	Swaziland	3
Colombia	6	Liberia	1	Sweden	6
Congo, Rep. of the	2	Lithuania	2	Syria	4
Costa Rica	4	Malawi	4	Thailand	4
Cote d'Ivoire	3	Malaysia	5	Togo	3
Croatia	2	Malta	6	Tonga	4
Cyprus	4	Mauritius	5	Trinidad and Tobago	6
Denmark	4	Mexico	5	Tunisia	3
Dominican Republic	3	Moldova	2	Turkey	6
Ecuador	5	Mongolia	2	Uganda	4
Egypt	4	Morocco	6	United Kingdom	2
El Salvador	3	Mozambique	3	United States	3
Fiji	2	Namibia	1	Uruguay	5
Finland	6	Nepal	3	Venezuela	5
France	5	New Zealand	5	Zambia	2
Gabon	3	Nicaragua	2	Zimbabwe	3
Gambia, The	1	Norway	4	Total	393

2.2.3   Results

We start exploring the relationship between remittance receipts and political transition by regressing our measure of institutional quality, i.e. the Freedom House Political Rights index, on the ratio of workers' remittances to GDP without including any other control variables (columns (1) to (4) in Table 2.5). Being OLS estimates biased upward in dynamic panel models, we know that the coefficient on the lagged dependent variable presented in column 1 will provide us with an upper bound useful to assess the reliability of the estimation in the subsequent columns. Analogously, the coefficient in column (2) provides us with a lower bound given that fixed effects OLS estimates are downward biased in small T, large N panel data.

In order to overcome these problems, in column (3) we present D-GMM estimates that by construction are not affected by unobserved heterogeneity or endogeneity of the explanatory variables. The estimated coefficient on the lagged dependent variable in column (3) is close to the lower bound, suggesting that some problems still persist. As already discussed, Blundell and Bond (1998) show that in the presence of persistent endogenous variables lagged levels are weak instrument for the correspondent differenced variables, leading then to biased estimations. Given that we know that

TABLE 2.5: Remittances and Political Instituions: Main Regressions

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM	(9) S-GMM
PRI_{t-5}	0.830***	0.259***	0.432***	0.629***	0.562***	0.555***	0.569***	0.552***	0.553***
	(0.021)	(0.056)	(0.110)	(0.093)	(0.074)	(0.065)	(0.067)	(0.068)	(0.070)
$Remittances_{t-5}(\%GDP)$	0.137	0.358	0.713***	0.491*	0.161	0.035	0.194	-0.057	0.303
	(0.159)	(0.238)	(0.215)	(0.265)	(0.347)	(0.258)	(0.298)	(0.330)	(0.295)
$Educ.Gini_{t-5}$					-0.005***	-0.005***	-0.005***	-0.004***	-0.006***
					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$EHII_{t-5}$					-0.006*	-0.005	-0.006**	-0.004	-0.007*
					(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
$LogPop_{t-5}$					0.020	0.032	0.023	0.001	0.023
					(0.022)	(0.025)	(0.019)	(0.019)	(0.017)
$Emigration_{t-5}$						0.369			
						(0.498)			
$Trade_{t-5}(\%GDP)$							0.000		
							(0.000)		
$Urbanization_{t-5}$								0.002*	
								(0.001)	
$Inf.Mortality_{t-5}$									0.001
									(0.001)
Observations	653	653	492	653	393	393	390	393	393
N. countries	156	156	146	156	110	110	109	110	110
N. instr.			29	40	91	108	108	108	108
AR(2) test			0.856	0.685	0.729	0.739	0.754	0.744	0.816
Hansen test			0.208	0.040	0.334	0.445	0.525	0.448	0.520
Diff. Hansen test				0.018	0.502	0.850	0.787	0.868	0.897

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (9) all variables are considered pre-determined and instrumented for their own first three lags.

political institutions change slowly over time, in column (4) we try to address these problems by augmenting the difference equation with the equation in levels. The reliability of the S-GMM estimation hinges upon the validity of the underlying moment conditions. Both the Hansen and the difference-in-Hansen tests suggest that the instrument used are not exogenous and, as a consequence, that the moment conditions do not hold.

The results so far are in line with the theory presented in the previous section. The theoretical model shows that political institutions depend on the configuration of the parameters μ^*, $\hat{\kappa}$ and $\tilde{\kappa}$, representing the opportunity cost of revolution for the poor and repression for the elite relative to other political outcomes. We proxy these parameters using three variables, namely education inequality, income inequality and population size.

Glaeser et al. (2007) show that education reduces information costs, reason for which we believe that in societies with a more equal distribution of education the poor solve the collective action problem more easily ($\mu^* \uparrow$) and then it is also more difficult for the elite to repress ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$). Castello-Climent (2008) finds empirical evidence in support of this hypothesis. Population size is commonly considered a determinant of political institutions in the literature[40] and can be thought of having both a positive and a negative impact. If on the one hand it might be more difficult for a large class of poor agents to coordinate ($\mu^* \downarrow$), on the other hand the elite might find harder to repress such a large group of opponents ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$). Finally, higher income inequality θ makes revolution more likely for the poor ($\mu^* \uparrow$) and repression for the rich ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$). This is a result of the fact that in more unequal societies the poor have more to gain and the rich to lose from making a move away from dictatorship.

Once we include these additional controls in column (5), the model is no longer misspecified. Both the Hansen and the difference-in-Hansen tests suggest that the estimation results are reliable. As expected, countries with a more equal distribution of education are expected to have better political institutions. We attribute this effect to the link between education and information barriers. Income inequality plays a similar role, showing that the effect working through μ dominates that working through κ. One standard deviation increase in income inequality leads to a reduction of nearly 0.1 points in the long term value of democracy[41]. Finally population size is not found to have a statistically significant impact on institutional quality.

According to the model sketched out in the previous section, remittances impact political institutions by altering the income of the recipient households which belong to the poor group. For this reason we expect that holding constant income inequality, remittances will not have any impact to the extent to which a certain country recog-

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[40]Barro (1999), Acemoglu et al. (2005b) and Bobba and Coviello (2006), among the others.

[41]The long run effect is given by the formula $\frac{\beta_2}{1-\beta_0}$.

nizes political rights[42]. Not surprisingly the estimated coefficient turns out to be not significant[43].

In columns (6) to (9) we want to test whether these findings are driven by the omission of some important determinant of institutional quality that are correlated to remittance inflows. Our results could be reversed indeed, depending on the nature and magnitude of the correlation between the omitted variable and remittances as well as of that between the omitted variable and political institutions. We consider four additional control variables, namely emigration and urbanization rates, a measure of openness to trade and infant mortality rate[44]. These variables are included one at a time and instrumented using their own first three lags.

Emigration has been shown to have a positive impact on political institutions by Docquier et al. (2011) and given that it is likely to be positively correlated with remittances we want to check whether its inclusion among the set of regressors results in changes in sign and significance of the estimate for β_1. Column (6) shows that the results remain essentially unaltered. In the next column we include openness to trade as measured by the sum of imports and exports over GDP. This variable is positively correlated to remittance receipts and Lopez-Cordova and Meissner (2005) attest its beneficial effect on institutional quality. Similarly to the results in the previous column, there are no major changes in the estimated coefficients.

The inclusion of the urbanization rate as an additional control in column (8) is motivated by the evidence according to which rural households are the main recipients of remittances in some countries[45] and at the same time countries with high fractions of the population living in rural area are shown to democratize more slowly (Barro (1999)). Once again, the estimation is not affected by the inclusion of this variable. The same happens in column (9), once we include infant mortality rate to proxy for countries' living standard as an additional control.

The results so far show that the ratio of remittance receipt over GDP in a country is not a determinant of the steady state level of its political quality once education inequality, population size and income inequality are controlled for. In addition, if we exclude these controls, the model is misspecified and the resulting inference is not reliable. However, by studying the reduced form of the D-GMM estimator we can learn whether remittances help predict changes in the democracy index in the first-differenced equation.

---

[42]The model predicts that remittances affect institutional quality by narrowing the income gap between the rich elite and the median voter. Whether this mechanism translates into reductions in income inequality depends on the class to which the median voter belongs. For this reason, in order to test the prediction of the theoretical model we just need to include income inequality in the set of the explanatory variables and observe whether the coefficient on the variable measuring remittances is still significant.

[43]One potential concern might be that the variable measuring remittances is not significant in column (5) due to its high correlation with the expected household income inequality index. However, the fact that the model is correctly specified only when $EHII_{t-5}$ is in the set of regressors as well as a correlation as low as 0.11 between the two variables suggest that multicollinearity is not a concern in this estimation.

[44]Abdih et al. (2010) adopt the same set of controls.

[45]Rapoport and Docquier (2005) offer a survey of these studies.

Since the results in Table 2.5 show that remittances can be omitted from the specification, following Bond et al. (2001) we estimate the equation below for the sample of observations for which our measure of remittance receipts over GDP is available:

$$
\begin{aligned}
Democracy_{i,t} = {} & \beta_0 Democracy_{i,t-5} + \beta_1 EducationInequality_{i,t-5} \\
& + \beta_1 Population_{i,t-5} + \beta_3 IncomeInequality_{i,t-5} + \eta_i + \zeta_t + \epsilon_{i,t}
\end{aligned}
$$

As already discussed, by comparing the estimation results delivered by simple OLS, fixed effect OLS, D-GMM and S-GMM regressions respectively, we can understand the extent to which the D-GMM estimator is affected by weak instrumentation and whether the problem can be overcome by introducing the level equation in the S-GMM fashion. Columns (1), (2), (3) and (5) in Table 2.6 show the results of this exercise. Given that now our purpose is to understand whether remittances have an impact on political institutions working through indirect channels, we introduce an additional column that will help us in this direction.

TABLE 2.6: Remittances and Political Institutions:
Bounding Procedure

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) D-GMM IV	(5) S-GMM
PRI_{t-5}	0.623***	0.143**	0.284**	0.276**	0.555***
	(0.048)	(0.062)	(0.134)	(0.109)	(0.072)
$Educ.Gini_{t-5}$	-0.003***	-0.002	0.005	0.009	-0.005***
	(0.001)	(0.003)	(0.006)	(0.006)	(0.001)
$EHII_{t-5}$	-0.004**	0.002	0.003	0.006	-0.003
	(0.002)	(0.003)	(0.006)	(0.006)	(0.003)
$LogPop_{t-5}$	-0.002	-0.019	0.136	0.252	-0.016
	(0.006)	(0.133)	(0.272)	(0.218)	(0.030)
Observations	393	393	317	317	393
N. countries	110	110	100	100	110
N. instr.			53	65	74
AR(2) test			0.190	0.137	0.414
Hansen test			0.566	0.445	0.184
Diff. Hansen test					0.617

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) and (5) all variables are considered pre-determined and instrumented for their own first three lags. In column (3) the instrument set is augmented by using the first three lags of the variable measuring *workers' remittances*.

The theoretical model presented in the previous section suggests that income inequality is the channel of transmission from remittances to political institutions. For this reason, despite excluding the ratio of remittance receipts to GDP from the set of re-

gressors, we can still include the lags of this variable in the instrument set to alleviate the weak instrument problem. This strategy would be successful if the estimate for β_0 in column (4) lied in the interval that has as lower bound the estimate in column (3) and as upper bound that in column (5). What we see instead is that the coefficient in column (4) is lower than the corresponding estimate in column (3), suggesting that the weak instrument problem is even exacerbated and that then remittances do not affect political institutions through indirect channels.

The findings so far suggest that there is no causal link leading to changes in institutional quality in response to changes in the level of remittance receipts in a country[46] In order to have a deeper understanding of these results we want to test whether this discrepancy is driven by the use of different variables measuring remittances and political institutions. We start this exercise by focusing on the variable measuring remittances.

The World Bank World Development Indicator Database presents two different variables measuring remittances, namely *workers' remittances* and *workers' remittances and compensation of employees*. The results presented so far are based on the former. Chami et al. (2008) shows that using the more aggregated measure, i.e. *workers' remittances and compensation of employees*, could result in imprecise estimation due to the different nature of the two components of this variable. While *workers' remittances* are private transfers from migrants in the host country to recipients in the home country, *compensation of employees* represents the earned income of (and not private transfers from) migrants in the host country for less than a year. In addition, *compensation of employees* are found to be pro-cyclical and then more identifiable as private capital flows rather than private transfers[47].

In this study remittances are seen as additional sources of income that are used to buy goods and services in the home country that would be otherwise publicly provided. For this reason, the inclusion of compensation of employees in the remittance statistic would pollute our estimation by capturing an economic behavior that is different from the one we are interested in. Nevertheless, in Table 2.7 and 2.8 we replicate the estimations carried out in Table 2.5 and 2.6 by using *workers' remittances and compensation of employees* as explanatory variable. By doing so, we want to check whether the results are robust to alternative definitions of the remittance statistic. The message conveyed by both tables is unaltered: the level of remittance receipts in a country does not affect its institutional quality.

In the next two tables we want to test whether the results are driven by the specific concepts of political institutions captured by the Freedom House Political Rights Index, i.e. the extent to which it is possible for the citizens to take part in politics and government effectiveness. For this reason, in Table 2.9 we use the Freedom House Civil Liberties Index as dependent variable. By doing so we want to capture differ-

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[46]These results are in contrast with the evidence shown by Abdih et al. (2010) according to which remittances are associated with a deterioration of political institutions in recipient countries.

[47]Chami et al. (2008) provide a detailed discussion on the difference between *workers' remittances* and *compensation of employees*.

TABLE 2.7: Remittances and Political Institutions: Alternative Definition of Remittances

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM	(9) S-GMM
PRI_{t-5}	0.857***	0.271***	0.378***	0.605***	0.678***	0.674***	0.651***	0.612***	0.669***
	(0.019)	(0.063)	(0.126)	(0.092)	(0.078)	(0.069)	(0.066)	(0.077)	(0.068)
$Rem.\&Com._{t-5}(\%GDP)$	0.057	0.064	0.288	-0.048	-0.104	-0.070	-0.156	-0.080	-0.087
	(0.093)	(0.256)	(0.466)	(0.121)	(0.137)	(0.245)	(0.330)	(0.296)	(0.267)
$Educ.Gini_{t-5}$					-0.004***	-0.003**	-0.004***	-0.003**	-0.003
					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$EHII_{t-5}$					-0.004	-0.002	-0.004	0.001	-0.003
					(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$LogPop_{t-5}$					0.016	0.041*	0.013	-0.006	0.017
					(0.014)	(0.022)	(0.020)	(0.017)	(0.016)
$Emigration_{t-5}$						0.692			
						(0.439)			
$Trade_{t-5}(\%GDP)$							0.000		
							(0.001)		
$Urbanization_{t-5}$								0.004***	
								(0.001)	
$Inf.Mortality_{t-5}$									-0.000
									(0.002)
Observations	603	603	447	603	366	366	365	366	366
N. countries	153	153	137	153	103	103	103	103	103
N. instr.			29	40	91	108	108	108	108
AR(2) test			0.487	0.431	0.730	0.714	0.743	0.785	0.728
Hansen test			0.114	0.117	0.372	0.562	0.612	0.464	0.544
Diff. Hansen test				0.178	0.616	0.796	0.991	0.330	0.988

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (9) all variables are considered pre-determined and instrumented for their own first three lags.

ent aspects of institutional quality such as the level of recognition of some important individual rights (association, organization, expression and belief) as well as the importance of the rule of law. It is interesting to see that we do not find any significant effect of remittances on this dimension of institutional quality[48].

TABLE 2.8: Remittances and Political Institutions:
Alternative Definition of Remittances. Bounding Procedure.

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) D-GMM IV	(5) S-GMM
PRI_{t-5}	0.710***	0.179***	0.112	0.070	0.534***
	(0.050)	(0.063)	(0.133)	(0.107)	(0.092)
$Educ.Gini_{t-5}$	-0.002***	-0.004	0.001	0.001	-0.005***
	(0.001)	(0.003)	(0.004)	(0.004)	(0.002)
$EHII_{t-5}$	-0.003*	0.002	0.001	0.003	-0.003
	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)
$LogPop_{t-5}$	0.001	-0.001	0.084	0.124	-0.019
	(0.005)	(0.121)	(0.207)	(0.175)	(0.031)
Observations	366	366	304	304	366
N. countries	103	103	96	96	103
N. instr.			53	65	74
AR(2) test			0.376	0.340	0.678
Hansen test			0.653	0.735	0.380
Diff. Hansen test					0.710

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) and (5) all variables are considered pre-determined and instrumented for their own first three lags. In column (3) the instrument set is augmented by using the first three lags of the variable measuring *workers' remittances and compensation of employees*.

A shortcoming of the approach taken so far lies in the fact that both the Political Rights and the Civil Liberties indexes focus on rights and liberties enjoyed by individuals rather than on the institutional characteristics of their government. Since changes in political regimes do not often correspond to immediate changes in political and civil rights, this could create some problems in our analysis. For this reason in Table 2.10 the dependent variable used is the Polity IV index, whose main characteristic is that it identifies political organizations as units of the analysis and put more emphasis on institutional aspects. The estimation results do not change even when we use this new variable.

Once we have shown that the main findings hold true even when we use alternative definitions of the key variables in our analysis, we want to test whether the results are robust to different types of S-GMM estimations. We follow the approach suggested by Roodman (2007) and Roodman (2009). Table 2.11 presents the results of

[48]While Abdih et al. (2010) show that remittances have a negative impact on these dimensions, they also provide evidence of a deterioration in the respect of the rule of law in countries with high remittances to GDP ratios.

TABLE 2.9: Remittances and Political Institutions. Dependent Variable: Civil Liberties Index (CLI)

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM	(9) S-GMM
CLI_{t-5}	0.847***	0.272***	0.528***	0.621***	0.594***	0.572***	0.608***	0.577***	0.577***
	(0.018)	(0.050)	(0.102)	(0.084)	(0.056)	(0.050)	(0.055)	(0.052)	(0.052)
$Remittances_{t-5}(\%GDP)$	0.002	-0.061	0.050	0.142	-0.168	-0.300	-0.173	-0.177	-0.027
	(0.123)	(0.132)	(0.273)	(0.303)	(0.240)	(0.190)	(0.234)	(0.219)	(0.255)
$Educ.Gini_{t-5}$					-0.004***	-0.003***	-0.003***	-0.003***	-0.004***
					(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$EHII_{t-5}$					-0.008***	-0.005***	-0.008***	-0.007***	-0.008***
					(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$LogPop_{t-5}$					-0.001	0.024	-0.004	-0.008	0.009
					(0.011)	(0.015)	(0.011)	(0.011)	(0.008)
$Emigration_{t-5}$						0.914**			
						(0.381)			
$Trade_{t-5}(\%GDP)$							-0.000		
							(0.000)		
$Urbanization_{t-5}$								0.001	
								(0.001)	
$Inf.Mortality_{t-5}$									0.000
									(0.001)
Observations	655	655	494	655	393	393	390	393	393
N. countries	156	156	146	156	110	110	109	110	110
N. instr.			29	40	91	108	108	108	108
AR(2) test			0.793	0.895	0.984	0.870	0.990	0.994	0.943
Hansen test			0.0393	0.0165	0.473	0.336	0.521	0.423	0.615
Diff. Hansen test				0.130	0.524	0.430	0.651	0.430	0.694

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (9) all variables are considered pre-determined and instrumented for their own first three lags.

TABLE 2.10: Remittances and Political Institutions. Dependent Variable: Polity IV Index.

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM	(9) S-GMM
$Polity4_{t-5}$	0.813***	0.304***	0.809***	0.846***	0.614***	0.597***	0.592***	0.590***	0.562***
	(0.023)	(0.057)	(0.135)	(0.084)	(0.064)	(0.065)	(0.067)	(0.061)	(0.068)
$Remittances_{t-5}(\%GDP)$	-0.179	0.557	-0.153	-0.010	0.044	-0.037	0.111	0.060	0.249
	(0.176)	(0.518)	(0.424)	(0.183)	(0.294)	(0.294)	(0.336)	(0.334)	(0.348)
$Educ.Gini_{t-5}$					-0.004***	-0.004***	-0.004***	-0.005***	-0.008***
					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$EHII_{t-5}$					-0.001	-0.001	-0.001	-0.002	-0.005
					(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
$LogPop_{t-5}$					0.025	0.026	0.011	0.027	0.022
					(0.020)	(0.022)	(0.019)	(0.020)	(0.020)
$Emigration_{t-5}$						0.365			
						(0.394)			
$Trade_{t-5}(\%GDP)$							-0.000		
							(0.000)		
$Urbanization_{t-5}$								-0.001	
								(0.001)	
$Inf.Mortality_{t-5}$									0.002**
									(0.001)
Observations	532	532	387	532	360	360	357	360	360
N. countries	136	136	124	136	104	104	103	104	104
N. instr.			29	40	91	108	108	108	108
AR(2) test			0.882	0.876	0.123	0.132	0.139	0.119	0.0697
Hansen test			0.0631	0.0742	0.564	0.455	0.526	0.573	0.512
Diff. Hansen test				0.681	0.631	0.922	0.750	0.819	0.570

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (9) all variables are considered pre-determined and instrumented for their own first three lags.

this exercise.

The results in column (1) display the outcome of a two-step S-GMM estimation in which all variables are considered predetermined and instrumented for their own first three lags[49]. Despite being consistent and asymptotically efficient in finite samples, two-step S-GMM are known to be affected by downward bias in the computed standard errors. For this reason, in column (1) and throughout the paper we always report Windmeijer corrected standard errors. However, to further corroborate our findings in column (2) we show that even when we consider one-step S-GMM the results do not change.

TABLE 2.11: Remittances and Political Institutions: Alternative S-GMM specifications.

VARIABLES	S-GMM 2-step 3 lags	S-GMM 1-step 3 lags	S-GMM 2-step 5 lags	S-GMM 2-step 2 lags	S-GMM 2-step collapsed
PRI_{t-5}	0.562***	0.554***	0.546***	0.580***	0.361***
	(0.074)	(0.067)	(0.069)	(0.089)	(0.116)
$Remittances_{t-5}(\%GDP)$	0.161	0.158	0.115	0.180	0.766
	(0.347)	(0.341)	(0.348)	(0.358)	(0.778)
$Educ.Gini_{t-5}$	-0.005***	-0.005***	-0.005***	-0.005***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$EHII_{t-5}$	-0.006*	-0.006*	-0.006*	-0.006	-0.003
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
$LogPop_{t-5}$	0.020	0.022	0.020	0.029	-0.088
	(0.022)	(0.022)	(0.023)	(0.020)	(0.075)
Observations	393	393	393	393	393
N. countries	110	110	110	110	110
N. instr.	91	91	106	76	36
AR(2) test	0.729	0.739	0.744	0.732	0.778
Hansen test	0.334	0.334	0.531	0.151	0.443
Diff. Hansen test	0.502	0.502	0.793	0.220	0.321

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses, with the exception of column (2) in which one-step robust standard errors are reported. AR(2) is Arellano-Bond test for serial correlation. Hansen test report the p-values for the null hypothesis of instrument exogeneity. Diff. Hansen test report the same statistic for the set of instruments associated with the level equation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (1) and (2) all variables are considered pre-determined and instrumented for their own first three lags. In column (3) and (4) all variables are instrumented for their own first five and two lags respectively. In column (6), a collapsed instrument set is used.

In the last three columns we want to show that the results do not depend upon the instrument set used. Roodman (2007) points out how instrument proliferation may lead to: (i) overfitting of the endogenous regressors, and (ii) unreliable Hansen test statistics. For this reason in columns (3) to (5) we show the results obtained using 5 lags, 2 lags and a collapsed instrument matrix, respectively. The message conveyed by the estimations in column (7) is that the number of lags used as instrument do not alter the main conclusion of our analysis.

We can then conclude that remittances do not have either a direct or an indirect impact on political institutions once we choose the right specification. As shown in the previous section, education and income inequality are important determinants of

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[49]These results are the same as those shown in column (5) of Table 2.5. We present them again in Table 2.11 for comparison purposes.

institutional quality and, as a consequence, their omission leads to unreliable estimations.

2.3 Conclusion

Recent studies document a negative impact of remittances on political development in recipient countries, such effect mainly working through increases in corruption. In this paper, we use a model explaining the determinants of institutional quality to understand how remittances affect political regimes.

We find that remittance inflows reduce recipients' reliance on public spending and as a consequence: (i) increase the importance of redistribution of political power *vis-a-vis* redistribution of income for this group, and (ii) reduce the economic costs of democratic regimes for the ruling elite.

The empirical specification is designed following the predictions of the theoretical model. Using a sample of 110 countries spanning the period 1980-2005, we show that remittances do not have a detrimental effect on the quality of governance, once we correctly specify the equation to be estimated, i.e. we control for education and income inequalities. These results are robust to the use of alternative definitions of the key variables in our model as well as to the adoption of different econometric techniques.

The contribution of this paper is both theoretical and empirical. From a theoretical point of view, we provide a microfoundation to explain the link between remittances and institutional quality. The novelty of this approach consists in the fact that we look directly at the processes leading to the creation of different political institutions and see whether remittances play a role. Empirically, we use the information obtained from the theoretical exercise to identify a sound specification to be tested. The study of this topic within dynamic a panel framework helps us overcome the shortcomings deriving from cross-sectional estimations.

However, some limits emerge from this study. The fact that we do not find empirical evidence in support of an indirect effect of remittance inflows on political institutions suggests that there is no perfect matching between the theoretical model and the empirical results. These findings point out that our knowledge on the link between workers' remittances and institutional development is far from being exhausted and more work is needed to improve both the empirical and the theoretical specifications.

Chapter 3

Emigration, Population Structure & Democracy in Sending Countries

Society's polarization is commonly seen as a determinant of poor economic development. Factions with opposing interests face different incentives and this often translates into distributive conflicts. Sub-optimal economic and political outcomes therefore arise as natural outcomes of such tensions[1]. In this respect, the existence of a group with interests intermediate to those of the two opposing factions can be thought of as having a beneficial impact on countries' development.

A large body of studies provide support to this hypothesis. Among the others, Alesina and Perotti (1996), Barro (1999), Easterly (2001) and Loayza et al. (2012) carry out empirical analyses that differ for sample, time span, estimation methodology and variables used. However they all come to same conclusion, i.e. societies with larger middle classes enjoy higher levels of institutional development. In addition, Acemoglu and Robinson (2001) indicates the presence of a growing middle class as the main determinant explaining different political trajectories in Costa Rica and Colombia as opposed to Guatemala, El Salvador and Nicaragua[2].

Members of the middle class usually correspond to the higher skilled part of the population. Galor and Zeira (1993) show theoretically that, in the presence of imperfect credit markets, individuals belonging to the middle class face low liquidity constraint and then are more likely to invest in human capital. By virtue of their higher education levels, members of this group play a key role in coordinating opposition parties and voice for democratic freedoms under autocratic regimes[3].

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[1]Alesina (1992) and Acemoglu and Robinson (2001).

[2]According to Acemoglu and Robinson (2001), the presence of smallholder producers of coffee in Costa Rica and Colombia is the main reason for which these countries underwent a democratic transition in the middle of th nineteenth century, while Guatemala, El Salvador and Nicaragua democratized much later, despite sharing the same colonial past and economic structure with the other two countries.

[3]Acemoglu and Robinson (2001) describe the importance of the middle class in the coordination of the movements that led to the First Reform Act in Britain and to the unrest during the Paris Commune in France.

Given the importance of the high skilled segment of the population for countries' long run economic and institutional development, concerns have risen following the high migration outflows of educated workers[4]. The evidence displayed in Table 3.1 reinforces such worries by showing that the countries losing the largest part of their high skilled workforce are islands and poor economies in which this type of labor is already a scarce factor of production. As a result, the size of the middle class is likely to be sensibly affected in these sending countries.

Despite the relevance of the topic, the literature linking brain drain and the size of the middle class to domestic institutions is still at an early stage. Li and McHale (2009) analyze the relationship between skilled labor emigration and domestic institutions within an *exit and voice* model. In this framework, high skill people remaining at home have a positive impact on institutional development, irrespective of their participation in political activities. On the contrary, educated migrants contribute to political advancement only if they voice from abroad or return to their countries at a later stage. Empirically, their cross-sectional analysis provides support to this hypothesis[5].

Spilimbergo (2009) and Docquier et al. (2011) overcome the problem associated with cross-sectional analyses, by considering dynamic-panel regressions. In particular, Spilimbergo (2009) focus on the effect of a specific type of emigration, i.e. foreign-educated students, on the quality of domestic institutions. His work shows that students educated abroad contribute to domestic institutional development only if education is acquired in democratic countries.

In the study by Docquier et al. (2011), total emigration and domestic human capital are found to have a positive impact on home country institutions. When emigration of the skilled workforce is included in the analysis, no statistically significant effect is found. The authors attribute these results to the fact that high skilled emigration is associated positively with total emigration and negatively with domestic human capital. Numeric simulations provide evidence in this direction. In particular, it is shown that the effect of *migration of the best and brightest* is positive in certain countries only once the incentive effects of emigration on human capital acquisition are taken into account.

This paper adds to the previous literature in two distinct ways. First, it provides microfoundations to understand the link between emigration of different skill groups, population structure and institutional quality. While previous studies outline potential mechanism of transmission from emigration to home country institutions, to the

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[4]Docquier and Rapoport (2012) provide a comprehensive survey of the economic research on brain drain.

[5]Using countries' geographical characteristics as instrument for emigration, the authors find a positive impact of high skill emigration on Voice and Accountability and Polical Stability, and a negative effect on Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. However, as the authors themselves acknowledge, their empirical strategy adopted is likely to be affected by the endogeneity of the instrument used. Engerman and Sokoloff (2002) and Acemoglu et al. (2002b), among the others, provide evidence showing the direct link between geography and institutional development.

TABLE 3.1: Countries Most Affected by High-skill Emigration

Country	High skilled emigration	Share of tertiary educated
Guyana	0.889	0.002
Jamaica	0.850	0.125
Haiti	0.835	0.009
Trinidad and Tobago	0.792	0.036
Tonga	0.696	0.091
Belize	0.654	0.076
Rwanda	0.640	0.005
Barbados	0.634	0.011
Gambia, The	0.588	0.022
Fiji	0.573	0.100
Malta	0.568	0.091
Mauritius	0.550	0.026
Sierra Leone	0.518	0.008
Ghana	0.451	0.042
Liberia	0.442	0.025
Kenya	0.378	0.023
Laos	0.372	0.041
Tanzania	0.358	0.009
Cyprus	0.308	0.248
El Salvador	0.304	0.095
Nicaragua	0.288	0.123
Ireland	0.286	0.252
China, Hong Kong SAR	0.284	0.146
Sri Lanka	0.280	0.133
Papua New Guinea	0.276	0.014
Cuba	0.276	0.067
Vietnam	0.263	0.024
Uganda	0.243	0.048
Honduras	0.239	0.042
Guatemala	0.235	0.036
Croatia	0.216	0.061
Afghanistan	0.213	0.074
Dominican Republic	0.209	0.126
Congo, Rep. of the	0.209	0.034
New Zealand	0.204	0.420

Note: Emigration data are taken from Defoort (2008) and education data from Barro and Lee (2010).

best of my knowledge this is the first work that looks at emigration within a model that explains the long-run determinants of institutional development. Second, it uses the newly developed conceptual framework as a guide to identify causal relationships in the empirical analysis.

The theoretical framework is based on Acemoglu and Robinson (2006). In this setting, political institutions are determined by the interplay of three social groups, i.e. a rich elite, the high-skilled workers (or the middle class), and the low-skilled workers (or the poor). Emigration of different social groups shifts the balance of powers, in particular the population structure and the distribution of income.

Whether the quality of home countries institutions is enriched or impoverished from migration of different types of workers depends on the effects on the relative size and economic power of the skilled middle class. In general, larger and wealthier middle classes fasten the process of democratic transitions by: (i) acting as a buffer in the redistributive conflict between the rich and the poor, (ii) coordinating coalitions to overthrow dictatorial regimes.

In this context, the effect of both types of emigration on political quality is ambiguous *a priori*. Low-skilled emigration impacts institutional development: (i) positively by increasing the relative size of the middle class, and (ii) negatively by reducing its relative income. The impact of high-skilled migration works through the same channels, but in the opposite direction.

Empirically, this hypothesis is tested using a sample of 122 countries spanning the period 1980-2005. In line with the prediction of the theoretical section, distribution of income and population structure (used to proxy the relative size and income of the middle class) turn out to be crucial to correctly specify the empirical model. We find that the magnitude and statistical significance of both types of emigration vanishes when we control for the relative power of the middle class. Such results provide support to our hypothesis according to which emigration impacts political development through changes in the relative size and income of the key groups in the population.

The remainder of the paper is organized as follows. In Section 3.1, I describe the theoretical model used to explain the impact of high and low skill emigration on institutional quality and outline the main mechanisms of transmission. In Section 3.2, this conceptual framework is used as a guide for the empirical analysis and robustness tests are carried out. Finally, Section 3.3 concludes.

3.1   Theoretical Model

In this section, we present the theoretical framework used to investigate the impact of emigration of different skill levels on domestic institutional quality. As in Acemoglu and Robinson (2006)[6], political regimes are determined by the interplay of

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[6]Chapter 8 of their book focuses on a three-class model.

three groups, i.e. the rich, the middle class and the poor.

The theoretical contribution of this paper compared to the original model by Acemoglu and Robinson (2006) is the introduction of high and low skilled emigration. In the remainder of the theoretical section, I discuss the impact of different types of emigration on the political end economic variables of the original model.

3.1.1 Economic Structure

Consider an economy populated by a continuum 1 of agents: δ agents are rich ($i = r$), h are high-skilled ($i = h$) and l are low skilled ($i = l$), such that $\delta + h + l = 1$ and $\delta < h < l$. Each rich agent owns $\frac{K}{\delta}$ units of capital, high skilled workers own one unit of skilled labor, and low skilled workers one unit of low skilled labor.

The unique output good is produced combining capital (K), high-skilled labor (H) and low-skilled labor (L) according to the following Cobb-Douglas production function[7]:

$$Y = K^{\theta_r} H^{\theta_h} L^{\theta_l}. \tag{3.1}$$

Given the distribution of endowments across agents belonging to different groups, we can rewrite the production function as:

$$Y = K^{\theta_r} h^{\theta_h} l^{\theta_l}. \tag{3.2}$$

It is possible to derive the rents earned by the three types of agents as the marginal product of the correspondent factor of production:

$$r = \frac{\partial Y}{\partial K} = \theta_r K^{\theta_r - 1} h^{\theta_h} l^{\theta_l} = \theta_r \frac{Y}{K} \tag{3.3}$$

$$w_h = \frac{\partial Y}{\partial h} = \theta_h K^{\theta_r} h^{\theta_h - 1} l^{\theta_l} = \theta_h \frac{Y}{h} \tag{3.4}$$

---

[7]The choice of a Cobb-Douglas production function implicitly corresponds to assuming an elasticity of substitution equal to one between highly and less educated workers. In the literature, labor is often expressed as a CES function of the two different types of workers, with an elasticity of substitution ranging from 1.3 to 2 as discussed in Docquier et al. (2010). In Appendix C.2 we show that the nature of the results does not change if we adopt the CES specification.

$$w_l = \frac{\partial Y}{\partial l} = \theta_l K^{\theta_r} h^{\theta_h} l^{\theta_l - 1} = \theta_l \frac{Y}{l} \tag{3.5}$$

while the shares of national income accruing to the three groups can be the written as:

$$s_K = \frac{rK}{Y} = \theta_r \tag{3.6}$$

$$s_h = \frac{w_h h}{Y} = \theta_h \tag{3.7}$$

$$s_l = \frac{w_l l}{Y} = \theta_l \tag{3.8}$$

with $\theta_r + \theta_h + \theta_l = 1$.

Let us now analyze the comparative statics of wages with respect to emigration of members of the two groups. For high skilled wages we have:

$$\frac{\partial w_h}{\partial h} = \theta_h (\theta_h - 1) K^{\theta_r} h^{\theta_h - 2} l^{\theta_l} < 0 \tag{3.9}$$

$$\frac{\partial w_h}{\partial l} = \theta_h \theta_l K^{\theta_r} h^{\theta_h - 1} l^{\theta_l - 1} > 0 \tag{3.10}$$

Not surprisingly the wage of the highly skilled workers goes up as a result of high skilled migration and down as a result of low skilled migration[8].

Similarly, for low-skilled labor we have:

$$\frac{\partial w_l}{\partial h} = \theta_h \theta_l K^{\theta_r} h^{\theta_h - 1} l^{\theta_l - 1} > 0 \tag{3.11}$$

$$\frac{\partial w_l}{\partial l} = \theta_l (\theta_l - 1) K^{\theta_r} h^{\theta_h} l^{\theta_l - 2} < 0 \tag{3.12}$$

---

[8]In support of these predictions, Mishra (2007) and Aydemir and Borjas (2006) show that emigration of a certain skill groups leads to an increase in the wages of non-migrants belonging to the same group.

After having discussed the different components of factor prices, we want to define the domestic incomes earned by the members of the three different groups. Since within groups members are homogeneous we can write:

$$y^r = \frac{rK}{\delta} = \frac{\theta_r}{\delta} Y \qquad (3.13)$$

$$y^h = \frac{w_h h}{h} = \frac{\theta_h}{h} Y \qquad (3.14)$$

$$y^l = \frac{w_l l}{l} = \frac{\theta_l}{l} Y \qquad (3.15)$$

We impose $y^r > \bar{Y} = \frac{Y}{\delta+h+l} > y^h > y^l$, which implies the following set of inequalities:

$$\theta_r > \frac{\delta}{\delta + h + l} \qquad (3.16)$$

$$\theta_h < \frac{h}{\delta + h + l} \qquad (3.17)$$

$$\theta_l < \frac{l}{\delta + h + l} \qquad (3.18)$$

This means that the share of income owned by the elite is higher than the share of people belonging to this group in the total population, while the opposite is true for high and low skilled workers.

3.1.2 Political Structure

3.1.2.1 Individual Behaviour

Political institutions are identified by the redistribution policy they adopt. There are two instruments to accomplish these duties: a positive tax rate τ proportional to income and a lump-sum transfer T, equal for all agents. Also, associated with taxation there is a distortion, captured by the term $c(\tau)y$, where $c(\cdot)$ is a twice continuously

differentiable function with: i.) $c(0) = 0$, ii.) $c'(\cdot) > 0$, iii.) $c''(\cdot) > 0$ and iv.) $c'(0) = 0$, v.) $c'(1) = 1^9$. The government budget constraint then implies:

$$TR = \delta \tau y^r + h\tau y^h + l\tau y^l - c(\tau)Y = (\tau - c(\tau))Y \tag{3.19}$$

hence the lump-sum transfer is $T = \frac{TR}{\delta + h + l}$.

Individuals' indirect utility is equal to post-tax income and given by:

$$V\left(y^i | \tau^i\right) = \left(1 - \tau^i\right) y^i + T \tag{3.20}$$

Each agent will choose her optimal tax rate in order to maximize the expression in (3.20). Imposing the first order conditions we obtain:

$$-y^i + \left(1 - c'\left(\tau^i\right)\right) \frac{Y}{\delta + h + l} = 0 \Rightarrow \frac{y^i}{\frac{Y}{\delta + h + l}} = 1 - c'(\tau^i) \Rightarrow \frac{\theta_i}{\frac{h}{\delta + h + l}} = 1 - c'(\tau^i) \tag{3.21}$$

Combining equation (3.21) and conditions (3.16) to (3.18), it is possible to draw conclusions on the optimal tax rates preferred by the three different groups. In particular, when $i = r$, condition (3.21) never holds, implying that the elite always prefer not to redistribute ($\tau^r = 0$) whenever possible. Contrarily, when $i = h$ or $i = l$, the tax rate will always be positive and the fact that $y^h > y^l$ implies that $\tau^h < \tau^l$.

When the median voter is a high skilled agent, i.e. $i = h$, condition (3.21) implies:

$$\frac{\theta_h}{\frac{h}{\delta + h + l}} = 1 - c'(\tau^h) \tag{3.22}$$

By using the implicit function theorem it is possible to learn how a change in h affects τ^h. Define:

$$F(\theta_h, \delta, \tau^h) = 1 - \frac{\theta_h}{\frac{h}{\delta + h + l}} - c'(\tau^h) = 0. \tag{3.23}$$

The derivative of τ^h with respect to h will then be given by $\frac{\partial \tau^h}{\partial h} = -\frac{F_h}{F_{\tau^h}}$. Let us

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[9] Imposing these conditions implies that there is no distortion when the tax rate is zero (i.), distortions are increasing (ii.) and strictly convex (iii.) in τ, marginal distortions are small for low level of τ (iv.) and large for high levels of the tax rate (v.).

calculate these derivatives:

$$F_h = \frac{\theta_h (1 - h)}{h^2} > 0 \tag{3.24}$$

As for the derivative at denominator, we have:

$$F_{\tau^h} = -c'' \left(\tau^h \right) < 0 \tag{3.25}$$

which simply reflects the concavity of the utility function. As a result we have:

$$\frac{\partial \tau^h}{\partial h} = \frac{\theta_h (1 - h)}{h^2 c'' (\tau^h)} > 0 \tag{3.26}$$

The intuition behind expression (3.26) is the following: by reducing the availability of highly educated workers, emigration of the most skilled agents increases the relative income of the members of this group and in turn reduces their need for redistribution.

Following the same steps, it is possible to show that the opposite is true for low skilled emigration[10]:

$$\frac{\partial \tau^h}{\partial l} = -\frac{\theta_h}{h c'' (\tau^h)} < 0^{[11]}. \tag{3.27}$$

3.1.2.2 Political Regimes

Now let us analyze the different political outcomes that can arise in a country. Dictatorships correspond to political situations in which the elite maximizes its utility. From equation (3.21) and keeping in mind expression (3.16), it follows that the optimal tax rate for the elite is $\tau^r = 0$. However, because of the inegalitarian nature of this regime, the other groups would be willing to overthrow the ruling class. In particular workers can mount a violent revolution.

For revolution to be a threat, high and low skilled workers have to form a coalition. After revolution, the two types of workers share the returns, while the elite is left

---

[10]In Appendix C.2, we show that this result does not depend on the substitutability between the factors of production.

with nothing:

$$V^h(R, \mu) = V^l(R, \mu) = \frac{1-\mu}{h+l}Y. \tag{3.28}$$

The constant μ represents the fraction of economy's income which is destroyed during the revolutionary process; what remains is equally distributed between workers.

The revolution constraint is binding if both the middle class and the poor prefer revolution to the status quo under the existing system:

$$V^l(R, \mu) = \frac{1-\mu}{h+l}Y > y^l \tag{3.29}$$

$$V^h(R, \mu) = \frac{1-\mu}{h+l}Y > y^h. \tag{3.30}$$

Since by assumption $y^h > y^l$, if the inequality in (3.30) holds, then (3.29) will also be true. Therefore we have:

$$\frac{1-\mu}{h+l}Y > \frac{\theta_h}{h}Y \Rightarrow \mu < 1 - \left(1 + \frac{l}{h}\right)\theta_h = \mu^+ \tag{3.31}$$

Expression (3.31) tells us that when the cost of revolution μ is lower than a certain threshold μ^+ the revolution constraint binds. Such threshold, depends negatively on θ^h. This means that the higher the share of income owned by the middle class, the less likely this group will be to mount a revolt. Also, it depends negatively on the number of low skilled workers and positively on the number of high skilled workers. Indeed, a reduction of high skilled workers will lead to a lower increase in the payoff of revolution compared to the corresponding effect on the payoff from the status quo y^h. This is due to the fact that the proceeds from a revolution are also shared with the low skilled workers.

The discussion above implies that the effect of high skilled emigration on μ^+ is negative. Formally:

$$\frac{\partial \mu^+}{\partial h} = \frac{l\theta_h}{h^2} > 0 \tag{3.32}$$

Implication 3.1.1 *Emigration of the highly educated makes the revolution constraint bind less often, i.e. $\frac{\partial \mu^+}{\partial h} > 0$.*

Now let us focus on the effect of l on the revolution constraint. In general, low skilled emigration will induce an increase in the payoff of revolution, which however this time will lead to a decrease in y^h. As a result the effect of low-skilled migration on the opportunity cost of revolution is negative, i.e. low skilled emigration makes the revolution constraint bind more often. Formally,

$$\frac{\partial \mu^+}{\partial l} = -\frac{\theta_h}{h} < 0 \tag{3.33}$$

Implication 3.1.2 *Low-skilled emigration makes the revolution constraint bind more often, i.e. $\frac{\partial \mu^+}{\partial l} < 0$.*

In order to prevent revolution the elite can take different actions. One of those is to try to keep political power by promising redistribution. However, this is only a partially credible promise because they can reset the tax with probability $(1-p)$ once revolution is no longer threatening. The values of the three different groups in this case are:

$$V^i(N, \tau^N) = y^i + p \left[\tau^N \left(\frac{Y}{\delta + h + l} - y^i \right) - c\left(\tau^N\right) \frac{Y}{\delta + h + l} \right] \tag{3.34}$$

where τ^N is the tax rate at which the elite promises redistribution.

Another option for the elite is to extend the franchise only to the middle class, in which case we talk about partial democracy. Since $\delta < h < l$, in that case the median voter would belong to the high skilled group and the tax implemented would be τ^h. Therefore we have:

$$V^i(PD) = y^i + \left[\tau^h \left(\frac{Y}{\delta + h + l} - y^i \right) - c\left(\tau^h\right) \frac{Y}{\delta + h + l} \right] \tag{3.35}$$

The values in democracy depends on whether the median voter is a poor or a middle-class agent, i.e. on whether $\frac{l}{\delta + h + l} > 1/2$:

$$V^i(D) = y^i + \left[\tau^D \left(\frac{Y}{\delta + h + l} - y^i \right) - c\left(\tau^D\right) \frac{Y}{\delta + h + l} \right] \tag{3.36}$$

where $\tau^D = \tau^h$ if $\frac{l}{\delta + h + l} < 1/2$, while $\tau^D = \tau^l$ if $\frac{l}{\delta + h + l} > 1/2$. Notice that in the first case partial and full democracy leads to the same allocation, while in the second case

$V^r(PD) > V^r(D)$. This follows from the fact that $y^h > y^l$ and then $\tau^h < \tau^{l}$[12].

Implication 3.1.3 *When the median voter is the pivotal agent under full democracy, i.e. $\frac{l}{\delta+h+l} < 1/2$, the allocations resulting from full democracy correspond to those arising from partial democracy.*

The result above suggests that population structure plays an important role in political transitions. Societies with large middle classes are more likely to be full democracies because they rely less on public spending. Contrarily, democratic liberties are more restricted in countries largely populated by low skilled workers because of their high reliance on redistribution. As a result, by increasing the relative size of the middle class in the population, low-skilled migration is expected to have a potentially beneficial impact on institutional development, while the opposite is true for high-skilled migration.

Finally, we analyze the last political choice the elite can opt for, i.e. repression. When the rich repress the opponents, they always succeed however a fraction κ of each agent's income gets destroyed. The resulting values are:

$$V^i(O|\kappa) = (1 - \kappa)y^i \tag{3.37}$$

From the discussion above, is clear that the elite would always prefer to promise redistribution rather than democratize (both partially and fully). However, whether promising redistribution is a viable channel to stop revolution depends on the following conditions:

$$V^h(N, \tau^N) \geq V^h(R, \mu) \tag{3.38}$$

or

$$V^l(N, \tau^N) \geq V^l(R, \mu) \tag{3.39}$$

Given that the payoff from revolution is the same for skilled and unskilled workers and since the right hand side in expression (3.38) is higher than that in (3.39), then the rich just need to satisfy (3.38). In other words, the ruling group needs to convince high skilled workers not to partake in revolution.

---

[12]The dynamics behind transitions from partial to full democracies are exactly the same as those occurring in transitions from autocratic to democratic regimes analyzed in Chapter 1.1. In this case, low-skilled migration by aligning the income of the poor and of the new ruling class would increase the likelihood of a democratic transition. Contrarily emigration of the most skilled would widen the income gap between the group in power and the poor, reducing then the probability of enfranchisement for the less skilled.

The best offer that the elite can make is $\tau^N = \tau^h$, that is the tax rate preferred by the high skilled agents. It then follows that the promise of redistribution can prevent revolution only if:

$$V^h(N, \tau^N = \tau^h) \geq V^h(R, \mu) \tag{3.40}$$

We can define a threshold value μ^*, such that the above condition holds as equality:

$$\mu^* = 1 - \frac{l+h}{h} \left\{ \theta_h + p \left[\tau^h \left(\frac{h}{\delta+h+l} - \theta_h \right) - \frac{h}{\delta+h+l} c(\tau^h) \right] \right\} \tag{3.41}$$

If the actual cost of revolution μ is lower than μ^* than a revolution will take place, while if revolution is relatively costly ($\mu \geq \mu^*$) promising redistribution will be enough to turn down the revolution threat.

It is interesting to study the comparative statics of this threshold:

$$
\begin{aligned}
\frac{\partial \mu^*}{\partial h} = {} & \frac{l\theta_h}{h^2} \left(1 - p\tau^h \right) + \frac{\delta p}{(\delta+h+l)^2} \left(c\left(\tau^h\right) - \tau^h \right) \\
& + p(h+l) \frac{\partial \tau^h}{\partial h} \left[\left(\frac{\theta_h}{h} - \frac{1}{\delta+h+l} \right) + \frac{1}{\delta+h+l} c'\left(\tau^h\right) \right]
\end{aligned} \tag{3.42}
$$

The term in square brackets is equal to zero as a result of the condition in (3.22). The first term in equation (3.42) is equal to the derivative of $\left[-\frac{h+l}{h}\theta_h + \frac{h+l}{h}p\tau^h\theta_h \right]$ with respect to h, i.e. the component of μ^* representing the benefit of the post-tax income associated with redistribution relative to the payoff of revolution. Such derivative is positive, meaning that high-skilled emigration ($h \downarrow$) makes revolution less attracting. The reason lies in the fact that post-tax income grows faster than the return to revolution; while the proceeds from a revolt are shared by both high- and low-skilled agents, the increase in income that follows emigration of the more skilled exclusively benefits the members of this group.

The second term in equation (3.42) is equal to the derivative with respect to h of $p\frac{h+l}{\delta+h+l}\left(c\left(\tau^h\right) - \tau^h \right)$, i.e. the component of μ^* representing the benefit of the lump-sum transfer associated with redistribution relative to the payoff of revolution. The derivative is negative, i.e. the higher the number of agents taking part into a revolt ($h+l$) in the total population, the more costly revolution is relative to redistribution. For this reason, outflows of high-skilled agents leads to increases in the opportunity-cost of revolution ($\mu^* \uparrow$). As a result, the total effect of high-skilled emigration on μ^* is not clear *a priori*.

Implication 3.1.4 *The effect of high skilled migration on the opportunity cost of rev-*

olution relative to redistribution is ambiguous, i.e. $\frac{\partial \mu^*}{\partial h} \lesseqgtr 0$.

The comparative statics with respect to l follow the same reasoning but do not lead to the same mixed results.

$$
\begin{aligned}
\frac{\partial \mu^*}{\partial l} &= \frac{\theta_h}{h}\left(p\tau^h - 1\right) + \frac{\delta p}{(\delta + h + l)^2}\left(c\left(\tau^h\right) - \tau^h\right) \\
&\quad + p\left(h + l\right)\frac{\partial \tau^h}{\partial l}\left[\left(\frac{\theta_h}{h} - \frac{1}{\delta + h + l}\right) + \frac{1}{\delta + h + l}c'\left(\tau^h\right)\right]
\end{aligned}
\tag{3.43}
$$

The main difference with respect to (3.42) is that now the first and second term are both negative. Given that as result of low-skilled migration post-tax income goes down for the high-skilled revolution becomes a more attracting option relative to redistribution. In addition, as already seen in the previous case, a reduction in the number of agents partaking in revolution makes such option more rewarding relative to redistribution. As a result, low skilled emigration always makes workers more likely to revolt.

Implication 3.1.5 *Low skilled migration makes promised redistribution from the rich less likely to stop the middle class from revolting, i.e.* $\frac{\partial \mu^*}{\partial l} < 0$.

Now we turn our attention on considering when partial or full democratization are enough to stop revolution. It is sufficient to have:

$$
V^h(PD) \geq V^h(R, \mu)
\tag{3.44}
$$

Following what we have done previously we define the cost of revolution μ°, such that expression (3.44) holds as equality:

$$
\mu^\circ = 1 - \frac{l + h}{h}\left\{\theta_h + \left[\tau^h\left(\frac{h}{\delta + h + l} - \theta_h\right) - \frac{h}{\delta + h + l}c(\tau^h)\right]\right\}.
\tag{3.45}
$$

Since μ° has the same expression as μ^* except for the presence of the probability p, the same comparative statics results apply.

Implication 3.1.6 *The effect of high skilled migration on the opportunity cost of revolution relative to partial democracy is ambiguous, i.e.* $\frac{\partial \mu^\circ}{\partial h} \lesseqgtr 0$.

Implication 3.1.7 *Low skilled migration makes partial democracy less likely to stop the poor from revolting, i.e.* $\frac{\partial \mu^\circ}{\partial l} < 0$.

So far we have not considered the repression option that the elite has. In general the

elite prefer repression over promising redistribution if:

$$V^r(O|\kappa) > V^r(N|\tau^N = \hat{\tau}). \tag{3.46}$$

We define $\hat{\kappa}$ as the cost of repression at which expression (3.46) holds as equality:

$$\hat{\kappa} = \frac{p}{\theta_r} \left[\frac{\delta}{\delta+h+l} c(\hat{\tau}) - \hat{\tau} \left(\frac{\delta}{\delta+h+l} - \theta_r \right) \right] \tag{3.47}$$

when $\kappa \geq \hat{\kappa}$ repression is relatively costly and the elite will prefer redistribution, while the opposite is true when $\kappa < \hat{\kappa}$.

Now let's analyze the effects of high- and low-skilled emigration on $\hat{\kappa}$. In order to accomplish this goal we look at the comparative statics of this threshold with respect to h and l, respectively.

$$\frac{\partial \hat{\kappa}}{\partial h} = \frac{p}{\theta_r} \left\{ \frac{\partial \hat{\tau}}{\partial h} \left[\frac{\delta}{\delta+h+l} c'(\hat{\tau}) - \left(\frac{\delta}{\delta+h+l} - \theta_r \right) \right] - \frac{h+l}{(\delta+h+l)^2} (c(\hat{\tau}) - \hat{\tau}) \right\} > 0 \tag{3.48}$$

Equation (3.48) suggests that high-skilled emigration makes repression less likely for the elite. Such effect works through two channels. First, redistribution becomes less costly because the optimal tax rate goes down as a consequence of a reduction in h (first product in square brackets). Second, since there are relatively more rich agents in the economy the burden of taxation is lower for the members of the elite (second product in square brackets).

Implication 3.1.8 *High skilled migration increase the cost of repression relative to redistribution for the rich, i.e. $\frac{\partial \hat{\kappa}}{\partial h} > 0$.*

With respect to low-skilled emigration we have the following result:

$$\frac{\partial \hat{\kappa}}{\partial l} = \frac{p}{\theta_r} \left\{ \frac{\partial \hat{\tau}}{\partial l} \left[\frac{\delta}{\delta+h+l} c'(\hat{\tau}) - \left(\frac{\delta}{\delta+h+l} - \theta_r \right) \right] - \frac{h+l}{(\delta+h+l)^2} (c(\hat{\tau}) - \hat{\tau}) \right\}. \tag{3.49}$$

Now the effect of emigration of the less skilled is ambiguous. While the second product in square brackets is unaltered with respect to equation (3.48), the first product is now negative. This is due to the fact that as seen in equation (3.27) the expression $\frac{\partial \hat{\tau}}{\partial l}$ is negative, while from expression (3.16) we know that $-\left(\frac{\delta}{\delta+h+l} - \theta_r \right)$ is positive. As a consequence, the effects of a reduction in l on the opportunity-cost of repression go

in opposite direction and it is not possible to say *a priori* which one will be dominant.

Implication 3.1.9 *The effect of less skilled migration on the cost of repression relative to redistribution is ambiguous, i.e.* $\frac{\partial \hat{\kappa}}{\partial l} \lessgtr 0$.

Now define the threshold for the elite to be indifferent between democratization and repression by $\tilde{\kappa}(\tau)$ as a function of the tax rate in democracy:

$$V^r(O|\kappa) = V^r(PD) \tag{3.50}$$

or:

$$V^r(O|\kappa) = V^r(D) \tag{3.51}$$

Both (3.50) and (3.51) imply:

$$\tilde{\kappa}(\tau) = \frac{1}{\theta_r}\left[\frac{\delta}{\delta + h + l}c(\tau) - \tau\left(\frac{\delta}{\delta + h + l} - \theta_r\right)\right] \tag{3.52}$$

where $\tau \in \left\{\tau^D, \tau^{PD}\right\}$. Whenever $\kappa < \tilde{\kappa}(\tau)$ the elite would go for repression rather than any type of democratization. The comparative statics with respect to h and l lead to exactly the same result as for $\hat{\kappa}$.

Implication 3.1.10 *High skilled migration increase the cost of repression relative to democracy for the rich, i.e.* $\frac{\partial \tilde{\kappa}(\tau)}{\partial h} > 0$.

Implication 3.1.11 *The effect of less skilled migration on the cost of repression relative to democracy is ambiguous, i.e.* $\frac{\partial \tilde{\kappa}(\tau)}{\partial l} \lessgtr 0$.

3.1.2.3 The equilibrium

I now characterize the *subgame perfect equilibrium* of this game. The strategy of the elite is referred to as σ^r and consists of the actions $\left\{\omega, \psi, \phi, \tau^N, \bar{\tau}^N\right\}$. $\omega \in \{0,1\}$ denotes the repression decision, with $\omega = 1$ corresponding to repression and $\omega = 0$ to non-repression. $\psi \in \{0,1\}$ represents the decision to partially democratize, where $\psi = 1$ indicates that the middle class is granted the right to vote. $\phi \in \{0,1\}$ represents the decision to democratize, where $\phi = 1$ indicates that the franchise has been extended to every person in the society. $\tau^N \in [0,1]$ is the tax rate at which redistribution is promised, when $\phi = 0$. Finally, $\bar{\tau}^N \in [0,1]$ represents the tax rate that the elite resets with probability $1 - p$ if the opponents do not revolt.

The strategy of the skilled middle class and of the unskilled poor are denoted by σ^h and σ^l, respectively. They consist of the actions $\{\rho^h, \tau^{PD}\}$ for the middle class and $\{\rho^l, \tau^D\}$ for the poor. The revolution decision is represented by $\rho^i : \{0,1\}^3 \times [0,1] \rightarrow [0,1]$, with $i = h, l$, and depends on ω, ψ, ϕ and τ^N. Note that $\rho^i = 1$ corresponds to revolution. Finally, $\tau^i \in [0,1]$, $(i = PD, D)$, represents the tax rate set by the pivotal agent (the middle class in partial democracy, the poor in full democracy if $\frac{l}{\delta+h+l} > 1/2$) under non-dictatorial regimes. Then a *subgame perfect equilibrium* is a strategy combination denoted by $\{\tilde{\sigma}^r, \tilde{\sigma}^h, \tilde{\sigma}^l\}$ such that $\tilde{\sigma}^r$, $\tilde{\sigma}^h$ and $\tilde{\sigma}^l$ are mutually best responses.

As in Acemoglu and Robinson (2006), we have the following result[13].

Proposition 3.1.12 *There is a unique subgame perfect equilibrium in the game sketched out in this section.*

1. *If equation* (3.40) *does not hold, the revolution constraint does not bind and the elite stays in power without taking any action.*

2. *If equation* (3.40) *holds, the revolution constraint binds and the following political regimes can arise:*

    (a) *If $\mu < \mu^*$, equation* (3.44) *holds and $\kappa \geq \tilde{\kappa}(\tau^{PD})$, the elite undertakes partial democratization. In addition if $\frac{l}{\delta+h+l} < 1/2$, then partial democratization corresponds to full democratization.*

    (b) *If $\mu < \mu^*$ and $\kappa < \tilde{\kappa}(\tau^{PD})$; or if $\mu < \mu^*$ and equation* (3.44) *fails to hold; or if $\mu \geq \mu^*$ and $\kappa < \hat{\kappa}$, then the elite uses repression.*

    (c) *If $\mu \geq \mu^*$ and $\kappa \geq \hat{\kappa}$, then the elite promises redistribution.*

Emigration of workers with different skill sets directly alters the configuration of parameters that determines the political regime arising in equilibrium. In general, both high skilled workers (the pivotal agents) and the elite face the choice between a violent option (repression for the latter, revolution for the former) and another alternative that involves cooperation with the opponents (extension of the franchise or concessions for the latter, non-revolution for the former). High- and low-skill emigration affects the opportunity costs of such political options through changes in the relative sizes and in the rents earned by the different social groups.

We find that the higher the number of people mounting a violent political action, the less profitable the option is. As a result, through this channel both high- and low-skilled migration make revolution more likely ($\mu^* \uparrow$), since they reduce the number of people claiming a part of the proceeds. On the contrary, emigration of any type of worker decreases the likelihood of a repression, because the larger the relative size of the rich class in the economy, the less costly redistribution is to bear for this group ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$).

---

[13]A formal proof of the existence and uniqueness of the equilibrium is shown in Appendix C.1.

At the same time, emigration alters the availability of factors of production in the economy and then increases the rents of the factors that become relatively scarcer. By making the wages of the more educated higher, high-skill emigration reduces the gains of revolution relative to redistribution ($\mu^* \downarrow$), while the opposite is true for low-skilled emigration ($\mu^* \uparrow$). In addition, a richer middle class is likely to demand less redistribution $\tau^h \downarrow$, reason for which emigration of this group makes repression less likely ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$), while the opposite ($\hat{\kappa} \uparrow, \tilde{\kappa} \uparrow$) follows low-skill emigration.

Finally, emigration may have an additional impact on the equilibrium described above. Since in countries with more educated workers $\left(\frac{l}{\delta+h+l} < 1/2 \right)$ democratic institutions put a lower burden on the ruling group, i.e. $\tau^h < \tau^l$, transitions to full democracies are more likely to occur as a result of low-skilled migration and less likely to occur when high skill emigration rates are high (part 2.a. in Proposition 3.1.12). This mechanism reinforces the importance of the workforce skill composition as a channel of transmission from emigration to institutional quality.

Table 3.2 displays the overall impact of different types of emigration on the relevant parameters.

TABLE 3.2: Effects of Emigration on Relevant Parameters

	High-skilled emigration	Low-skilled emigration
τ^h	-	+
τ^l	+	-
μ^+	-	+
μ^*	?	+
μ°	?	+
$\hat{\kappa}$	-	?
$\tilde{\kappa}$	-	?

3.2 Empirical Analysis

The previous section shows that the direction of the impact of high- and low-skill emigration on institutional quality is not clear *a priori*. Whether the quality of home countries institutions is enriched or impoverished from migration of different types of workers depends on the effects on the relative size and economic power of the skilled middle class. In general, larger and wealthier middle classes fasten the process of democratic transitions.

Low-skilled emigration impacts institutional development: (i) positively by increasing the relative size of the middle class, and (ii) negatively by reducing its relative income. The impact of high-skilled migration works through the same channels, but in the opposite direction.

The merit of the theoretical model is that of identifying the channels of transmission from high and less skilled emigration to political development, i.e. changes in h and l and in τ^h and τ^l. While, the former are purely population effects, in particular changes in the population composition; the latter can be traced back to changes in income inequality.

The identification strategy adopted here to test whether the predictions of the model are valid can be summarized as follows: firstly, we analyze whether migration flows have an impact (either direct or indirect) on political transition controlling for a restricted set of explanatory variables (lagged democracy, and lagged high- and less-skilled emigration rates); once we have verified this, guided by the theoretical model we include controls for countries' population structure and income distribution and check whether emigration is still significant. If emigration affects political institutions through the aforementioned channels, we expect the coefficient on emigration to turn statistically not significant after the inclusion of these additional variables.

3.2.1 Econometric Model

In line with the previous literature we estimate a dynamic panel model. The basic specification is as follows:

$$
\begin{aligned}
Democracy_{i,t} = {} & \beta_0 Democracy_{i,t-5} + \beta_1 HighSkilledEmigration_{i,t-5} \\
& + \beta_2 TotalEmigration_{i,t-5} + \beta_3 X_{i,t-5} \\
& + \eta_i + \zeta_t + \epsilon_{i,t}
\end{aligned}
\tag{3.53}
$$

where i denotes the country and t the time period.

As in previous studies[14], the lagged dependent variable enters the set of explanatory variables to reflect the persistent nature of institutions: once set up institutions are costly to revert. The variables of interest are $HighSkilledEmigration_{i,t-5}$ and $TotalEmigration_{i,t-5}$. Since we control for emigration of highly skilled, the coefficient on total emigration, i.e. β_2, conveys information about the impact of less skilled migration. For this reason, when we discuss the results, we use the terms *total emigration* and *less skilled emigration* interchangeably to refer to this variable. The model does not clearly predict what sign we should expect for β_1 and β_2.

$X_{i,t-5}$ represents a vector of additional controls such as income inequality, and the fraction of the population with tertiary education, population size and education inequality. As already said, we expect β_1 and β_2 to turn not significant when these additional controls are included in the regression. Finally, we always include time

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[14]Acemoglu et al. (2005b), Bobba and Coviello (2006), Castello-Climent (2008) Spilimbergo (2009) and Docquier et al. (2011).

(ζ_t) and country (η_i) fixed effects so as to control respectively for underlying common trends of democracy and unobservable heterogeneity.

The estimation of Equation (3.53) presents two main challenges, i.e. the presence of unobserved effects and the endogeneity of some control variables. In particular, as shown by Bertocchi and Strozzi (2008) institutions are likely to be both push and pull factors determining international migration. For example, countries with low institutional quality are likely to experience higher emigration flows. To address these issues, I use the System Generalized Method of Moments (S-GMM) estimator proposed by Blundell and Bond (1998). Hence, I first differentiate Equation (3.53) to control for unobserved country-specific effects:

$$
\begin{aligned}
Democracy_{i,t} - Democracy_{i,t-5} &= \beta_0 \left(Democracy_{i,t-5} - Democracy_{i,t-10} \right) \\
&+ \beta_1 \left(HighSkillEmig_{i,t-5} - HighSkillEmig_{i,t-10} \right) \\
&+ \beta_2 \left(TotalEmigration_{i,t-5} - TotalEmigration_{i,t-10} \right) \\
&+ \beta_3 \left(X_{i,t-5} - X_{i,t-10} \right) \\
&+ \left(\zeta_t - \zeta_{t-5} \right) \\
&+ \left(\epsilon_{i,t} - \epsilon_{i,t-5} \right).
\end{aligned}
\tag{3.54}
$$

The remaining problems in estimating (3.54) are the endogeneity of some explanatory variables and the correlation between $(\epsilon_{i,t} - \epsilon_{i,t-5})$ and the lagged difference of the dependent variable. Under the assumption of sequential exogeneity[15] and of zero serial and cross-correlation of the idiosyncratic error term $\epsilon_{i,t}$, past levels of the dependent variable (or any pre-determined variable) can be used as instruments for the current first differences of the correspondent variable[16]. Note that sequential exogeneity simply implies that future (unanticipated) shocks to the dependent variable do not influence current levels of pre-determined regressors.

The estimator obtained following the procedure just sketched out is known as the Difference Generalized Method of Moment (D-GMM) estimator. However, in presence of persistent explanatory variables such as democracy in (3.53), Blundell and Bond (1998) show that past levels are weak instruments for the correspondent differenced variables, and this leads to a large estimation bias. To overcome this problem, they introduced the S-GMM estimator obtained by augmenting the first differenced equation with the level equation. The introduction of an additional moment condition[17] then ensures that the variable in levels can be instrumented by the lagged first differences of the corresponding explanatory variables.

The gain in consistency associated to the GMM estimator hinges upon the validity

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[15]This assumption requires that the idiosyncratic error term has mean zero conditional upon the current set of information and the unobserved effect.

[16]Under the above stated assumptions the following moment conditions hold $E[Z_{i,t-s}\Delta\epsilon_{i,t}] = 0$ for $t = 3, ..., T; s \geq 2$; where $Z_{i,t-s}$ is any predetermined variable.

[17]$E[\Delta Z_{i,t-s}(\eta_i + \epsilon_{i,t})] = 0$ for $t = 4, ..., T$.

of the moment conditions on which the estimation procedure is based. To make sure such moment conditions hold, this paper carries out two tests: first, exogeneity of instruments is checked by using the Hansen test of overidentifying restriction; second, the degree of serial correlation in the error term is inspected by testing the null hypothesis of zero second order correlation in the differenced error term ($\epsilon_{i,t} - \epsilon_{i,t-5}$), which corresponds to the hypothesis of zero first order correlation in $\epsilon_{i,t}$.

Following the literature[18], in the analysis the lagged dependent variable as well all the control variables of interest are considered predetermined and instrumented with internal instruments. One-period and further lags are used according to the specification[19].

3.2.2 Data and Descriptive Statistics

The baseline sample is an unbalanced panel of 122 countries spanning from 1980 to 2005 (dependent variable) with five-year lags. Information on the quality of political institutions is expressed using three different measures: the Political Right and the Civil Liberties indexes provided by Freedom House, and the Polity Composite Democracy Index, taken from the POLITY IV data set. The first two indicators are based on answers to a list of questions. For the former, such questions belong to three groups: electoral process, political pluralism and participation, and the functioning of government. In the case of the Civil Liberties Index the groups of questions are four: freedom of expression and belief, association and organization rights, rule of law and personal autonomy, and individual rights. Both indicators range from 1 to 7, where higher scores denote less democratic institutions.

The Polity composite democracy index is obtained by subtracting an autocracy from a democracy index, both ranging from 0 to 10. The resulting indicator ranges from -10 to 10, with higher values denoting most democratic institutions. It measures three key aspects of political institutions: the ability of political regimes to provide citizens with institutions through which they can choose their preferred political outcome, the presence of constraint on the power of the executive, and the degree of individuals' civil liberties. As in previous studies[20], I follow the transformation of these indexes in the range $[0, 1]$ proposed by Barro (1999), where 1 denotes the most-democratic institutions.

My main explanatory variables -*tertiary educated emigration rate* and *total emigration rate*- are taken from Defoort (2008). Using census data of the six main OECD host countries[21], the author constructs emigration stocks and rates by skill starting from 1975 until 2000 with five-year lags. Overall, almost 75% of the total South-

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[18]Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b), Castello-Climent (2008) and Bobba and Coviello (2006).

[19]Under each table, the note specify the number of lags used as instruments for the corresponding predetermined variables.

[20]Docquier et al. (2011), Spilimbergo (2009), Acemoglu et al. (2005b) and Castello-Climent (2008).

[21]USA, Canada, Australia, Germany, UK and France.

North immigration flows are monitored.

Income inequality is measured using the estimated household income inequality (EHII) index computed by Galbraith and Kum (2005)[22]. Such measure is derived from the econometric relationship between a measure of inter-sectoral pay inequality produced by the University of Texas Inequality Project and based on data published by the United Nation Industrial Development Organization, and the Gini coefficients proposed by Deininger and Squire (1996). The advantage of the EHII index lies in the fact that it offers a broader and more consistent coverage compared to other measures of inequality, which are often too sparse and not comparable across countries.

In order to measure resident human capital, I consider the share of tertiary educated workers over the total resident labor force aged 25 and older, whose source is Barro and Lee (2010). The Gini coefficient for education is constructed following the procedure outlined in Castello and Domenech (2002) on the basis of the data provided by Barro and Lee (2010). Investment share of GDP, real GDP per capita and population size are taken from the Penn World Tables Version 7.0 by Heston et al. (2011), while the source of the remaining control variables is the World Bank World Development Indicators 2011[23].

Table 3.3 presents summary statistics, while Table 3.4 and Table 3.5 show the sample coverage.

TABLE 3.3: Summary Statistics

	Obs.	Mean	Std.Dev	Min	Max
Political Rights	525	0.63	0.35	0	1
Civil Liberties	525	0.61	0.31	0	1
Polity	491	0.67	0.37	0	1
H Skill Emigration	461	0.16	0.19	0.01	0.85
Tot Emigration	461	0.04	0.07	0.01	0.33
Log Population	461	9.13	1.68	4.55	13.94
Income inequality	396	41.70	6.61	25.89	62.32
Education inequality	525	37.01	21.92	5.15	93.53
Tertiary Educated	525	6.36	5.76	0.08	31.95

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[22] If data in the sample years are not available, I use data on the year before (preferred) or the year after.

[23] In Appendix D.1, I discuss how different data sources are harmonized in order to ensure that changes in countries' borders do not affect the results.

TABLE 3.4: Years Covered in the Sample

Year	Observations	Frequency
1980	84	16.00
1985	94	17.90
1990	93	17.71
1995	92	17.52
2000	98	18.67
2005	64	12.19

TABLE 3.5: Countries in the Sample

Country	Obs.	Country	Obs.	Country	Obs.
Afghanistan	4	Greece	5	Pakistan	5
Albania	2	Guatemala	5	Panama	6
Algeria	5	Haiti	3	Papua New Guinea	4
Argentina	4	Honduras	5	Paraguay	1
Armenia	1	Hungary	6	Peru	3
Australia	6	Iceland	5	Philippines	5
Austria	6	India	6	Poland	6
Bangladesh	5	Indonesia	6	Portugal	6
Barbados	5	Iran	6	Qatar	4
Belgium	5	Iraq	4	Romania	3
Belize	1	Ireland	6	Russian Federation	2
Benin	2	Israel	6	Rwanda	3
Bolivia	6	Italy	6	Saudi Arabia	1
Botswana	4	Jamaica	4	Senegal	6
Brazil	2	Japan	6	Sierra Leone	1
Bulgaria	6	Jordan	6	Singapore	6
Burma (Myanmar)	3	Kenya	6	Slovak Republic	2
Burundi	4	Korea, Rep.	6	Slovenia	2
Cameroon	6	Kuwait	6	South Africa	6
Canada	6	Kyrgyzstan	2	Spain	6
Central African Republic	4	Latvia	1	Sri Lanka	5
Chile	6	Lesotho	1	Swaziland	5
China	2	Liberia	1	Sweden	6
Colombia	6	Libya	2	Syria	5
Congo, Rep. of the	2	Lithuania	2	Tanzania	6
Costa Rica	4	Luxembourg	6	Thailand	5
Cote d'Ivoire	3	Malawi	5	Togo	3
Croatia	2	Malaysia	6	Tonga	4
Cuba	3	Malta	6	Trinidad and Tobago	6
Cyprus	6	Mauritius	6	Tunisia	4
Denmark	5	Mexico	6	Turkey	6
Dominican Republic	3	Moldova	2	Uganda	4
Ecuador	6	Mongolia	2	Ukraine	1
Egypt	5	Morocco	6	United Arab Emirates	2
El Salvador	4	Mozambique	3	United Kingdom	6
Fiji	5	Namibia	1	United States	6
Finland	6	Nepal	3	Uruguay	6
France	5	Netherlands	6	Venezuela	5
Gabon	3	New Zealand	5	Zambia	4
Gambia, The	2	Nicaragua	3	Zimbabwe	5
Ghana	4	Norway	6	Total	525

3.2.3 Results

In order to study the impact of different types of emigration on institutional quality we start by focusing on regressions in which past levels of institutional quality and the lagged emigration rates of different skill groups are the only regressors. The later addition of other control variables helps us shed light on the mechanisms of transmission from emigration to quality of institutions. The estimation results obtained using the restricted set of explanatory variables are shown in the first four columns in

Table 3.6. In each column, we present the results of a different estimation technique, namely pooled OLS, fixed effects OLS, D-GMM and S-GMM.

It is interesting to note that each technique is affected by shortcomings when it comes to estimating such model. We know that in dynamic panel model OLS estimates are biased upward, while FE estimates are downward biased and inconsistent in panel data with small T and large N. In addition, in presence of persistent dependent variable, as it is the case for political institutions in this model, Blundell and Bond (1998) show that D-GMM estimates are biased downward[24]. For this reason we augment the difference equation with the equation in levels. However, the Hansen test suggests that the underlying moment conditions on which the estimation is based are not valid and that, therefore, the model is misspecified.

The conceptual framework developed in Section 3.1 provides us with a guide for the empirical analysis. As previously shown, the political outcome arising in equilibrium is the result of a specific configuration of parameters representing the opportunity-cost of revolution (μ^*) for the non-ruling class and of repression ($\hat{\kappa}, \tilde{\kappa}$) for the group in power (Proposition 3.1.12). We have also shown that the skill composition of the domestic labor force $\left(\frac{\delta}{\delta+h+l}, \frac{h}{\delta+h+l}, \frac{l}{\delta+h+l} \right)$ as well as the distribution of income ($\theta_r, \theta_h, \theta_l$) are key factors affecting such threshold values (Implications 3.1.1 to 3.1.11). In columns (5) and (6) of Table 3.6, we modify the empirical specification in order to incorporate the insights conveyed by the theoretical model.

We start by augmenting the set of the explanatory variables presented in column (5) with a measure of income inequality and the log of population size at origin. While the reason behind the inclusion of the former has already been discussed, we need to further motivate the inclusion of the latter.

In the empirical political economy literature, population size is commonly considered as a potential determinant of political institutions[25]. In countries with large populations, revolting groups are thought to have more difficulties in coordinating. However, for the same reason they are also less likely to be entirely controlled by the ruling class[26]. At the same time, country size also seems to influence emigration. In particular, the data show that small countries are more likely to experience high emigration rates. For this reason, as in Docquier et al. (2011) we believe that the exclusion of a variable measuring the size of a country would likely bias our estimation and then we always include population size in the regressions from now on.

It is not surprising to see that once we control for the level of inequality and the size of the country the model is no longer misspecified. These findings give empirical support to the prediction of the conceptual framework sketched out in the previous section. However, interestingly enough, despite making the model meaningful neither of the two additional variables turn out to be significant. On the contrary, the coefficient

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[24]This is due to the fact that in this case lagged levels are weak instruments for the corresponding differenced variables.

[25]For example Barro (1999), Acemoglu et al. (2005b) and Bobba and Coviello (2006).

[26]In terms of out theoretical framework, both the cost of revolution (μ) and that of repression (κ) are expected to be higher in countries with large populations.

on the lagged dependent variables is in the range of values found in previous studies and confirms the evidence according to which institutional quality changes slowly over time.

High skilled migration does not seem to play a role in shaping institutional quality. However, it is interesting to see that the coefficient on this variable is negative, even if not significant. Contrarily, total migration, which here is used as a proxy for emigration of less educated workers, enters the regression with a positive and significant coefficient[27]. One standard deviation increase in this type of emigration is expected to increase the long term value of the democracy index by 0.42[28]. The large magnitude of this effect suggests that the model is still imprecisely specified. For this reason, using again the theoretical framework as a guide, in column (6) we control for the skill composition of the population to proxy for the relative size of different social groups.

TABLE 3.6: Emigration of Different Skill Levels and Political Institutions: Main Regressions

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM
PRI_{t-5}	0.854***	0.370***	0.550***	0.736***	0.719***	0.664***
	(0.015)	(0.045)	(0.120)	(0.057)	(0.059)	(0.070)
$Highskill Emigration_{t-5}$	-0.078	-0.093	-0.297	-0.101	-0.283	-0.076
	(0.052)	(0.164)	(0.480)	(0.116)	(0.217)	(0.159)
$Total Emigration_{t-5}$	0.287**	0.338	0.085	0.389	1.692***	0.797
	(0.116)	(0.269)	(0.337)	(0.280)	(0.651)	(0.520)
$Log Pop_{t-5}$					0.033	0.021
					(0.032)	(0.018)
$EHII_{t-5}$					-0.006	-0.003
					(0.003)	(0.003)
$Educ.Gini_{t-5}$						-0.003***
						(0.001)
$Tertiary Educated_{t-5}$						0.002
						(0.002)
Observations	988	988	800	988	558	525
N. countries	188	188	188	188	137	122
N. instr.			32	48	76	104
AR(2) test			0.790	0.757	0.472	0.871
Hansen test			0.028	0.049	0.351	0.513
Diff. Hansen test				0.254	0.217	0.559

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (6), all the variables are considered pre-determined and instrumented for their own first two lags.

[27]The same pattern is found in Docquier et al. (2011).

[28]This effect is given by the formula $\frac{\beta_2}{1-\beta_0}$.

From the theory presented in the previous section, we know that the shares of the population belonging to different classes are potential determinants of political institutions through their impact on τ, μ^*, $\hat{\kappa}$, $\tilde{\kappa}$. Bearing this in mind, we want to test whether emigration of different skill groups have an impact on institutional quality once we keep the human capital structure of the population constant. In order to accomplish this goal we include two additional variables into the set of controls. The first is the share of total population aged 25 years and over with completed tertiary education. The second is the Gini index of education inequality proposed by Castello and Domenech (2002).

The share of tertiary educated in the population is used as a proxy for the size of the middle class. We supplement this measure with an index of education inequality to control for the size of the other education groups. The motivation behind the choice of this variable is twofold[29]. Firstly, non-ruling groups are likely to face lower coordination costs associated with revolution ($\mu^* \uparrow$) in societies with a more equal distribution of education. Similarly, a less polarized distribution of education could make repression a less viable channel for the groups in power ($\hat{\kappa} \downarrow, \tilde{\kappa} \downarrow$)[30]. Secondly, from an empirical point of view, Castello-Climent (2008) shows that the only aspect of education that matters for institutional quality is its distribution rather than its average level.

In column (6) we show the results of this exercise. The coefficients on both high and total emigration are not statistically significant once we hold constant income inequality and the structure of the population in terms of human capital. We interpret these results as suggesting that changes in the relative size of the middle class are the channels through which this variable affects the quality of domestic institutions[31].

As described in the previous section, the ruling group would be less likely to extend the franchise to the whole population when the median voter is a low skill agent $\left(\frac{l}{\delta+h+l} > 1/2 \right)$ because the redistribution demanded in democracy by this group is higher than that demanded by high skilled workers (Implication 3.1.3). The signs of the coefficients of interest (negative for high skill migration and positive for low skill migration, even if both not significant) seem to give further support to this hypothesis.

Once we have shed light on the relationship between skill composition of emigration and political institutions, we want to test whether these findings are driven by the misspecification of the empirical model. In particular, we want to check whether the

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[29]In unreported regression we use as control variables the share of the population with primary, secondary and tertiary education, respectively. The estimation results are not different from those reported in the paper.

[30]Glaeser et al. (2007) propose a model in which education by reducing information costs leads to better political institutions.

[31]One could be concerned that the emigration rates in column (6) are statistically not significant due to a problem of multicollinearity. However differently from what happens under multicollinearity, the aforementioned coefficients turn statistically not significant as a result of a reduction in their magnitude rather than of an increase in their standard errors.

results are driven by the omission of some relevant determinant of political institutions correlated to high and lower skill emigration rates. The results of this exercise are shown in Table 3.7.

Docquier et al. (2011) indicates exposure to democratic values as one of the channels through which emigration can impact domestic institutional quality. Three studies provide empirical evidence to this claim. Spilimbergo (2009) shows that countries with higher percentages of students acquiring education in democratic countries are more likely to be at a later stage of institutional development. Batista and Vicente (2010) find that in Cape Verde families exposed to migration in the US are more likely to demand for government accountability relative to those in which some members have been or still are in Portugal. Finally, Mahmoud et al. (2011) provides empirical evidence of a causal relationship between westward migration and the reduction of consensus for the Communist party in Moldova.

In order to test whether our findings are driven by the relationship between emigration, political institutions at origin and at destination we construct an index of democracy in the destination countries. As in Spilimbergo (2009), such index is equal to the weighted average of the democracy index in the host countries, the weights being the corresponding bilateral flows[32]. In column (1) of Table 3.7, we present the results of the estimation in which the new index of democracy in included among the explanatory variables. In line with the previously mentioned studies, democracy at destination seem to have an impact on domestic institutional quality, but there are not significant changes in the coefficients on the rest of the variables. It is also interesting to see that the impact of less skilled migration, as shown by the coefficient on total emigration, is halved even if still not significant.

In the next column we include the log of the GDP per capita. While there is a consensus in identifying different levels of economic development as one of the main factors behind international migration, there is still an open debate on whether economic prosperity is a *condicio sine qua non* for institutional development[33]. The new variable enters the regression with a non-significant coefficient and leaves the estimation unaltered.

The inclusion of the urbanization rate in column (3) is motivated by two reasons[34]. First, in countries with a more urban population it is easier for the non-ruling group to coordinate and mount a revolution ($\mu \downarrow$). However, at the same time urban masses are easier to control by the group in power ($\kappa \downarrow$). Second, rural areas are traditionally poorer and then more likely to experience high emigration rates. The inclusion of this variable results in an increase in the coefficient on lower skill emigration which nevertheless is still only marginally significant.

Next, we want to test whether the results are driven by the strong correlation be-

[32]Data on bilateral migration flows are taken from Ozden et al. (2011).

[33]A recent paper by Heid et al. (2011) find new empirical support for the modernization theory on which some doubts were casted by Acemoglu et al. (2009).

[34]Barro (1999) and Castello-Climent (2008) do not find a statistically significant effect of this variable on institutional quality.

TABLE 3.7: Emigration of Different Skill Levels and Political Institutions: Additional control variables

VARIABLES	(1) S-GMM	(2) S-GMM	(3) S-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM	(8) S-GMM
PRI_{t-5}	0.623***	0.672***	0.671***	0.688***	0.642***	0.683***	0.689***	0.650***
	(0.064)	(0.059)	(0.063)	(0.069)	(0.068)	(0.065)	(0.068)	(0.065)
$HighskillEmigration_{t-5}$	-0.154	-0.095	-0.009	-0.095	-0.083	-0.062	-0.105	-0.129
	(0.159)	(0.161)	(0.188)	(0.191)	(0.140)	(0.168)	(0.166)	(0.165)
$TotalEmigration_{t-5}$	0.412	0.701	0.924*	0.838	0.820*	0.767	0.714	0.608
	(0.521)	(0.487)	(0.482)	(0.569)	(0.474)	(0.524)	(0.542)	(0.558)
$LogPop_{t-5}$	0.007	0.020	0.033*	0.018	0.025**	0.026*	0.008	-0.001
	(0.016)	(0.017)	(0.020)	(0.015)	(0.012)	(0.016)	(0.014)	(0.015)
$EHII_{t-5}$	-0.003	-0.000	-0.002	-0.002	-0.003	-0.002	-0.003	-0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
$Educ.Gini_{t-5}$	-0.002**	-0.002*	-0.002*	-0.002***	-0.002*	-0.002**	-0.002**	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$TertiaryEducated_{t-5}$	-0.000	-0.001	-0.001	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.003)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
$PRIhost_{t-5}$	0.212**							
	(0.086)							
$GDPPC_{t-5}$		0.040						
		(0.028)						
$Urbanization_{t-5}$			0.002					
			(0.001)					
$Trade_{t-5}(\%GDP)$				-0.000				
				(0.000)				
$Inf.Mortality_{t-5}$					-0.000			
					(0.001)			
$LifeExpectancy_{t-5}$						0.001		
						(0.003)		
$FDI_{t-5}(\%GDP)$							0.000	
							(0.000)	
$GDPPCGrowth_{t-5}$								-0.004
								(0.003)
Observations	525	514	525	501	524	525	476	492
N. countries	122	119	122	119	122	122	119	117
N. instr.	118	118	118	118	118	118	118	118
AR(2) test	0.801	0.570	0.838	0.998	0.877	0.845	0.830	0.800
Hansen test	0.482	0.451	0.372	0.514	0.581	0.483	0.318	0.487
Diff. Hansen test	0.665	0.530	0.277	0.314	0.633	0.256	0.323	0.310

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first two lags.

tween the international movement of people (emigration) and the correspondent flows of good and services (trade) and of capital (FDI inflows). In particular, Rauch and Trindade (2002) show that migration networks foster trade by reducing information costs, while Javorcik et al. (2011) find that the inflow of US FDI is higher in countries with a high share of their population in the United States, the effect being stronger for tertiary educated migrants.

At the same time, the political economy literature indicates trade and FDI as possible determinants of institutional quality. Lopez-Cordova and Meissner (2005) provide evidence in support of a beneficial impact of trade on the institutional development, while Aidt and Albornoz (2011) propose a model highlighting various channels through which FDI could play a role in democratic transitions. When we include these variables as additional controls in columns (4) and (7) respectively, we do not see any change in our results.

The variables included in columns (5) and (6), namely infant mortality and life expectancy, captures two different aspects of a countries' standards of living. As it was the case for GDP per capita, these variables can be easily thought of as affecting both the migration decision and domestic institutional progress[35]. Total emigration turns only marginally significant when infant mortality is included in the set of regressors, while no change occurs when we consider life expectancy.

Finally in column (8) we want to account for two important facts related to economic growth. On the one hand, migration outflows traditionally reach a peak in times of domestic economic crises and slow down when the economy recovers. On the other hand, political changes are more likely to arise in times of economic crises[36]. Once again the results are unaltered when we add this additional control variable.

The estimations reported in Table 3.8 are carried out to address two possible concerns, i.e. instrument proliferation[37] and sample bias. For this reason, in the regressions reported in this table we limit the number of lags used as instruments to only the first one, and replicate the same estimation for three different samples of countries. In addition, given the importance of the *exposure to democracy* channel highlighted in the literature and discussed earlier, for each sample we also run the baseline regression with the *democracy-at-destination* index in the set of the explanatory variables.

In column (1) we consider the baseline sample and the restricted set of instruments. It is possible to see that the main findings of the paper are not affected by the number of instruments used. Once we control for the level of inequality and the skill composition of the population, we do not find a statistically significant effect of different skill types of emigration on institutional quality. In addition, when we add the *democracy*

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[35]Both Barro (1999) and Castello-Climent (2008) include these measures in their empirical exercises.

[36]In the language of our model, the revolution constraint is more likely to bind when countries experience a recession.

[37]Roodman (2007) shows that in S-GMM estimations instrument proliferation results in: (i) overfitting of the instrumented variables, and (ii) unreliable statistics for the Hansen test.

TABLE 3.8: Emigration of Different Skill Levels and Political Institutions: Alternative samples

VARIABLES	Baseline 1 lag	Baseline 1 lag	Developing 1 lag	Developing 1 lag	Non oil 1 lag	Non oil 1 lag
PRI_{t-5}	0.645***	0.572***	0.607***	0.571***	0.649***	0.610***
	(0.082)	(0.080)	(0.095)	(0.083)	(0.098)	(0.072)
$Highskill Emigration_{t-5}$	-0.140	-0.145	-0.100	-0.122	-0.092	-0.104
	(0.192)	(0.188)	(0.204)	(0.171)	(0.184)	(0.175)
$Total Emigration_{t-5}$	0.899	0.242	0.954	0.341	0.667	0.370
	(0.694)	(0.448)	(0.814)	(0.715)	(0.690)	(0.405)
$LogPop_{t-5}$	0.019	-0.004	0.021	0.003	0.031**	0.023
	(0.020)	(0.016)	(0.028)	(0.021)	(0.014)	(0.017)
$EHII_{t-5}$	-0.004	-0.006***	0.002	0.001	-0.006*	-0.007**
	(0.003)	(0.002)	(0.005)	(0.003)	(0.004)	(0.003)
$Educ.Gini_{t-5}$	-0.003***	-0.003***	-0.003**	-0.003**	-0.002**	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Tertiary Educated_{t-5}$	0.001	-0.000	-0.003	-0.007	-0.000	-0.000
	(0.002)	(0.003)	(0.007)	(0.008)	(0.003)	(0.003)
$PRIhost_{t-5}$		0.214*		0.152		0.169
		(0.118)		(0.143)		(0.112)
Observations	525	525	333	333	463	463
N. countries	122	122	85	85	109	109
N. instr.	76	86	76	86	76	86
AR(2) test	0.912	0.837	0.867	0.824	0.399	0.361
Hansen test	0.263	0.225	0.584	0.679	0.371	0.420
Diff. Hansen test	0.401	0.381	0.737	0.812	0.482	0.492

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first lag.

at destination index in column (2), we still see a large reduction of the coefficient on low-skill emigration.

In order to ensure that our results are not driven by the heterogeneous level of development of the countries in our sample, we restrict the analysis to developing countries[38]. The results in columns (3) and (4) show that our results hold even in this case. Finally, in the last two columns we exclude oil-exporting countries from the sample because of their peculiar democratization trajectories[39]. The same conclusions apply.

In the next two tables, we want to address another possible concern. The variable used so far to measure the quality of political institutions mainly focuses on rights and freedoms enjoyed by individuals, with a particular stress on political participa-

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[38]We use the World Bank classification as of 2010.

[39]We classify as oil-exporting countries all the economies whose fuel-based export over GDP is among the top 20 in the classification adopted by Ross (2001).

tion and government effectiveness. In order to test whether our results hinge upon the specific definition of political development chosen, in Table 3.9 and 3.10 we replace the Freedom House Political Rights Index with two different indicators of institutional development.

TABLE 3.9: Emigration of Different Skill Levels and Political Institutions. Dependent Variable: Polity IV Index

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM
$PolityIV_{t-5}$	0.846***	0.455***	0.769***	0.839***	0.810***	0.670***
	(0.018)	(0.050)	(0.104)	(0.064)	(0.055)	(0.058)
$Highskill Emigration_{t-5}$	-0.093	-0.065	-0.179	-0.192	-0.074	-0.024
	(0.066)	(0.210)	(0.312)	(0.127)	(0.131)	(0.145)
$Total Emigration_{t-5}$	0.360**	0.905	0.579	0.965**	1.230*	0.753
	(0.171)	(0.625)	(0.660)	(0.379)	(0.671)	(0.631)
$LogPop_{t-5}$					0.037	0.012
					(0.024)	(0.016)
$EHII_{t-5}$					-0.002	-0.001
					(0.003)	(0.002)
$Educ.Gini_{t-5}$						-0.003***
						(0.001)
$Tertiary Educated_{t-5}$						-0.001
						(0.003)
Observations	780	780	614	780	505	481
N. countries	156	156	156	156	126	115
N. instr.			32	48	76	104
AR(2) test			0.673	0.663	0.273	0.042
Hansen test			0.014	0.055	0.283	0.257
Diff. Hansen test				0.692	0.545	0.264

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (6), all the variables are considered pre-determined and instrumented for their own first two lags.

We start by using the Polity IV index as new dependent variable. Differently from the Political Right Index, the Polity IV measure shifts its focus from citizens to governments *per se*. In particular, political organizations are the center of the analysis and more emphasis is put on their institutional characteristics. Since institutional changes do not always translate into immediate changes in citizens' rights, we want to ensure that the analysis is not affected by this timing problem. The results in Table 3.9 show the same pattern as in the previous estimation. The model starts to be correctly specified only when we include income inequality among the regressors. In addition, the statistical significance of the coefficient on total emigration vanishes

when we hold constant the structure of the population[40].

TABLE 3.10: Emigration of Different Skill Levels and Political Institutions.
Dependent Variable: Civil Liberties Index (CLI)

VARIABLES	(1) OLS	(2) FE OLS	(3) D-GMM	(4) S-GMM	(5) S-GMM	(6) S-GMM	(7) S-GMM
CLI_{t-5}	0.876***	0.404***	0.527***	0.711***	0.781***	0.693***	0.657***
	(0.013)	(0.039)	(0.090)	(0.054)	(0.068)	(0.050)	(0.054)
$HighSkillEmigr._{t-5}$	-0.041	0.048	0.011	0.036	-0.150	-0.067	-0.187
	(0.040)	(0.110)	(0.253)	(0.093)	(0.165)	(0.134)	(0.120)
$TotalEmigr._{t-5}$	0.151	0.044	-0.391	0.014	1.540**	1.046**	0.522
	(0.098)	(0.219)	(0.250)	(0.242)	(0.704)	(0.448)	(0.385)
$LogPop_{t-5}$					0.033*	0.014	-0.001
					(0.020)	(0.011)	(0.012)
$EHII_{t-5}$					-0.004	-0.003	-0.003
					(0.003)	(0.002)	(0.003)
$Educ.Gini_{t-5}$						-0.002**	-0.003***
						(0.001)	(0.001)
$TertiaryEducated_{t-5}$						0.002	-0.002
						(0.002)	(0.002)
$CLIhost_{t-5}$							0.153*
							(0.086)
Observations	994	994	804	994	559	525	441
N. countries	190	190	189	190	137	122	122
N. instr.			32	48	76	104	107
AR(2) test			0.764	0.579	0.250	0.394	0.925
Hansen test			0.009	0.032	0.230	0.552	0.196
Diff. Hansen test				0.569	0.839	0.925	0.313

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. In columns (3) to (7), all the variables are considered pre-determined and instrumented for their own first two lags.

Finally, in Table 3.10 we use the Freedom House Civil Liberties Index as dependent variable. The dimension of institutional development object of analysis slightly changes when we use this indicator. Individual rights as well as the extent to which the rule of law is respected are the institutional features targeted by the Civil Liberties Index. Not surprisingly then, we can see that total emigration representing emigration of the lower skilled is still significant even when we control for income inequality and the human capital composition of the population. In order to find explanation for such evidence, in the last column of the table we add the *democracy-at-destination* index. Since individual freedoms are more likely to be recognized the more a country is exposed to foreign democratic values, we expect this inclusion to

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[40]Despite the results are in line with the previous regressions, doubts on the validity of this estimation are casted by the fact that we fail to reject the null hypothesis of order 2 serial correlation in the error term.

affect the coefficients on the emigration rates. The results in column (7) provide evidence supporting this hypothesis.

3.3 Conclusion

Despite the impacts of middle classes on democratic development and of emigration on sending societies are largely discussed in the economic literature, little work has been done to connect these two separate streams of research. The existing papers adopt an empirical approach to study the relationship between emigration and political institutions in home countries. However, so far no microfounded model has been proposed to analyze emigration, population structure and domestic institutional quality in a unifying framework.

In this paper, we propose a theoretical model, based on Acemoglu and Robinson (2006), to understand the channel of transmission from emigration to political transition. As shown by empirical and historical evidence, large and wealthy middle class are the main force behind political transition by virtue of their higher level of income and human capital relative to poor masses. In our theoretical framework, high and low-skilled migration affect institutional quality by altering the relative economic and political power of this pivotal group.

The contribution of the paper is also empirical. Using the newly-developed conceptual framework as a guide, we are able to correctly identify the empirical specification. When we do not control for the *middle-class-channel* we find that low-skilled emigration has a positive impact on institutional quality, while the effect of high-skilled migration is not statistically significant. However, when we hold constant the population structure and the distribution of income in the country, such effects disappear.

We also test whether workers migrating to democratic societies play a role in the political development of their own home countries. Interestingly enough we find that most of the effect of emigration on political institution is attributable to exposure to democratic values when we look at the extent to which individual freedoms are recognized. However the impact on the middle class is what drives changes in political rights and government effectiveness.

Appendices

Appendix to Chapter 1

A.1 Proof of Proposition 1.1.2

In Section 1.1.2.3 I have defined a *Markov perfect equilibrium* as a strategy combination denoted by $\{\tilde{\sigma}^r, \tilde{\sigma}^p\}$ such that $\tilde{\sigma}^r$ and $\tilde{\sigma}^p$ are mutually best responses for all S_t^s and S_t^p. The strategy of the elite σ^r consists of the actions $\{\omega, \phi, \tau^N\}$, while the strategy of the poor is denoted by σ^p and consists of the actions $\{\rho, \tau^D\}$. Recall that the initial political regime is autocracy.

Let us start with the proof of part 1, representing the situation in which the revolution constraint is not binding, i.e. $\theta \leq \mu$. It is possible to find the complete set of *Markov perfect equilibria* using backward induction. The timing of the game is such that the elite moves first and then the poor follow, therefore, I start by focusing on the action of the poor after the move of the elite $\{\omega, \phi, \tau^N\}$. Since, by construction, in this case the poor never find revolution convenient relative to autocracy, the unique best response for the poor in both states (L, A) and (H, A) is to choose $\tilde{\sigma}^p(S_t^p = \cdot, S_t^s = A | \omega = 0, \phi = 0, \tau^N = \cdot) = \{\rho = 0\}$. As a consequence, the unique best response for the elite is $\tilde{\sigma}^r(S_t^p = \cdot, S_t^s = A) = \{\omega = 0, \phi = 0, \tau^N = 0\}$, that is, the elite sets its optimal tax rate $\tau^N = 0$ under both social states.

To prove part 2, I focus on the case in which $\theta > \mu$. Now $\tilde{\sigma}^p(S_t^p = L, S_t^s = A | \omega = 0, \phi = 0, \tau^N = \cdot) = \{\rho = 0\}$ is still the unique best response whenever the state is (L, A), since in this case the cost of revolution is so high to discourage the poor from mounting a violent revolt ($\mu^L = 1$). As in the previous case, the elite's unique best response to this strategy is $\tilde{\sigma}^r(S_t^s = L, S_t^p = A) = \{\omega = 0, \phi = 0, \tau^N = 0\}$.

When the state is (H, A), the poor agents' unique optimal strategy depends on whether the elite can stop revolution by redistributing ($\mu \geq \mu^*$) or not ($\mu < \mu^*$). If $\mu \geq \mu^*$, there exists a tax rate τ^* such that if the elite sets $\hat{\tau} \geq \tau^*$ the poor will not revolt, while if $\hat{\tau} < \tau^*$ there will be a revolution. Recalling that the poor cannot move if the elite chooses to repress, the poor agents' unique optimal strategy in state (H, A) in this case is $\tilde{\sigma}^p(S_t^p = H, S_t^s = A | \omega = 0, \phi = 0, \tau^N = \hat{\tau}) = \{\rho = 0\}$ if $\{\omega = 0, \phi = 0, \hat{\tau} \geq \tau^*\}$,

or if $\{\omega = 0, \phi = 1\}$, while it is $\tilde{\sigma}^p(S_t^p = H, S_t^s = A | \omega = 0, \phi = 0, \tau^N = \hat{\tau}) = \{\rho = 1\}$ if $\{\omega = 0, \phi = 0, \hat{\tau} < \tau^*\}$. The optimality result follows from the definition of τ^* and from Assumption 1.1.1, according to which poor agents always prefer democracy to revolution. Now, the elite's unique best response depends on whether repression is relatively less costly than redistribution ($\kappa < \hat{\kappa}$) or not ($\kappa \geq \hat{\kappa}$). If $\kappa < \hat{\kappa}$ then the elite's unique best response is $\tilde{\sigma}^r(S_t^s = L, S_t^p = A) = \{\omega = 1, \phi = 0, \tau^N = 0\}$, while if $\kappa \geq \hat{\kappa}$, then $\tilde{\sigma}^r(S_t^s = L, S_t^p = A) = \{\omega = 0, \phi = 0, \tau^N = \tau^*\}$.

When $\mu < \mu^*$ in state (H, A) redistribution is not a viable channel for the elite to stop revolution. In this case, the poor agents' unique best response is $\tilde{\sigma}^p(S_t^s = H, S_t^p = A | \omega = 0, \phi = 0, \tau^N = \cdot) = \{\rho = 0\}$ if $\{\omega = 0, \phi = 1\}$, while it is $\tilde{\sigma}^p(S_t^s = H, S_t^p = A | \omega = 0, \phi = 0, \tau^N = \cdot) = \{\rho = 1\}$ if $\{\omega = 0, \phi = 0, \tau^N = \cdot\}$, because by construction redistribution never prevents revolution. Similarly to the previous case, the elite's unique best response depends on whether repression is relatively less costly ($\kappa < \tilde{\kappa}$) than the other political option (democratization in this case), or not ($\kappa \geq \tilde{\kappa}$). If $\kappa < \tilde{\kappa}$, then the elite's unique best response is $\tilde{\sigma}^r(S_t^s = L, S_t^p = A) = \{\omega = 1, \phi = 0\}$, while if $\kappa \geq \hat{\kappa}$, then $\tilde{\sigma}^r(S_t^s = L, S_t^p = A) = \{\omega = 0, \phi = 1\}$. In the last case, a political transition takes place, with the new political state being $S_t^p = D$. Since in democracy the median voter sets her preferred tax rate without any constraint, and afterward democracy establishes forever, the strategy of the poor after $\phi = 1$ will be $\tilde{\sigma}^p(S_t^s = \cdot, S_t^p = D) = \{\tau^D = \tau^p\}$ under both social states, where τ^p is the optimal tax rate for the members of the poor group. This completes the proof of Proposition 1.1.2.

A.2   Effect of Emigration on Equilibrium Political Regimes

Proposition A.2.1 *Suppose $\epsilon < \left(1 - \frac{\delta}{\theta}\right)$ and $\mu^*, \hat{\kappa}$ and $\tilde{\kappa}$ are defined as in (1.10), (1.11) and (1.12), respectively. Then:*

- $\frac{\partial \mu^*}{\partial \epsilon} > 0$

- $\frac{\partial \hat{\kappa}}{\partial \epsilon} < 0$

- $\frac{\partial \tilde{\kappa}}{\partial \epsilon} < 0$

Corollary A.2.2 *Propositions 1.1.2. and A.2.1 imply that emigration makes democracy more likely.*

A.3 Robustness test

TABLE A.1: Emigration and Political
Institutions: Same Number of
Observations

VARIABLES	(1) S-GMM	(2) S-GMM	(3) S-GMM
PRI_{t-5}	0.641***	0.678***	0.790***
	(0.068)	(0.080)	(0.062)
$LogPop_{t-5}$	0.029	0.027	0.088***
	(0.023)	(0.021)	(0.024)
$Educ.Gini_{t-5}$	-0.004***	-0.004***	
	(0.001)	(0.001)	
$EHII_{t-5}$	-0.004		
	(0.003)		
$Emigration_{t-5}$	0.212	0.555	1.618***
	(0.385)	(0.432)	(0.384)
Observations	525	525	525
N. countries	122	122	122
N. instr.	91	74	57
AR(2) test	0.869	0.643	0.591
Hansen test	0.228	0.230	0.306
Diff. Hansen test	0.175	0.398	0.412

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Wind-meijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial corre-lation. The sample is an unbalanced panel, spanning from 1980 to 2005 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instru-mented for their own first three lags.

TABLE A.2: Emigration and Political
Institutions: Alternative Emigration
Data

VARIABLES	(1) S-GMM	(2) S-GMM	(3) S-GMM
PRI_{t-5}	0.661***	0.829***	0.804***
	(0.072)	(0.049)	(0.066)
$LogPop_{t-5}$	0.023	0.012	0.075**
	(0.027)	(0.022)	(0.030)
$Educ.Gini_{t-5}$	-0.004***	-0.003**	
	(0.001)	(0.001)	
$EHII_{t-5}$	-0.004		
	(0.003)		
$Emigration_{t-5}$	0.339	-0.030	0.719**
	(0.336)	(0.286)	(0.321)
Observations	441	656	656
N. countries	122	141	141
N. instr.	81	64	48
AR(2) test	0.317	0.818	0.921
Hansen test	0.453	0.076	0.045
Diff. Hansen test	0.118	0.347	0.119

*** p<0.01, ** p<0.05, * p<0.1. Two-step robust, Wind-meijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial cor-relation. The sample is an unbalanced panel, spanning from 1980 to 2000 (dependent variable) with 5 years lags. All the variables are considered pre-determined and in-strumented for their own first three lags.

TABLE A.3: Emigration and Political Institutions: Alternative Emigration Data - Same Number of Observations

VARIABLES	(1) S-GMM	(2) S-GMM	(3) S-GMM
PRI_{t-5}	0.661***	0.719***	0.792***
	(0.072)	(0.071)	(0.081)
$LogPop_{t-5}$	0.023	0.035	0.152**
	(0.027)	(0.030)	(0.060)
$Educ.Gini_{t-5}$	-0.004***	-0.004***	
	(0.001)	(0.001)	
$EHII_{t-5}$	-0.004		
	(0.003)		
$Emigration_{t-5}$	0.339	0.492	1.740**
	(0.336)	(0.586)	(0.682)
Observations	441	441	441
N. countries	122	122	122
N. instr.	81	65	49
AR(2) test	0.317	0.724	0.781
Hansen test	0.453	0.312	0.477
Diff. Hansen test	0.118	0.243	0.387

*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Two-step robust, Windmeijer corrected standard errors clustered by country in parentheses. AR(2) is Arellano-Bond test for serial correlation. The sample is an unbalanced panel, spanning from 1980 to 2000 (dependent variable) with 5 years lags. All the variables are considered pre-determined and instrumented for their own first three lags.

B

Appendix to Chapter 2

B.1 Remittances used for investment

In this Appendix, I show the implication that remittances have for political institutions when they are fully invested. To make notation simple, we show such an effect in a static model, which corresponds to the dynamic version presented in the paper.

B.1.1 Economic Structure

Consider an economy populated by a continuum 1 of agents: a fraction δ is rich, while the remaining $1 - \delta$ is poor. Each rich agent owns $\frac{K}{\delta}$ units of capital, while poor agents own one unit of labor and $\frac{R}{1-\delta}$ units of capital. Note that R represents total remittances, which are equally distributed among members of the poor group.

The unique output good is produced from the following production function:

$$y = (K + R)^{\theta}(1 - \delta)^{1-\theta} \tag{B.1}$$

Given that all markets are competitive, factors are paid their marginal product. Therefore, setting the price of output equal to one, we can write:

$$w = (1 - \theta)(K + R)^{\theta}(1 - \delta)^{-\theta} \tag{B.2}$$

and

$$r = \theta(K + R)^{\theta-1}(1 - \delta)^{1-\theta}. \tag{B.3}$$

From these expressions we can see that w increases when remittances are positive, while r decreases.

Since the income of the rich is given by

$$y^r = \frac{rK}{\delta} = \frac{\theta}{\delta}\frac{K}{K+R}y \tag{B.4}$$

we can conclude that remittances make the rich agents poorer (K and δ do not change, while the interest rate is now lower). The opposite is true for the poor, whose income is given by:

$$y^p = \frac{wN}{1-\delta} + \frac{rR}{1-\delta} = \frac{1-\theta}{1-\delta}y + \frac{\theta}{1-\delta}\frac{R}{K+R}y \tag{B.5}$$

The first condition we can derive from (B.4) and (B.5) follows from the inequality $y^r > y^p$. This implies $\theta > \delta\frac{K+R}{K}$, meaning that when remittances are positive, in order for the rich group to be such, the fraction of income (θ) accruing to capital ($K+R$) owners, has to be larger than when remittance inflows are equal to zero.

B.1.2 Political Structure

Political institutions are identified by the redistribution policy they adopt. There are two instruments to accomplish these duties: a positive tax rate τ proportional to income and a lump-sum transfer T, given by:

$$T = \delta\tau y^r + (1-\delta)\tau y^p - c(\tau)y = (\tau - c(\tau))y \tag{B.6}$$

where $c(\tau)$ represents a distortion associated to taxation, where $c(\cdot)$ is a twice continuously differentiable function with: i.) $c(0) = 0$, ii.) $c'(\cdot) > 0$, iii.) $c''(\cdot) > 0$ and iv.) $c'(0) = 0$, v.) $c'(1) = 1$[1].

Poor citizens choose their preferred tax rate in democracy, so as to maximize their after-tax income given by $(1-\tau)y^p + (\tau - c(\tau))y$. By imposing the first order conditions, we obtain the following:

$$\frac{y^p}{y} = 1 - c'(\tau^p) \Rightarrow \frac{1-\theta}{1-\delta} + \frac{\theta}{1-\delta}\frac{R}{K+R} = 1 - c'(\tau^p) \tag{B.7}$$

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[1]Imposing these conditions implies that there is no distortion when the tax rate is zero (i.), distortions are increasing (ii.) and strictly convex (iii.) in τ, marginal distortions are small for low level of τ (iv.) and large for high levels of the tax rate (v.).

Since the second term on the left hand side in (B.7) is positive as long as $R > 0$, we can conclude that when there are positive remittances the preferred tax rate of the citizens in democracy is lower than when $R = 0$.

Now we focus on the different payoffs that the two groups get under different political regimes. In revolution citizens obtain:

$$\frac{1-\mu}{1-\delta}y \tag{B.8}$$

Whenever (B.8) is higher than the income of the poor, then this group will find it convenient to revolt rather than to accept the political status quo in which the elite is in power without taking any action. It is possible to define the revolution constraint imposing (B.8) > (B.5). This leads to the condition:

$$\theta > \mu\frac{K+R}{K} \tag{B.9}$$

Condition (B.9) tells us that the revolution constraint binds less often when $R > 0$, because in this situation the poor agents are relatively richer, given that they control more resources (labor and capital). For this reason they are more likely to accept the status quo.

Now let's consider the payoff of redistribution, assuming that the rich set the highest distribution they can, that is, they set $\tau = \tau^p$. Denoting by p the probability that the elite sticks to its promise, the resulting return ($i = r, p$) will be:

$$y^i + p(\tau^p(y - y^i) - c(\tau^p)y) \tag{B.10}$$

Setting (B.10) equal to the return of revolution given in (B.8), it is possible to define the value of μ for which the poor will be indifferent between accepting concessions and revolting:

$$\mu^* = \theta\frac{K}{K+R} - (1-\delta)\,p[\tau^p c'(\tau^p) - c(\tau^p)] \tag{B.11}$$

If $\mu < \mu^*$ people will revolt. Contrarily, when $\mu \geq \mu^*$ they will accept redistribution. Notice that the higher μ^*, the more likely is that people will revolt. When $R > 0$, the effect on (B.11) is twofold: there is a direct effect that can be seen in the first term on the right hand side, and an indirect effect through a reduction in taxes. Both the first and the second term on the right-hand side will decrease, therefore the overall

effect on μ^* is ambiguous *a priori*. The reason is simple: both payoffs are lower when remittances are positive. On the one hand, citizens control more resources, so they will have less to expropriate when revolution takes place; on the other hand, the redistribution they will get is lower as well, because now they are richer, given that they have an additional source of income.

The payoff of repression for the two groups is instead given by:

$$(1 - \kappa)y^i \tag{B.12}$$

therefore setting (B.12) equal to (B.10) for the rich, with $\hat{\tau}$ instead of τ^p, we get the cost of repression which makes the elite indifferent between repressing and redistributing:

$$\hat{\kappa} = \frac{p}{\theta}\left[c(\hat{\tau})\delta\left(\frac{K+R}{K}\right) - \hat{\tau}\left(\delta\left(\frac{K+R}{K}\right) - \theta\right)\right]. \tag{B.13}$$

From (B.13) we can see that $\hat{\kappa}$ decreases when $R > 0$, meaning that the elite will prefer more often redistribution to repression because redistribution now takes place at a lower tax rate, while after repression the same fraction κ of resources is destroyed.

Finally we define the payoff from democracy:

$$y^i + \tau^p(y - y^i) - c(\tau^p)y \tag{B.14}$$

and equalizing this to (B.12) for the rich, we get the cost of repression which makes the elite indifferent between repressing and democratizing:

$$\tilde{\kappa} = \frac{1}{\theta}\left[c(\tau^p)\delta\left(\frac{K+R}{K}\right) - \tau^p\left(\delta\left(\frac{K+R}{K}\right) - \theta\right)\right] \tag{B.15}$$

which, again, is lower when $R > 0$, for the same reason explained above. As a result, democracy will be more often preferred to repression.

To sum up we have the following changes when we introduce remittances:

1. The poor will be less willing to mount a revolution to overthrow the elite ($\theta > \delta\frac{K+R}{K}$).

2. It is not clear if the poor will accept more often redistribution or democracy (μ^*)

3. The elite will prefer more often redistribution rather than repression ($\hat{\kappa}$)

4. The elite will prefer more often democracy rather than repression ($\tilde{\kappa}$)

As a result, remittances change the distribution of resources in the economy, so as to make the interests of the two groups closer. For this reason, both groups will have a decreased interest in recurring to violent solutions. On the one hand, democracy will be more likely because the elite will choose to repress less often; on the other hand, the poor will less willing to voice and then trigger a democratic transition.

Appendix to Chapter 3

C.1 Proof of Proposition 3.1.1

In Section 3.1.2.3, I have defined a *subgame perfect equilibrium* as a strategy combination denoted by $\{\tilde{\sigma}^r, \tilde{\sigma}^h, \tilde{\sigma}^l\}$ such that $\tilde{\sigma}^r, \tilde{\sigma}^h$ and $\tilde{\sigma}^l$ are mutually best responses. The strategy of the elite σ^r consists of the actions $\{\omega, \psi, \phi, \tau^N, \bar{\tau}^N\}$, while the strategy of the middle class and of the poor are denoted by σ^h and σ^l respectively and consists of the actions $\{\rho^i, \tau^{PD}\}$ for the middle class and $\{\rho^i, \tau^D\}$ for the poor, with $i = h, l$.

Let us start with the proof of part 1, representing the situation in which the revolution constraint is not binding. It is possible to find the complete set of *subgame perfect equilibria* using backward induction. The timing of the game is such that the elite moves first and then the opponents follow, therefore, I start by focusing on the action of the opponents after the move of the elite $\{\omega, \psi, \phi, \tau^N, \bar{\tau}^N\}$. Since, by construction, in this case neither the middle class or the poor find revolution convenient relative to autocracy, the unique best response for both groups is to choose $\tilde{\sigma}^i(\omega = 0, \psi = 0, \phi = 0, \tau^N = \cdot) = \{\rho = 0\}$. As a consequence, the unique best response for the elite is $\tilde{\sigma}^r = \{\omega = 0, \psi = 0, \phi = 0, \tau^N = 0\}$, that is, the elite sets its optimal tax rate $\tau^N = 0$.

To prove part 2, I focus on the case in which the revolution constraint is binding, i.e. condition (3.31) holds. The opponents' unique optimal strategy depends on whether the elite can stop revolution by redistributing ($\mu \geq \mu^*$) or not ($\mu < \mu^*$). If $\mu \geq \mu^*$, there exists a tax rate τ^* such that if the elite sets $\hat{\tau} \geq \tau^*$ the middle class will not revolt, while if $\hat{\tau} < \tau^*$ there will be a revolution (the poor is assumed to always revolt). Recalling that the opponents cannot move if the elite chooses to repress, the middle class agents' unique optimal strategy is $\tilde{\sigma}^h(\omega = 0, \psi = 0, \phi = 0, \tau^N = \hat{\tau}) = \{\rho^h = 0\}$ if $\{\omega = 0, \psi = 0, \phi = 0, \hat{\tau} \geq \tau^*\}$, while it is $\tilde{\sigma}^h(\omega = 0, \phi = 0, \tau^N = \hat{\tau}) = \{\rho^h = 1\}$ if $\{\omega = 0, \phi = 0, \hat{\tau} < \tau^*\}$. At this we introduce nature as an additional player in order to model the commitment problem of the elite. If nature chooses $v = 1$, the elite gets to reset the tax rate to $\tau^r = 0$, while if $v = 0$ the elite sticks to its promise. The optimality

result follows from the definition of τ^*. Now, the elite's unique best response depends on whether repression is relatively less costly than redistribution ($\kappa < \hat{\kappa}$) or not ($\kappa \geq \hat{\kappa}$). If $\kappa < \hat{\kappa}$ then the elite's unique best response is $\tilde{\sigma}^r = \{\omega = 1, \phi = 0, \tau^N = 0\}$, while if $\kappa \geq \hat{\kappa}$, then $\tilde{\sigma}^r = \{\omega = 0, \phi = 0, \tau^N = \tau^*\}$.

When $\mu < \mu^*$ redistribution is not a viable channel for the elite to stop revolution. Following the fact that for the elite is sufficient to convince the middle class not to revolt to prevent revolution, the extension of the franchise to the whole population, i.e. $\phi = 1$ will never be considered as an option. In this case, the middle class agents' unique best response is $\tilde{\sigma}^h(\omega = 0, \psi = 1, \phi = 0, \tau^N = \cdot) = \{\rho^h = 0\}$ if $\{\omega = 0, \psi = 1\}$ and condition (3.44) holds. Contrarily, we have $\tilde{\sigma}^h(\omega = 0, \psi = 0, \phi = 0, \tau^N = \cdot) = \{\rho^h = 1\}$ if condition (3.44) does not hold, irrespective of the action of the elite. The results follow from the fact that in this case by construction democratization does not prevent revolution.

The elite's unique best response depends on whether repression is relatively costly ($\kappa < \tilde{\kappa}\left(\tau^{PD}\right)$) compared to the other political option (partial democratization in this case) and on whether partial democracy is enough to prevent revolution, i.e. condition (3.44) holds.

If $\kappa < \tilde{\kappa}\left(\tau^{PD}\right)$, then the elite's unique best response is $\tilde{\sigma}^r = \{\omega = 1, \psi = 0, \phi = 0\}$, while if $\kappa \geq \hat{\kappa}\left(\tau^{PD}\right)$, then $\tilde{\sigma}^r = \{\omega = 0, \psi = 1, \phi = 0\}$. In the last case, the franchise is extended to the middle class. If $\frac{l}{\delta+h+l} < 1/2$, then the median voter under partial democracy corresponds to the median voter under full democracy, and therefore there is no difference between the two political regimes. As a result, in either cases the middle class median voter sets her preferred tax rate without any constraint, i.e. the strategy of the middle class after $\psi = 1$ will be $\tilde{\sigma}^h = \{\tau^{PD} = \tau^h\}$, where τ^h is the optimal tax rate for the members of the skilled middle class.

To completes the proof of Proposition 3.1.1 we also need to notice that whenever condition (3.44) does not hold the dominant strategy for the elite is $\tilde{\sigma}^r = \{\omega = 1, \psi = 0, \phi = 0\}$, i.e. repression is the only way to avoid being overthrown by a violent revolution mounted by the opponents.

C.2   Alternative Specification of the Production Function

Consider the economy described in Section 3.1.1. Following Docquier et al. (2010), the unique output good is now produced combining capital (K) and labor (N) according to the following technology:

$$Y = K^\theta N^{1-\theta} \tag{C.1}$$

Capital is assumed to be perfectly mobile across countries, each of which is too small

to have an impact on the global capital markets. As a result, the return to capital are the same across the world. The following condition denotes the international net rate of return to capital:

$$R^* = \theta K^{\theta-1} N^{1-\theta} = \theta \frac{Y}{K} \tag{C.2}$$

Defining the constant A as

$$A = \left(\frac{\theta}{R^*}\right)^{\frac{\theta}{1-\theta}}$$

we can rewrite the production function as:

$$Y = AN \tag{C.3}$$

Labor in efficiency unit is a nested CES function of highly educated (N_h) and low educated workers (N_l):

$$N = \left[\alpha N_h^{\frac{\sigma-1}{\sigma}} + (1-\alpha)N_l^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}} \tag{C.4}$$

where α is the relative productivity level of highly educated workers, while σ is the elasticity of substitution between the two types of workers. The distribution of endowments implies $N_h = h$ and $N_l = l$.

It is not surprising to see that an increase in either types of labor results in an increase in total labor in efficiency unit, i.e.:

$$\frac{\partial N}{\partial h} = \alpha \left(\frac{N}{h}\right)^{\frac{1}{\sigma}} > 0 \tag{C.5}$$

and

$$\frac{\partial N}{\partial l} = (1-\alpha)\left(\frac{N}{l}\right)^{\frac{1}{\sigma}} > 0 \tag{C.6}$$

It is possible to derive the wage rate for the two types of workers by substituting the expression for N as given in (C.4) into the production function shown in (C.3) and

then taking derivative with respect to quantity of labor.

$$w_h = \frac{\partial Y}{\partial h} = A\alpha\left(\frac{N}{h}\right)^{\frac{1}{\sigma}} > 0 \tag{C.7}$$

and

$$w_l = \frac{\partial Y}{\partial l} = A(1-\alpha)\left(\frac{N}{l}\right)^{\frac{1}{\sigma}} > 0 \tag{C.8}$$

The shares of national income accruing to the three groups can be the written as:

$$s_K = \frac{R^*K}{Y} = \theta \tag{C.9}$$

$$s_h = \frac{w_h h}{Y} = \alpha\left(\frac{N}{h}\right)^{\frac{1-\sigma}{\sigma}} = \theta_h \tag{C.10}$$

$$s_l = \frac{w_l l}{Y} = (1-\alpha)\left(\frac{N}{l}\right)^{\frac{1-\sigma}{\sigma}} = \theta_l \tag{C.11}$$

From the fact that $\theta_h + \theta_l + \theta = 1$ and since θ does not vary, $\theta_h + \theta_l = 1 - \theta$ will be constant, too.

Let us now analyze the comparative statics of wages with respect to emigration of members of the two groups. For high skilled wages we have:

$$\frac{\partial w_h}{\partial h} = \frac{1}{\sigma}A\alpha\left(\frac{N}{h}\right)^{\frac{1-\sigma}{\sigma}}\left(\frac{h\alpha\left(\frac{N}{h}\right)^{\frac{1}{\sigma}} - N}{h^2}\right) = \frac{1}{\sigma}A\theta_h N\frac{\theta_h - 1}{h^2} < 0 \tag{C.12}$$

$$\frac{\partial w_h}{\partial l} = \frac{1}{\sigma}A\frac{\theta_h}{h}(1-\alpha)\left(\frac{N}{l}\right)^{\frac{1}{\sigma}} > 0 \tag{C.13}$$

Again, not surprisingly the wage of the highly skilled workers goes up as a result of high skilled migration and down as a result of low skilled migration.

Similarly, for low-skilled labor we have:

$$\frac{\partial w_l}{\partial h} = \frac{1}{\sigma} A \frac{\theta_l}{l} \alpha \left(\frac{N}{h}\right)^{\frac{1}{\sigma}} > 0 \tag{C.14}$$

$$\frac{\partial w_l}{\partial l} = \frac{1}{\sigma} A \theta_l N \frac{\theta_l - 1}{l^2} < 0 \tag{C.15}$$

Now we want to use equation (C.3) to rewrite wages in the following way:

$$w_h = \frac{\alpha}{h} \left(\frac{N}{h}\right)^{\frac{1-\sigma}{\sigma}} Y = \frac{\theta_h}{h} Y \tag{C.16}$$

$$w_l = \frac{(1-\alpha)}{l} \left(\frac{N}{l}\right)^{\frac{1-\sigma}{\sigma}} Y = \frac{\theta_l}{l} Y \tag{C.17}$$

From the expressions above we can see that the shares of income accruing to high skilled and low skilled workers play an important role in determining the wage levels of such groups.

For this reason we want to have a closer look and check the comparative statics with respect to emigration. Recalling that $\theta_h = \alpha \left(\frac{N}{h}\right)^{\frac{1-\sigma}{\sigma}}$, we have:

$$\frac{\partial \theta_h}{\partial h} = \frac{1-\sigma}{\sigma} \alpha \left(\frac{N}{h}\right)^{\frac{1-2\sigma}{\sigma}} \left(\frac{h\alpha\left(\frac{N}{h}\right)^{\frac{1}{\sigma}} - N}{h^2}\right) = \frac{1-\sigma}{\sigma} \frac{\theta_h}{h} (\theta_h - 1) \tag{C.18}$$

Notice that this derivative is positive when the two types of labor are substitute ($\sigma > 1$) and negative when they are complements ($\sigma < 1$). As suggested by Docquier et al. (2010), we assume $1.3 \leq \sigma \leq 2$. As a consequence, high skilled emigration ($h \downarrow$) implies a decrease in the share of total income owned by high skilled workers ($\theta_h \downarrow$).

With respect to low skilled labor we have:

$$\frac{\partial \theta_h}{\partial l} = \frac{1-\sigma}{\sigma} \alpha N^{\frac{1-2\sigma}{\sigma}} h^{\frac{\sigma-1}{\sigma}} (1-\alpha) \left(\frac{N}{l}\right)^{\frac{1}{\sigma}} = \frac{1-\sigma}{\sigma} \frac{\theta_l}{l} \theta_h. \tag{C.19}$$

When the two types of labor are substitute this derivative is negative, while it is

positive when they are complements. As a result low-skilled emigration ($l \downarrow$) implies an increase in θ_h, for σ in the range of values we consider.

Now we turn our attention on $\theta_l = (1-\alpha)\left(\frac{N}{l}\right)^{\frac{1-\sigma}{\sigma}}$. We have the following comparative statics:

$$\frac{\partial \theta_l}{\partial l} = \frac{1-\sigma}{\sigma}(1-\alpha)\left(\frac{N}{l}\right)^{\frac{1-2\sigma}{\sigma}}\left(\frac{l(1-\alpha)\left(\frac{N}{l}\right)^{\frac{1}{\sigma}} - N}{l^2}\right) = \frac{1-\sigma}{\sigma}\frac{\theta_l}{l}(\theta_l - 1) \qquad \text{(C.20)}$$

If $\sigma > 1$, then $\frac{\partial \theta_l}{\partial l} > 0$, while the opposite is true when $\sigma < 1$. This implies that low skilled emigration ($l \downarrow$) depresses the share of income owned by the low skilled ($\theta_l \downarrow$) when $1.3 \le \sigma \le 2$.

Finally we have:

$$\frac{\partial \theta_l}{\partial h} = \frac{1-\sigma}{\sigma}(1-\alpha)N^{\frac{1-2\sigma}{\sigma}}l^{\frac{\sigma-1}{\sigma}}\alpha\left(\frac{N}{h}\right)^{\frac{1}{\sigma}} = \frac{1-\sigma}{\sigma}\frac{\theta_h}{h}\theta_l \qquad \text{(C.21)}$$

which is negative when the two factors are substitute ($\sigma > 1$) and positive when they are complements $\sigma < 1$, meaning that high skilled emigration increases the income share of low skilled workers (we focus on $1.3 \le \sigma \le 2$).

The domestic incomes earned by the members of the three different groups are still given by (3.13), (3.14) and (3.15), and inequalities (3.16), (3.17) and (3.18) still hold. As in Section 3.1.1, agents will choose her optimal tax rate in order to maximize the expression in (3.21), which implies the following first order condition:

$$\frac{\theta_h}{\frac{h}{\delta+h+l}} = 1 - c'(\tau^h)$$

By using the implicit function theorem it is possible to learn how a change in h affects τ^h. Define:

$$F(\theta, \delta, \tau^h) = 1 - \frac{\theta_h}{\frac{h}{\delta+h+l}} - c'(\tau^h) = 0. \qquad \text{(C.22)}$$

The derivative of τ^h with respect to h will then be given by $\frac{\partial \tau^h}{\partial h} = -\frac{F_h}{F_{\tau^h}}$. Let us

calculate these derivatives:

$$F_h = -\frac{\theta_h}{\sigma h^2}\left[\sigma h - 1 + \theta_h(1 - \sigma)\right] \tag{C.23}$$

Notice that this derivative is positive in our range of interest, i.e. when $1.3 \leq \sigma \leq 2$, due to the fact that $\frac{h}{\delta + h + l} < 1/2$. This means that for a limited amount of substitution between labor types the effect of an increase (decrease) of h on $\frac{h}{\delta + h + l}$ is stronger in magnitude compared to the corresponding effect on θ_h. Therefore, emigration will have the following effect $\frac{\theta_h}{\frac{h}{\delta + h + l}} \uparrow$.

As for the derivative at denominator, we have:

$$F_{\tau^h} = -c''\left(\tau^h\right) \tag{C.24}$$

which simply reflects the concavity of the utility function. As a result we have:

$$\frac{\partial \tau^h}{\partial h} = -\frac{\theta_h\left[\sigma h - 1 + \theta_h(1 - \sigma)\right]}{\sigma h^2 c''\left(\tau^h\right)} \tag{C.25}$$

Expression (C.25) is positive when we consider the elasticity of substitution suggested in the literature i.e., $1.3 \leq \sigma \leq 2$, meaning that high skilled migration has a negative effect on the optimal tax rate set in democracy by an agent of type $i = h$[1]. The reason for that is simple: high-skilled emigration induces an increase in the fraction of total income owned by each single high skilled agent who remains in the country and this reduces their need for redistribution.

Following the same steps, it is possible to show that:

$$\frac{\partial \tau^h}{\partial l} = -\frac{\theta_h\left[\sigma l + \theta_l(1 - \sigma)\right]}{\sigma h l c''\left(\tau^h\right)} \tag{C.26}$$

This derivative is negative irrespective of the value taken by σ. Indeed, when $\sigma < 1$ as result of low skilled emigration the numerator of $\frac{\theta_h}{\frac{h}{\delta + h + l}}$ goes down while the denominator goes up, implying a decrease of the fraction. When $\sigma > 1$ low skilled migration implies an increase in both numerator and denominator, which however leads again to an overall decrease of the fraction. This implies that a reduction in l is always associated with an increase in τ^h. Notice that contrarily to what happens when we look at the comparative statics with respect to h, here the effect does not

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[1]When $\sigma < 1$ the sign of the derivative will also depend on h and θ_h

depend on the value of σ, because the denominator of the fraction $\frac{\theta_h}{\frac{h}{\delta+h+l}}$ goes up faster as a result of a reduction in l rather than of h.

Appendix D

Data Appendix

D.1 Changes in Countries' Borders and Names in Different Sources of Data

TABLE D.1: Countries' borders and names over time

Country	Changes in borders/name
Bangladesh	Independent in 1971. It used to be a provincial state of Pakistan, known as East Pakistan.
Czech Republic	Independent in 1993, after the dissolution of Czechoslovakia.
Dem. Rep. of Congo	Known also as Congo-Kinshasa, from 1971 to 1997 it was named Zaire under Mobutu Sese Seko's regime.
Eritrea	Ethiopian province from 1952, it declared its independence in 1993.
Ethiopia	It included Eritrea from 1952 to 1993.
Germany	From 1949 to 1990 was split into East and West Germany.
Hong Kong	In 1997 it experienced a transfer of sovereignty from United Kingdom to China, becoming the first Chinese Special Administrative Region.
Macao	In 1999 it experienced a transfer of sovereignty from Portugal to China, becoming the second Chinese Special Administrative Region.
Pakistan	In included Bangladesh until 1971.
Republic of the Congo	Independent from France in 1960, it is also known as Congo or Congo-Brazzaville.
Republic of Yemen	From 1990 it merges North Yemen (Yemen Arab Republic, 1962-1990) and South Yemen (People's Democratic Republic of Yemen, 1969-1990).
Russian Federation	One of the 15 independent states (the others are Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) formed after the dissolution of the Soviet Union in 1991.
Serbia and Montenegro	From 1992 to 2003 was known as Federal Republic of Yugoslavia. In 2003 it became a political union called Serbia and Montenegro. Before 1992, this country together with Bosnia and Herzegovina, Croatia, Macedonia, and Slovenia formed the Socialist Federal Republic of Yugoslavia. From 2006 Serbia and Montenegro are two independent countries.
Slovak Republic	Independent in 1993, after the dissolution of Czechoslovakia.
Timor-Leste	Indonesian province from 1976, it attained independence in 2002.
Vietnam	From 1976 it merges North Vietnam (Democratic Republic of Vietnam, 1954-1976) and South Vietnam (State of Vietnam, 1949-55; the Republic of Vietnam, 1955-1975).

In this Appendix, I discuss the main changes in countries' borders and names that took place during the years included in our sample, i.e. from 1975 to 2005. Also, a description of how I treat data from different sources in order to make sure that the definitions used are homogeneous and then comparable within my dataset is

provided.

Column 1 in Table D.1 shows the name of the country in the most recent year in the sample, i.e. 2005, while in column 2, I describe the evolution of borders/name. The main source of data of this study are: Freedom House for the Political Rights and Civil Liberties Indexes, Penn World Tables Version 7.0 for investment share of GDP, population size and real GDP per capita, Defoort (2008) for emigration rates, Barro and Lee (2010) for education, Galbraith and Kum (2005) for Estimated Household Income Inequality and the World Bank World Development Indicators 2011 for other control variables. Table D.2 shows the starting year covered by each of these data sources for the countries listed in Table D.1.

TABLE D.2: Countries' Coverage According to Different Sources

Country	FH	PWT	Defoort (2008)	BL (2010)	Galbraith and Kum (2005)	WDI
Bangladesh	1975	1975	1975	1975	1975-1995	1975
Czech Republic	1995	1975*	1995	1975	n/a	1995
Dem. Rep. of Congo	1975	1975	1975	1975	n/a	1975
Eritrea	1995	1975*	1995	n/a	1975	1985*
Ethiopia	1995	1975*	1975*	n/a	1990*	1985*
Germany	1990	1975*	1975*	1975*	n/a	1975*
Hong Kong	n/a	1975	1975	1975	1975	1975
Macao	n/a	1975	1975	1975	1980	1985
Pakistan	1975	1975	1975	1975	1975	1975
Republic of the Congo	1975	1975	1975	1975	1970,1980,1985	1975
Republic of Yemen	1990	1975*	1975*	1975*	n/a	1990
Russian Federation	1995	1975*	1995	1975*	1975*	1995
Serbia and Montenegro	2005	n/a	n/a	n/a	n/a	n/a
Slovak Republic	1995	1975*	1995	1975*	1990*	1995
Timor-Leste	2000*	1975*	1975*	n/a	n/a	2000*
Vietnam	1980	1975*	1975*	1975*	n/a	1985

The asterisk denotes whether the year covered by a certain data source precedes the creation of the corresponding country. In that case, it is necessary to check what borders are considered. For example, in the second row we can see that there is an asterisk for Czech Republic when PWT data are considered. This is to indicate that in year 1975 Czech Republic did not exist, therefore it is important to understand what are the borders that PWT takes into account when it refers to Czech Republic.

A country will enter the sample only if in the corresponding raw there are not missing data (n/a). According to this criterion the country we need to focus our attention on are: Bangladesh, Pakistan, Republic of Congo, Russian Federation and Slovak Republic. The first three do not have asterisks in their rows, which means that the data are not affected by changes of borders. However the Republic of Congo is named *Congo* in Galbraith and Kum (2005), so I need to take this into account.

Russian Federation has asterisks in the cells corresponding to PWT, Barro and Lee (2010) and Galbraith and Kum (2005). The first two sources report data based on borders in 2005, therefore, they do not represent a problem. Contrarily, Galbraith and Kum (2005) treat USSR and Russia as a single country. To overcome this problem I will consider only data starting from the first available year in the dataset in which

Russian Federation is independent, i.e. 1995. The situation of Slovak Republic is very similar, however, the reason for which data on Expected Household Income Inequality are available in 1990 is simply due to the fact that the authors use retropolation techniques to obtain such information.

Finally, it is worth reminding that the emigration rates constructed by Defoort (2008) are based on census data of the six main OECD immigration countries. This means that it possible to build emigration rates for countries even before their creation. For example, from the immigration data on North and South Yemenites in 1980, it is possible to construct the emigration rate of Yemen, even if this country was formed in 1990.

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