

Earnings Premiums and Penalties for Self-Employment Around the World

DRAFT, PLEASE DO NOT QUOTE: May 2014

T. H. Gindling (UMBC), Nadwa Mossaad (UMBC)
and David Newhouse (World Bank)

Abstract

This paper uses local linear regressions to estimate the earnings premium or penalty associated with self-employment for each worker in 67 countries around the world. We find no evidence of systematic earnings penalties for self-employed workers in low- and middle-income countries; if anything the self-employed earn a premium in low-income countries. On the other hand, the vast majority of workers in high-income countries earn a self-employment earnings penalty. In low-and middle-income countries, self-employment earnings premiums are largest for poorly educated workers. This paper also investigates how self-employment earnings penalties relate to common measures of regulations at the country level. In general, self-employment penalties are larger in less regulated economies, and rise as measures of property rights enforcement increase and regulations on credit are loosened. Labor market regulations have no consistent relationship with self-employment earnings premiums. These results are at odds with the traditional view that self-employment in developing countries is largely residual employment in a segmented or dualistic labor market. Rather, these results appear to be more consistent with a model where a self-employment earnings penalty can exist because employees are able to bargain for a share of firm profits (quasi-rents). As countries develop, increased firm productivity and increasing bargaining power of employees lead to increased sharing of profits and higher earnings for employees, resulting in self-employment penalties in high-income countries.

I. Introduction

Over 35% of workers in developing economies, and the majority of workers in low income countries, are self-employed (Gindling and Newhouse, 2013). The prevalence of self-employment in developing countries has inspired a vast literature seeking to better understand its causes and determinants. Nonetheless, there is currently little consensus on the extent to which self-employed workers in developing countries voluntarily choose to be self-employed, based either on pecuniary or non-pecuniary factors, rather than being excluded from wage employment. The widespread belief that most self-employed workers earn less than comparable wage employees underpins the common view that labor regulations should be relaxed to broaden access to wage employment. Yet while many studies examine earnings differences between the informal and formal sectors in individual developing countries, there is very little comparative information on how and why the wage gaps between the self-employed and employees differ across countries.

This paper uses a comprehensive set of harmonized household surveys, the World Bank International Income Distribution Database (I2D2), and local linear regressions to estimate the self-employment earnings premium or penalty for individual workers for multiple years in 67 low, middle and high-income countries. The estimates control for basic worker characteristics such as age, education, and gender, as well as industry of work. The estimates of wage differentials are then combined with country-level data on government regulations and macroeconomic indicators from the World Bank Development Indicators, the World Bank Doing Business Surveys, the Heritage Foundation Economic Freedom indices, and the Fraser Institute's Economic Freedom of the World indices to analyze the relationship between government policies and self-employment wage differentials. This is the first study that we know of that takes a broad view of how labor market segmentation, measured by wage differentials, depends on countries' level of development and the strength of their de-jure regulations.

This study address the following five questions: Do workers appear to earn an earnings premium or pay an earnings penalty for self-employment? How do estimates of this premium or penalty vary across countries and regions? How does the estimated self-employment earnings penalty or premium change as countries develop? How does this penalty or premium differ between types of workers within countries? And finally, how is the presence of labor market and other regulations correlated with the size of the self-employment earnings premium/penalty?

In the entire sample of 67 countries the estimates indicate that there is an earnings penalty for self-employment for slightly less than half of the workers. This does not imply that approximately half of the workers in the world face a self-employment earnings penalty, because the sample of countries is not representative of the population of the world as a whole. The vast majority of the countries in the sample come from Latin America and Europe and Central Asia, while East Asia and the Pacific, the Middle East and North Africa, South Asia, Sub-Saharan Africa and North America are underrepresented.

The percent of workers who earn a self-employment earnings premium falls sharply as

GDP per capita increases. An estimated 85% of workers in low income countries would earn more as self-employed than as employees. That is, they face a self-employment earnings premium. Workers in middle-income countries are as likely to face a penalty as a premium for self-employment, and the mean self-employment premium/penalty in middle-income countries is close to zero. In high income countries, the results indicate that 90% of workers would earn less as self-employed workers than as wage employees.

The use of local linear regression allows us to estimate how self-employment penalties or premiums vary for different types of workers. In low-income countries, workers with low levels of education face larger self-employment earnings premiums than do self-employed workers with higher education. Similarly, workers in the bottom 10% of the distribution of earnings are more likely to face a self-employment earnings premium than are workers in the top 10%. In other words, in low income countries the self-employment earnings premium is largest for particularly vulnerable workers. However, differences between workers at different education and skill levels narrow as per capita GDP increases, and largely disappear in high-income countries. While there is substantial variation in our premium/penalty estimates across other types of workers, no other robust patterns between workers with different characteristics emerge.

Finally, we combine our estimates of self-employment earnings premium/penalties with country-level macroeconomic and regulatory data to estimate how regulations relate to self-employment earnings premium/penalties. The results indicate that, relative to employees, self-employed earnings are higher in more regulated economies. That is, after controlling for country-level fixed-effects, GDP per capita and other macroeconomic variables, the self-employed are more likely to face an earnings premium in more-regulated economies and a penalty in economies with greater economic freedom. In particular, the extent of property rights and absence of regulation in credit markets have a large and statistically significant negative relationship with the self-employment earnings gap; workers are more likely to face a self-employment earnings penalty if property rights are well-enforced and if credit markets are less regulated. These regulations are estimated to have a larger impact on the self-employment earnings gap of less-educated workers than more-educated workers. There is no systematic evidence that labor market regulations influence the size of the self-employment earnings gap.

Our evidence is not consistent with the traditional view that characterizes self-employment in developing countries as a residual informal sector in a segmented or dualistic labor market. According to that view, labor market regulation or efficiency wages raise the equilibrium wage above the market clearing level, which forces workers excluded from the formal sector to earn less as self-employed informal sector workers. Yet we find no evidence of widespread earnings penalties for self-employed workers in developing countries. Nor do we find any evidence that these penalties are greater for less educated workers, who according to the traditional view would be more likely to be excluded from wage employment. Finally, there is no evidence that the self-employment earnings penalty is larger in more regulated economies. If anything, our evidence suggests the opposite; workers in low-income countries are likely to earn more as self-employed workers than as employees, this self-employment premium is largest for poorly

educated workers and agricultural workers in low-income countries, and self-employed workers earn more, compared to wage employees, in more-regulated economies.

The findings appear to be more consistent with a view that self-employment penalties result from wage workers successfully bargaining for a portion of the quasi-rents earned by firms. According to this alternate view, the amount of quasi-rents, and possibly the share that workers' obtain, increases as countries develop, increasingly attracting workers from self-employment into wage work. The inability of poorly educated and agricultural workers to access these rents in low-income countries could explain the particularly large self-employment premiums among these workers. Meanwhile, in high-income countries, it is plausible that the size of firms' quasi-rents could vary less across workers' education level, in part because the well-educated self-employed can rely on well-functioning markets to provide credit and business support services. Finally, other things equal, the size of firms' quasi-rents, and therefore the self-employment wage penalty, could be larger in less regulated economies with stronger property rights and fewer credit market restrictions. While the evidence is far from conclusive, taken together the results seem consistent with an important role for wage bargaining over quasi-rents in explaining the observed patterns of self-employment premiums and penalties.

II. Literature Review

A. Theoretical

In a standard neo-classical model in which labor markets are perfectly competitive, labor is free to move between sectors, and workers maximize earnings, identical workers would earn the same amount whether they are wage employees or self-employed workers. In a competitive labor market, this will be true even though firms offer facilities that boost worker productivity, such as access to capital, export markets, and the opportunity to specialize. Assuming diminishing returns to labor in wage employment, the free movement of labor will equalize earnings between wage employees and the self-employed.

What are departures from the competitive labor market model that could lead to an observed self-employment penalty or premium? One possibility is that the model is correct, but that empirically the measures of the compensation of self-employed or wage employees are not measured properly. Absolute estimates of wage gaps are inherently imprecise due to the difficulty of measuring self-reported profits and of valuing non-wage benefits. For example, self-employed workers might systematically under-report earnings, which could lead to an observed self-employed penalty even when none exists (Hurst, Li and Pugsley, 2010). On the other hand, the self-reported earnings of employees include only returns to labor, while the self-reported earnings of the self-employed may also include returns to capital, as well as the returns to the risk of entrepreneurship. Failing to account for this may overestimate the self-employment earnings premium. Furthermore, wage employees often do not include the value of non-wage benefits, such

as firms' contribution to pensions, sick pay, severance pay, and health care, in their reported earnings. In the competitive labor market described above, self-employment earnings would include compensation for these foregone non-wage benefits (Meghir et al. 2012), which would lead the estimates to overestimate the self-employment premium.

Other explanations for a persistent earnings differential between the self-employed and employees must explain why workers fail to move from one sector to another in response to a systematic earnings difference between sectors. The traditional view of self-employment in developing economies associates self-employment with informality within a segmented or dualistic labor market where formal sector jobs are restricted by minimum wage, tax laws and labor market regulations that limit the growth of employment in the formal sector. Key to this view is that either government regulations, especially labor market regulations, or efficiency wages, limit the availability of formal sector employment. The dualistic labor market view subscribes to the notion that informality stems from an imbalance between high population growth and the slow growth of "good" formal jobs (Harris and Todaro, 1970; Fields 2005, 2009; Tokman 1978; De Mel et al. 2010;). This view argues that workers unable to find adequate employment opportunities in the formal sector are forced to take employment as self-employed workers in the low paid, marginal informal sector.

One distinguishing feature of labor market segmentation is earnings differentials; an earnings gap between informal sector workers and equally-qualified formal wage and salaried employees which has often been interpreted as a measure of the degree of labor market segmentation (Schultz 1961; Becker 1962; Mincer 1962). For example, Fields (2009) notes, "The distinguishing feature used by Nobel laureates Arthur Lewis (1954) and Simon Kuznets (1955) as well as other dual economy modelers is the fact that workers earn different wages depending on the sector of the economy in which they are able to find work." In this view, self-employment is prevalent in low-income economies because the formal economy is incapable of providing enough good, high-wage jobs. As countries develop, the proportion of workers who are self-employed falls and the wage differential between the self-employed and employees should eventually disappear. Typically, in this view regulations rather than efficiency wages are the cause of labor market segmentation, and countries with more restrictive regulations (especially labor market regulations) should exhibit bigger self-employment wage penalties.

An alternative explanation for why there might be a self-employment earnings penalty that does not rely on segmented labor markets is that workers maximize utility rather than earnings, leading to systematic compensating wage differentials. For example, if self-employment is more desirable than wage employment for reasons unrelated to earnings, such as greater autonomy and flexibility, we would expect to see a self-employment earnings penalty. Unlike the labor market segmentation explanation for self-employment wage penalties, the compensating differential explanation suggests that the self-employment wage penalty will be particularly large in more developed countries and among better educated workers, where the opportunity cost of time is higher and therefore the flexibility of self-employment will be valued more.

A third factor that could lead to an observed earnings differential between the self-employed and employees is self-selection (Roy, 1951; Heckman, 1979). Some workers may have a comparative advantage in self-employment and therefore choose to be self-employed, while others may have a comparative advantage in wage employment and therefore choose to be employed in firms. Our measured self-employment earnings differential compares those who selected self-employment with those who selected wage employment. However, this would lead to an upwardly biased estimate of both the earnings of both the wage and the self-employed, and so it is unclear how this would affect the observed self-employment penalty.

High adjustment or entry costs into self-employment could also contribute to an observed self-employment premium because the future earnings of self-employed workers would need to compensate for these costs. One such adjustment cost is the initial investment needed to set up a small business, often paid for through credit. If credit markets are imperfect and it is difficult to obtain credit, then self-employed workers must be paid more than they could get as employees in order to compensate them for the high costs of credit. On the other hand, in low-income countries much self-employment may require little capital, while searching for higher-paid wage employment may involve moving location and other expensive search costs.¹ For those facing credit constraints, starting a low-level business as a petty trader or farmer may entail less upfront cost than searching for a wage job. In this case, imperfect credit markets would create a self-employment earnings penalty.

Another adjustment cost could be associated with complying with the regulations and permits needed to start your own business. These costs can be substantial in many developing countries (de Soto, 1989). If there are regulatory and other costs to becoming self-employed that limit access to self-employment, then self-employed workers will be paid more to compensate for these additional costs, causing an observed self-employment wage premium. For example, if it is costly and time consuming to obtain all of the necessary permits and permissions to work as self-employed (i.e. a more regulated economy), or if taxes are higher for the self-employed than for employees, then self-employed workers may be paid more than they could get as employees in order to compensate them for the high costs of entry. In this case, we would expect to see an earnings premium for self-employment in more regulated economies, after controlling for other factors, especially in economies where there are costly regulations for starting a business. Note that the self-employed would need to be compensated for these regulatory costs even if they attempt to avoid them, if there are costs to violating these regulations.

A final possible reason why wage employees may earn more than similar self-employed workers is that workers may successfully bargain for a portion of the quasi-rents earned by firms. Several studies have identified non-competitive-rents as an important

¹ The costs of searching for wage employment include information costs. A lack of information may help to create a self-employment wage penalty. For example, self-employed farmers in rural areas in developing countries may not be aware that they could earn more in urban areas (Bryan, Chaudhuri, and Mobarak, 2012, Jensen 2012).

determinant of inter-industry wage differentials.² Most recently, Abowd, et al (2012) find that shared quasi-rents account for a large percentage inter-industry wage differentials in the United States and France. Based on wage bargaining models that allow for on the job search (Cahuc, et al, 2006, Mortenson, 2003), they posit that the wage firms pay employees is the sum of the opportunity cost of wage employment plus the workers' share of quasi-rents. Under the assumption that comparable workers' profits in self-employment is an approximation of wage workers' opportunity cost, the self-employment earnings penalty will be determined by the bargaining power of workers and the size of the quasi-rent. That is, the self-employment earnings penalty will increase if the relative bargaining power of employees increases or if firms' quasi-rents increase.

The bargaining power of workers, and therefore self-employment wage penalties, could be increased by labor market institutions such as unions, or the presence of efficiency wages. Van Reenan (1996) focuses on the role of innovation and increased labor productivity in generating quasi-rents, which firms can then "share" with workers as efficiency wages. That study presents strong evidence that in British firms workers in firms that adopt more innovative and more productive technologies earn more than identical workers in other firms. It argues that more productive firms allocate part of their "quasi-rents" from innovation to workers in the form of higher wages. To the extent firms share quasi-rents with workers, this would contribute to a self-employment wage penalty. These penalties would be larger in countries where firms are more productive, and therefore have more quasi-rents to share, and/or in countries in which labor market institutions favor workers in the wage bargaining process.

Since firms in low-income countries tend to be less productive than those in more developed countries, due to lack of credit, reliable inputs, and export markets that boost worker productivity, quasi-rents and therefore self-employment penalties would likely be smaller for workers in low-income countries. As countries develop, firms not only earn more quasi-rents, but labor market institutions may also become more effective in increasing workers' bargaining power. Both of these factors could increase the self-employment penalty. In low-income countries, poorly educated workers and those in rural areas may find it particularly difficult to access firms that generate and share substantial quasi-rents. The relative abundance of such workers in low-income contexts may also reduce the benefit of offering efficiency wages for firms.

B. Empirical

This paper contributes to two broad strands in the empirical literature. The first estimates the magnitude and causes of the earnings differentials between wage and salaried employees and self-employed workers. The second, strand, meanwhile, examines the impact of labor market regulations and other government policies on informality and other labor market outcomes.

² See, among others, Dickens and Katz (1987), Krueger and Summers (1988), and Mortenson (2003)

The first broad strand in the literature is the estimation of the magnitudes and causes of these wage differentials between self-employed and informal sector employees relative to formal sector wage and salary employees. Many of these studies examine wages in middle-income countries and conclude that workers in the informal sector earn less than equally qualified employees in the formal sector (i.e. Heckman and Hotz 1986; Gindling, 1991; Basch and Paredes-Molina, 1996; Günther and Launov, 2006). However, not all informal sector workers are self-employed, and the self-employed may be very different from informal sector employees. In a review of the evidence from Latin America, Perry et al. (2007, p.6) concludes that the self-employed voluntarily opt out of the formal sector, while informal salaried workers are queuing for more desirable jobs in either the formal salaried sector or as self-employed workers.

When researchers estimate formal-informal wage differentials separately for informal sector employees and self-employed workers, they typically find different results for the two groups. Compared to formal sector wage and salary employees, Arias and Khamis (2009) find an earnings penalty for informal wage and salary employees but an earnings premium for self-employed workers in Argentina. Nguyen et al. (2013) find the same thing in Vietnam. Bargain and Kwenda (2011) find similar results in Brazil and Mexico. However, for South Africa they find that both informal sector employees and self-employed workers pay an earnings penalty, relative to formal sector employees. Maloney (1999) finds that workers who transition from wage and salary employment into self-employment in Mexico benefit from higher earnings, while workers who transition into informal sector wage and salary employment experience a decline in earnings. Saavedra and Chong (1999) find an earnings penalty for informal sector employees, but no difference between the wages of informal self-employed workers and formal sector employees.

In summary, while the literature on wage differentials points to consistent earnings penalties for informal sector wage and salary employment, this is not the case for self-employment relative to wage and salaried employment. Most published studies conclude that self-employed workers do not earn less than equally qualified formal sector wage and salaried employees. However, most of these studies are from middle income and/or Latin American countries; there are few studies of self-employment earnings penalties or premiums in low-income countries outside of Latin America. In at least one African country (South Africa), a published study has shown that self-employed workers pay an earnings penalty. Our paper contributes to the literature on wage differentials between self-employment and wage and salary employment by estimating and comparing these differentials for a wider range of developing and high income countries than currently exists in the literature.

Labor market regulations, like segmentation, are a source of considerable controversy in the literature. Proponents argue that regulations protect workers from being taken advantage of by firms that have greater market power, and reduce shocks. Critics, meanwhile, claim that regulations often benefit insiders at the expense of less experienced and skilled outsiders. In addition, they point to evidence that employment protection regulations increase informal employment and reduce the gross labor mobility

that is crucial for creative destruction and productivity growth (Heckman and Pagés 2004, Freeman 2010). In addition to these two camps, a third view is emerging that in most contexts, the effects of regulatory reform are generally mild, particularly when compared to the intensity of the debate over regulations (World Bank, 2013; Gallagher, Giles, Park and Wang, 2013; Freeman, 2009; Eslava, Haltiwanger, Kugler and Kugler, 2010).

Calls to relax labor market regulation are often based on the classic two-sector model, in which stringent hiring and firing regulations ration workers out of the formal sector and increase the penalty to self-employment. In contrast, stronger barriers to starting a business would discourage workers from entering self-employment, pushing workers into wage employment and driving down returns to wage employment, thereby lowering the self-employment earnings penalty (or increasing the premium). In addition, the remaining entrepreneurs would be those who expected to earn a sufficiently high return to starting a business to make it worthwhile (Maloney 2004; de Soto 1989). This would further diminish the observed penalty to self-employment in countries with more onerous procedures for starting a business.

A substantial body of evidence, largely based on cross-country studies, documents a negative association between regulation and adverse labor market outcomes.³ Two key studies that inspired this literature are Heckman and Pagés (2004) in Latin America and Besley and Burgess (2004) in India. Heckman and Pagés (2004) examines the impact of mandated worker benefits, payroll taxes, minimum wage, and employment protection laws on employment. They find negative consequences of regulations on employment in general, and also find that the negative effects are worse for young and unskilled workers. They conclude that in the case of Latin America, rigid labor regulations protect workers already in the system at the expense of those considered outside, promoting inequality among the latter group. Besley and Burgess (2004) explore the Industrial Disputes Act (IDA) of 1947, a set of labor and employment laws aimed at protecting workers in the organized sector and how they affect long-run manufacturing development. They find that Indian states that amended the laws in a pro-worker direction grew more slowly than states that amended the laws in a pro-employer direction. Consequently, labor regulations, originally aimed at protecting workers, resulted in higher poverty and informality and low levels of productivity, investment, and employment in formal sectors in pro-worker states.

An extensive literature examines cross-country evidence on labor market regulations and tends to confirm that regulations are associated with negative effects. Botero et al. (2004), examined the correlations between the rigidity of employment laws, collective bargaining and social security laws on the size of the unofficial economy, labor force participation rates and unemployment in a sample of 85 countries. It found that heavier labor market regulation is associated with a larger informal sector, lower labor force participation and higher unemployment, especially among youth.

³ See Djankov and Ramalho (2009) for a detailed review.

Since then, a number of studies have used the same data and methodology to document adverse the effects of labor market regulation on a range of other labor market outcomes. Micco and Pagés (2006), for example, finds that stringent employment protection regulations are associated with reduced productivity, net firm entry, turnover, employment and value added in a sample of 69 countries. The effects of the regulations on job flows are mostly concentrated in highly volatile sectors, which require higher level of hiring flexibility. Pierre and Scarpetta (2004) suggest that countries with onerous labor regulations tend to hire less, rely more on on-the-job training and make greater use of temporary employment. Feldmann (2009) finds similar results using an alternative dataset on labor regulations for 73 countries taken from the World Economic Forum (WEF). They conclude that stricter regulations generally reduce employment and centralized collective bargaining increase female unemployment, and that the size of the effects seems to be larger for younger workers. Similarly, Djankov and Ramalho (2009) conducted a cross-country correlation analysis using data from the WEF and the Doing Business indicators as well as the Global Competitiveness Report. They use data from over 150 countries and show that developing countries with more rigid employment laws tend to have larger informal sectors and higher unemployment, especially among younger workers. They also show a large, significant and negative impact of cumbersome administrative procedures to start a business and the tax costs associated with operating a formal business on the size of the formal sector. Finally, Freund and Rijkers (2013) conclude that countries with weaker regulation are more likely to experience “unemployment miracles,” defined as swift, substantial and sustained reductions in unemployment rates.

Another recent strand of literature find a positive relationship between labor regulation and the size of the informal economy, where most own-account workers operate. Schneider et al. (2010), find that an increased burden of taxation, combined with inflexible labor market regulations and the quality of public institutions and services are the leading causes of the existence and growth of the shadow economy. Using the same shadow economy variable, Lehmann and Muravyev (2012) find similar results. Using country-level panel data from transition economies and Latin America, they find that higher employment protection legislation and larger tax wedge increase the size of the informal economy. Sabirianova Peter (2009) a longer-time span panel data to measure the effect of a global transition to flatter taxes on the size and growth of the shadow economy. She finds that flatter and simpler taxes reduce the size of the informal economy in the short run and that the effects are significantly larger with improved government institutions, low corruption and strong legal system.

Several papers find mixed results on the relationship between labor market regulations and entrepreneurship. Van Stel et al. (2007) combine data on individuals from the Global Entrepreneurship Monitor (GEM) with the Doing Business (DB) dataset to examine the relationship between regulations and entrepreneurship. They find no relationship between administrative barriers such as the time, the cost, or the number of procedures needed to start a business on the rate of entrepreneurship, although labor market regulations that strongly influence the rate on entrepreneurship amongst young and potential entrepreneurs. They analyze similar data and arrive at similar conclusions, rigid labor

regulations, through working status, social network and business skills, play a detrimental role in entrepreneurship, especially for those pursuing business opportunities. In particular they find that tougher entry regulations, contract enforcement and labor regulations reduce the likelihood to engage in new entrepreneurship activity for existing entrepreneurs.

Our paper contributes to this literature by using a country-level panel data set to examine the impact of economic development and labor market and other regulations on a measure of labor market segmentation, namely the self-employment penalty/premium. We examine the sensitivity of our results to different measures of regulations across countries that come from several sources: the World Bank's Doing Business Surveys, the Economic Freedom Index from the Heritage Foundation and the Economic Freedom of the World Index from the Frazer Institute.

III. Data

One objective of this research is to estimate self-employment earnings penalties or premiums, as well as the distribution of those premiums/penalties among workers, for countries throughout the world and within countries over time. A second objective is to estimate the relationship between labor market and other regulations and the magnitude and distribution of the self-employment earnings premium/penalty. This section describes the data to pursue each objective..

A. International Income Distribution Database used to estimate the self-employment earnings penalty/premium

The first and main data source is micro-level household surveys harmonized by the Development Economics Research Group of the World Bank, the International Income Distribution Database (I2D2).⁴ This database consists of nationally representative labor force surveys, budget surveys or living standards measurement surveys. The main advantage of these household surveys is that they provide information on the earnings of the self-employed as well as of wage and salary employees, in addition to other relevant information on individual socioeconomic characteristics. The data include three sets of consistently defined and coded variables: (i) demographic variables, (ii) education variables, (iii) labor force variables. In the first stage of our analysis, we use these data sets and local linear regressions to estimate a self-employment premium/penalty for each worker in each survey for which sufficient data are available.

Not all variables are available in all countries and years. In our analysis, we only use surveys where we can identify whether the worker is self-employed or a wage and salary employee, and where we also where data is collected on the earnings of both the self-employed and wage and salaried workers.⁵ In most countries, data are available for

⁴ The database is an updated version of that described in Montenegro and Hirn (2009). Version 4 of the I2D2, which was released in October 2013, was used.

⁵ Self-employed workers include those who self-identify as either an own account worker or an owner/employer. We use the ILO definition of own account workers as “workers who, working on their

multiple years. Our full sample consists of 338 surveys (country/year combinations), representing 67 countries, from 1980 to 2011. Within each country, we limit our samples to the working age population, 15-65 years old. The full country-year combinations available for our analysis, as well as the median estimated self-employment earnings premium(+)/penalty(-) for each country/year observation, are listed in the appendix in table A4.

B. Data sources for the macroeconomic, regulatory and institutional variables

In the second stage of the research, we construct a country/year-level panel data set of median estimated self-employment premiums/penalties, both for workers overall and for different demographic groups and different parts of the distribution. The data set of the estimated self-employment premiums/penalties for each year and country are merged with data on individual country and year macroeconomic, regulatory and institutional characteristics. We then use random effects and fixed effects models to analyze the relationship between the self-employment premiums/penalties and country-level characteristics such as measures/indices of labor market regulations, the rule of law, credit market regulations, regulations on starting a business, trade, taxes, GDP per capita and other macroeconomic variables. This sub-section describes these country-level variables.

i) Regulations and institutions: World Bank Doing Business Surveys (DB)

One source of data on labor and business regulations is the World Bank Doing Business (DB) project. This dataset is one of the first to measure business regulations in a comparable way across multiple countries including a large number of developing and transitioning economies. The data is available for 185 economies and according to the DB website "... provides objective measures of business regulations" and an opportunity to study the effect of such regulations on a host of economic factors (World Bank, 2013). The Doing Business project collects information on labor laws through questionnaires administered to local business experts (this includes business consultants, accountants as well as labor lawyers and government officials).

A key variable of the DB database is the Rigidity of Employment Index (REI), which measures the cost and inflexibility of employment regulations. The doing business index is modeled after the Employment Laws Index of Botero et al. (2004) which ranks economies based how their labor laws hamper doing business. The REI is a key policy variable in the growing literature on the relationship between labor market regulations, economic growth, and informality (Ardagna and Lusardi, 2008; Freund and Bolaky, 2008; Djankov and Ramalho 2009; Cuñat and Melitz 2011; and Helpman and Itzhoki 2010).

The Rigidity of Employment index is the average of three sub-indices; 1) difficulty of hiring, 2) rigidity of working hours and 3) difficulty of redundancy. REI takes a score

own account or with one or more partners, hold the type of job defined as a self-employed job, and have not engaged on a continuous basis any employees to work for them during the reference period"

between 0 and 100, with higher scores indicating larger barriers to employment. Using the availability of fixed-term contracts and minimum wage regulations (ratio of minimum wage to the average wage), the first sub-index measures the flexibility of small to mid-size firms to hire new workers. The second sub-index measures the flexibility of working nights and weekends, the length of a workweek and the number of paid vacation days. The third sub-index, difficulty of redundancy, is a measure of the firm's cost to dismiss workers, in weeks of salary, due to redundancy. It includes length of notice requirements, penalties and severance pay for terminating a redundant worker⁶. Lower scores for all three sub-indices indicate reduced restrictions on employment regulations.

Other Doing Business Survey variables include Procedures to Start a Business and Total Tax Rate). The Procedures to Start a Business variable is a measure of the number of procedures, time and cost officially required to legally start and operate a new business. A growing body of literature has shown that higher entry barriers lead to low levels of entrepreneurship, legally registered businesses, higher levels of corruption and higher levels of informality (Djankov et al., 2002; Ardagna and Lusardi, 2010b). The Total Tax Rate documents the tax burden on new businesses. These are taxes born by a business in the second year of operation as a percent of commercial profit before taxes are applied. Djankov et al. (2008) found that a high corporate tax burden had large and negative impact on investment, entrepreneurial activities, and growth. They also found a large impact on the size of the informal sector as firms facing higher tax burden choose to opt out of the formal sector.

The 'employing workers' component of the World Bank's Doing Business Indicators has had a significant influence on labor research and subsequently on policy reform recommendations especially in developing and transitioning economies. However this widely used set of indicators has in recent year been subject to severe criticism. The Employing Workers Indicator has suffered particular criticism on methodological and conceptual grounds.⁷ The index captures the *de jure* notion of the labor law, which often differs from the *de facto* laws and regulations on the ground. The index is also widely believed to carry one-sided view of labor market regulations, that of employers, and ignore social objectives set forth to protect workers rights and improving work environment standards of. This in turn, is argued, could encourage governments to engage in major deregulatory reforms disregarding much of the legislation set forth in the International Labor Conventions of the International Labor Organization (ILO). For a comprehensive review of the criticism see S. Lee, McCann, and Torm (2009).

⁶ The data collected refer to businesses in the economy's largest business city (which in some economies differs from the capital) and may not be representative of regulation in other parts of the economy. It should be noted that the measure favors flexible employment regulations. The index has also been subject to strong criticism; it assumes that rigid labor regulation is the result of rent seeking behaviors from those already in the system at the expense of those who are out.

⁷ The weakness of Employing Workers Indicator was made public in several reports by internal and external consultative groups along with extensive recommendations. As a result, Employing Workers indicator is excluded from the calculation of the ease of doing business ranking.

A further limitation of the DB data is that it is not available for many of the country/years for which we have estimates of self-employment premiums/penalties; the Doing Business Survey variables are available only from 2006 through 2011. Of the 338 surveys for which we have estimates of self-employment premiums/penalties, we can match data on regulations from the Doing Business survey for only 116.

To address the limitations of the Doing Business Index we consider two other sources of data on government institutions and regulations, both of which report variables for a larger set of countries and years than the Doing Business data: the Freedom Index from the Heritage Foundation (HF) and the Economic Freedom of Workers Index from the Fraser Institute (FI). Like the Doing Business indicators, both vary over time so can be included in our fixed-effects regressions. Another advantage of these two additional sources of regulatory variable is that both include a general index that can be used to proxy the overall level of government involvement in the economy.

ii) *Regulations and Institutions: Heritage Foundation Economic Freedom Index (HF)*

The Heritage Foundation Economic Freedom Index (HF) is an annual measure of the degree of economic freedom. The HF is a composite index of specific indices measuring: rule of law (property rights, freedom from corruption); government size (taxes and government spending); regulatory efficiency (business freedom, labor freedom, monetary freedom); and market openness (trade freedom and credit market freedom). In general, more economic freedom is cultivated by rule of law, open markets, limited government and regulatory “efficiency.” In this way, the overall Economic Freedom Index is a measure of general regulatory and institutional regulations/constraints on economic activity. The index ranges from 0 to 100, with 0 indicating the least “free” (most regulated/constrained) economic environment and 100 indicating the most “free” (least regulated/constrained) economic environment.

We first estimate the impact of the overall regulatory/institutional environment using the overall Economic Freedom Index. To examine the impact of more specific indicators of labor market and other regulations we then estimate the impact of the individual components of the index: the labor freedom index (a higher score indicates less rigid labor market regulations); the business regulation freedom index (a higher score indicates less rigid regulations on businesses); trade freedom (a higher score indicates fewer trade barriers); credit market freedom (a higher score indicates a less regulated credit market); the rule of law index (a higher score indicates greater rule of law and property rights); and an index of government size (taking into account government expenditures). These components of these sub-indices are described more detail in Table A2.

The overall Heritage Foundation Economic Index (HF) is available for 1995 through 2011. Combining our estimates of self-employment earnings penalties/premiums with the HF index results in a sample with 292 country/year observations. The sub-components of the index are available separately for a smaller number of years: 2005 through 2011. Combining our estimates of self-employment earnings penalties/premiums

with the sub-components of the HF index results in a sample with 154 country/year observations.

iii) Regulations and Institutions: Fraser Institute Economic Freedom of the World Index (FI)

The Fraser Institute Economic Freedom of the World Index (FI) “measures the degree to which the policies and institutions of countries are supportive of economic freedom” (Fraser Institute, 2013). As with the Heritage Institute Economic Freedom index, a higher value for the overall index implies that government policies and institutions lead to a less regulated /constrained economic environment. The FI index takes into account the following broad areas of economic freedom: size of government, legal system and property rights, freedom to trade internationally, sound money, labor market regulations, credit market regulations and business regulations.

As with the HF Economic Freedom Index, to examine the impact of more specific indicators of labor market and other regulations we use the individual components of the index: the labor freedom index (a higher score indicates less rigid labor market regulations); the business regulation freedom index (a higher score indicates less rigid regulations on businesses); trade freedom (a higher score indicates fewer trade barriers); credit market freedom (a higher score indicates a less regulated credit market); the rule of law index (a higher score indicates greater rule of law and property rights); and an index of government size (taking into account government expenditures). These components of these sub-indices are described more detail in Table A2.

The Fraser Institute World Economic Freedom index (FI) is available for 1995 and 2000 through 2010. Combining our estimates of self-employment earnings penalties/premiums with the FI index results in a sample with 196 country/year observations. Combining our estimates of self-employment earnings penalties/premiums with the sub-components of the HF index results in a sample with 180 country/year observations.

iv) Macroeconomic and other control variables

Finally, we add a set of key macroeconomic variables commonly used in labor and growth regressions. Most variables come the World Bank’s World Development Indicators (WDI) and the International Labor organization (ILO). These variables include: inflation, ILOI estimates of the employment to population ratio, and gross domestic income per capita (PPP 2005 U.S. dollars) as a measure of development of living standards between countries and over time.

IV. Methodology

Estimating the Self-employment Earnings penalty/Premium for each worker

For each country and year survey, we first estimate the probability that each worker is self-employed or wage employed using a standard logit model:

$$SE_i = \frac{1}{1 + e^{\alpha + \beta X_i + \varepsilon_i}} \quad [1]$$

- SE_i is a dummy variable indicating whether the worker i is self-employed (1) or a wage and salary worker (0);
- X_i is a vector of eight worker-specific variables. These are: Years of education, years of education squared, age, age squared, a gender dummy variable, an urban/rural dummy variable, a set of dummy variables for one-digit industry code, and a set of dummy variables representing the frequency of wage payments.⁸
- ε_i is the error term.

The observations are weighted according to the probability sample weights. The model generates a predicted probability of being self-employed for each worker. As described below, these predicted probabilities are used both as inverse probability weights to balance the self-employed and wage-employed comparison, and also to identify similar workers when estimating the local linear regressions.

To estimate the local linear regressions, we estimate the following earnings equation for each worker, country and year:

$$\ln Y_i = \alpha + EP_i * SE_i + \beta_i X_i + \mu_i \quad [2]$$

Where

- Y_i is the dependent variable, self-reported monthly earnings of worker i .
- EP_i is the estimate of the self-employment earnings premium, estimated separately for each worker in each survey (country/year).
- X_i is the same vector of control variables defined above

Local linear regression estimates of equation 2 are run separately for every individual i , in the sample of workers from the same county and year. For each regression that estimates the premium or penalty for individual i , the weight assigned to observation j is determined as follows:

$$W_{i,j} = \frac{PW_j * K(\hat{p}_i, \hat{p}_j)}{\hat{p}_j * SE_j + (1 - \hat{p}_j)(1 - SE_j)} \quad (3)$$

Where:

PW_j is the probability sample weight for observation j taken, from the original household survey

⁸ The frequency of wage payments is included as a control in order to guard against errors in the coding of wage payment frequencies across surveys, which could otherwise severely distort the results.

\hat{p}_j is the estimated probability that worker j is self-employed from equation (1)
 SE_j is 1 if worker j is self-employed and 0 if they are not.
 K is a kernel function that declines as the distance between \hat{p}_i and \hat{p}_j increases.

The denominator balances the self-employed and wage employed subsamples on observable characteristics, making the estimation more robust to violations of the linear functional form. Meanwhile, the kernel weighting function places more weight on observations that are similar to that worker. After experimentation, a Gaussian kernel weighting function with a bandwidth of 0.2 was selected. The local linear regressions are estimated using a variant of the Stata routine “lcreg” (Frölich and Melly, 2010). This process is repeated separately for each of the 338 surveys for which sufficient data exist in the I2D2 data.

To sum up, the local linear regressions estimate the self-employment premium for each worker, depending on how likely they were based on their observable characteristics to be self-employed.⁹ A positive value for EP_i indicates an earnings premium for self-employment for worker i , while a negative value indicates an earnings penalty for self-employment for worker i . This technique allows us to generate an estimate of the distribution of earnings premiums, and examine how the earnings premium differs for workers with different characteristics.

Estimating the Impact of Regulations on the Earnings premium

To estimate the impact of regulations, institutions, GDP per capita and other macroeconomic variables level of development on the earnings premium/penalty we use country-level panel data, where the dependent variable is a measure of the estimated self-employment earnings premium/penalty and the independent variables include measures of regulations and institutions, GNI per capita and macroeconomic variables. Because our data consist of multiple years of observations for many countries, this will allow us to control for time-invariant country-level fixed effects and also variables that change over time but not across countries. We estimate the following equation:

$$[4]$$

Where

- is the dependent variable, a measure of the self-employment log earnings premium/penalty, where $c = \text{country}$ and $t = \text{year}$. We estimate equation 4 using several summary measures of the self-employment premium/penalty for each county/year data point. The dependent variables that we use include: the median for each country/year; the median penalty/premium for men and for women; the median premiums for rural and urban workers; the median premiums for agricultural and non-agricultural workers; and the median premiums for workers by education level. We

⁹ The local linear regressions essentially provide non-parametric estimates of the interaction between self-employment and the estimated probability of being self-employed.

also estimate versions of equation 2 using the self-employment penalty/premium for workers at the 5th, 10th, 90th and 95th percentiles in the wage distribution.

- X is a vector of covariates that vary across countries but not over time. In the fixed effects estimates, these are country-level fixed effects. In the random effects estimates these are dummies indicating the region of the country; γ are the coefficients on these variables.
- D_t ($t=1\dots t$) is a vector of year dummy variables. These capture the year fixed effects, which capture shocks common across countries in a given year (such as an international economic crisis).
- ϵ_{ct} is the error term for country c at time t .
- Z is a vector of country-specific time-varying variables; β is a vector of coefficients on these variables. Z can include four types of variables:
 - *Macroeconomic and other control variables*: all regressions include the following variables: GDP per capita (ppp 2005 U.S. \$); GDP per capita squared; the inflation rate; the employment to population ratio.
 - *Regulation and Institution variables*: We then estimate five separate regressions that include five different specifications capturing regulations and institutions:
 1. The Economic Freedom Index from the Heritage Foundation (HF),
 2. The Economic Freedom of the World Index from Fraser Institute (FI)
 3. Sub-indices of the HF index measuring specific types of regulations and institutions: rule of law; labor market freedom; business regulation freedom; credit market freedom; trade freedom; and government size,
 4. Sub-indices of the FI index measuring specific types of regulations and institutions: rule of law; labor market freedom; business regulation freedom; credit market freedom; trade freedom; and government size,
 5. Measures of specific types of regulations from the World Bank's Doing Business Surveys (DB): the Rigidity of Employment Index, the Total Tax Rate faced by new businesses, and the number of Procedures to Start a Business.
 - All country-specific time-varying variables are logged.

The sample includes variables from multiple datasets, which report different years of data. Therefore each regression specification uses a different sample of countries and years. The smallest sample used to estimate the regulation regressions is for the DB specification, 116 observations. The largest sample is for specification where the regulatory and institution environment is proxied by the Heritage Foundation Economic Freedom Index (HF), 292 observations.

A potential issue with the methods described above is the endogeneity of regulatory policies, which have the potential to bias the results. For example, labor and business institutions are derived from historical factors in a country that may also affect self-employment earnings penalties. In addition, the level of regulations may depend on labor market conditions. Although country fixed effects are included to control for time-invariant country characteristics, regulatory reforms themselves may partly be influenced

by labor market outcomes. In the absence of an exogenous source of identification, we examine both random and fixed effects models and interpret the results as conditional correlations.

V. Earnings penalties and Premiums for the Self-employment around the World.¹⁰

In Table 1 we report the results of the estimation of the self-employment earnings penalties (-) and premiums (+) for workers in countries of different regions and income levels.¹¹ We report two statistics derived from the results of the local linear regressions: the percent of workers with an estimated earnings penalty (that is, the percent of workers for whom the coefficient on the self-employment variable in the wage equation is negative) and the mean self-employment penalty (-) or premium (+). For comparison purposes, we also report the mean premium/penalty estimates from simple OLS estimates of the wage equations for each survey (where the coefficient on self-employment is the same for all workers in a given survey). As expected, these simple OLS estimates are very similar to the mean local linear regression estimates. All statistics are weighted by population and therefore countries with large populations can have a large influence on the regional and income group means.

Almost 95% of our estimates of earnings premiums/penalties come from either Latin America & the Caribbean (63%), Western Europe (16%) or Eastern Europe and & Central Asia (14%). Most Latin American and Eastern European & Central Asian countries are middle income, and over 70% of our estimates of earnings penalties/premiums are from middle income countries. 19% of the sample is from high income countries, and only 10% from low income countries.

There is a self-employment earnings penalty for a little less than half of the workers in our sample, and a self-employment earnings premium for a little more than half. The population-weighted mean earnings penalty for self-employment across the entire sample

¹⁰ Table A1 presents the estimates of the size of the self-employment sector around the world, for all countries, by income group, region of the world and by demographic group. In low income countries, self-employment accounts over half of total employment. The proportion of workers who are self employed shrinks sharply as economies develop, falling to 12% of workers in high income countries. Within regions, the self-employment sector is largest in Sub-Saharan Africa and lowest in North America. The majority of our sample comes from Latin America and the Caribbean and Europe and Central Asia, where self-employment accounts for 32% of workers in Latin America and 17% in Europe and Central Asia. There is a good deal of variation across and within income groups, regions and demographic groups. Self-employment is consistently higher across regions for men compared to women (except in Sub-Saharan Africa), for rural and agricultural workers compared to urban and non-agricultural workers and for less-educated workers compared to more-educated workers. The results from our sample are consistent with the literature that has measured the size and characteristics of the self-employed around the world (i. e. Gindling and Newhouse, 2013; La Porta and Shleifer, 2008). Many of the surveys for which we have estimates of the size of the self-employment sector do not have all of the variables needed to estimate earnings premiums; we can estimate earnings premiums/penalties (Table 1) for less than half of the surveys for which we can estimate the percent self-employed.

¹¹ Table A4 presents the median wage penalty/premium for each survey (country/year) in our sample.

is very small; approximately 2%. As noted above, the sample of countries with available data is not a representative sample of the countries of the world, but is disproportionately Latin American and middle-income. The most robust result of the analysis is that workers in high income countries are much more likely to face a self-employment earnings penalty than are workers in low and middle income countries. We estimate that over 90% of the workers in high income countries face a self-employment earnings penalty. This is true in almost all of the high income countries in our sample; in over 90% of the high income countries in our sample the median worker faces an earnings penalty (see table A4 in the appendix).¹²

Workers in low income countries in our sample are most likely to face a self-employment earnings premium; only 15% of workers in these countries face an earnings penalty. Workers in middle-income countries are as likely to face a self-employment earnings penalty as they are to face a self-employment earnings premium. On average, the estimated self-employment/employee earnings differentials in middle-income countries are small. This evidence is not consistent with the traditional “exclusion” view of self-employment in developing countries, where self-employed workers are those who have been excluded from formal sector employment in firms and are forced to accept lower-paid self-employment.¹³

Figure 1 explores in more detail how the earnings penalty/premium changes as the level of GDP per capita differs between countries and years. Figure 1 presents a non-parametric estimate of the relationship between the earnings premium/penalty and the log of per capita GDP (2005 US \$, PPP), weighted by the population. Figure 1 also shows the data used to estimate this relationship by presenting a point for each survey (country/year), with the size of the point proportional to the population of each country/year. The patterns from table 1 are replicated here; in low income countries workers tend to face self-employment earnings premiums, which fall as GDP per capita increases so that there is, generally, a penalty for workers in high income countries.

Figure 1 shows that the majority of our data come from middle income countries, and that middle income countries tend to face earnings penalty/premium estimates near zero. The largest dot on the graph represents one survey from China, which exhibits a large self-employment earnings penalty. If China is excluded from the sample, then the self-employment earnings penalty/premium estimates are similar in lower-middle and upper-

12 This result also holds when we re-estimate that self-employment earnings premiums but exclude the industry dummy variables from the regression.

13 In order to explore whether workers were choosing the sector in which they could earn the highest, we performed additional analysis. This involved regressing the probability of being self-employed on the self-employment earnings premium/penalty, controlling for fixed effects for each survey (country/year). For low income countries, we found a positive, strong, and statistically significant correlation between the probability of being self-employed and the self-employment earnings premium (the coefficient was 0.9). Thus workers that are most likely to choose self-employment are those that benefit most from it financially. In middle income and high income countries, on the other hand, we found a statistically significant negative correlation between the probability of being self-employed and the self-employment earnings premium.

middle income countries. Finally, after approximately \$16,500 GDP per capita there is a significant drop in the graph, indicating that workers in high income countries are likely to face a significant self-employment earnings penalty. The biggest dots among the high income country group represent three surveys from the United States, where workers face a large self-employment earnings penalty.

By region, the most robust result is that workers in Western Europe and North America (which are almost all high income countries) are most likely to face a self-employment earnings penalty. Workers in Latin America are in the middle range of our estimates: the mean self-employment earnings penalty/premium in Latin America is close to zero. A Latin American worker is almost as likely to face a self-employment earnings penalty as a earnings premium. Workers in Eastern European & Central Asian countries are likely to face large self-employment earnings premiums. However, this last result is partly because Europe and Central Asia is dominated by populous Russia, where there is a large estimated self-employment earnings premium. For most (60%) of the countries in Europe and Central Asia, the median worker faces a self-employment earnings penalty (see appendix Table A4).

There are relatively few countries from other regions of the world in our sample. For example, East Asia and the Pacific are represented only by two observations: one survey from China and one from Timor-Leste.¹⁴ The Middle East and North Africa is represented only by Djibouti and the Republic of Yemen, and South Asia is also represented by only two countries: Pakistan and Bangladesh. North America is represented by three surveys from the United States. The number of countries from Africa in our sample is also small, with only fifteen observations covering 11 countries. For the full list of country/year surveys in our sample, and the median earnings premium estimate in each, see appendix Table A4.

An advantage of the local linear regression estimates of the self-employment earnings penalty/premium is that we can examine these estimates for different demographic groups and across the distribution. Table 2 shows the estimated earnings premium/penalty for workers at different points in the distribution of monthly earnings; the bottom (5th percentile) and top (95th percentile) of the distribution of monthly earnings (in each country/year).¹⁵ We do this because we suspect that workers at the top of the wage and skill distribution may have a comparative advantage in self-employment, and are therefore more likely to face a self-employment earnings premium, while workers at the bottom of the wage and skill distribution may be forced into self-employment involuntarily and may face a self-employment earnings penalty. For example, a study in Vietnam finds that estimated self-employment earnings penalties are larger for workers in the lower part of the distribution of wages and skills (Nguyen, Nordman, and Roubaud 2013). However, our results do not support this hypothesis. Overall, the sample mean estimate of the self-employment earnings penalty/premium is very similar for workers at

¹⁴ Some countries, like Indonesia, are excluded because the labor force survey does not collect earnings information for all self-employed workers.

¹⁵ The results are similar if we look at the 10th and 90th percentiles.

the 5th percentile and 95th percentile of the wage distribution. For low income and lower-middle income countries the premium (penalty) is actually smaller (larger) at the top of the distribution compared to the bottom of the distribution. In summary, we do not find strong evidence that workers at the top of the wage and skill distribution have a comparative advantage in self-employment compared to workers at the bottom of the distribution. If anything, our estimates suggest that in low and lower-middle income countries self-employed workers at the bottom of the wage distribution may have a comparative advantage in self-employment compared to workers at the top of the distribution, although this result is sensitive to changes in the sample of countries we use and to the specification of the wage equation used to estimate the self-employment earnings premiums/penalties.¹⁶

Table 3 presents self-employment earnings premium/penalties for different demographic groups. We find few robust systematic patterns in the self-employment earnings premium/penalty for different demographic groups. For example, the global average earnings premium for women (-0.02) and men (-0.03) is very similar. There is also very little difference between men and women within the three regions for which we have a substantial amount of data (Latin America & the Caribbean, Western Europe and Eastern Europe & Central Asia). On average across all observation there is a small self-employment premium in agriculture and in rural areas but a small self-employment earnings penalty in non-agricultural sectors and urban areas. However, once we control for regions of the world by looking at differences within regions (the bottom panel of table 3), this pattern disappears and we find that the earnings premium/penalty are very similar in rural and urban areas¹⁶ and for agricultural and non-agricultural workers.¹⁷

Table 3 presents some evidence that the self-employment earnings penalty differs for workers at different education levels for a sub-set of countries: low and middle income countries. For low and middle income countries the wages of the self-employed relative to employees decreases with education; the wages of the self-employed relative to employees are highest for those with the least education (primary incomplete) and lowest for secondary and university graduates. This again suggests that, for low and middle income countries, it is low-skilled workers who could benefit more (in terms of pay) from self-employment, while high-skilled workers are likely to be paid more as employees.

VI. Labor market regulations and the size of the self-employment earnings premium/penalty

To examine the impact of labor market regulations and other macroeconomic variables on the self-employment earnings premium/penalty we estimate equation (4) using our constructed country-level panel data set. We estimate this equation using country-level random effects and country-level fixed effects.

¹⁶ In particular, the l

¹⁷ Most of the descriptive results are robust to excluding industry dummies from the specification. The most notable exception is the size of the self-employment premium for agricultural workers.

Because the regression sample includes only those countries and years for which we have both self-employment earnings penalty/premium estimates and regulatory/institutional and macroeconomic variables, the sample of surveys used in the regressions is smaller than the sample used to construct the tables of descriptive statistics, it is also different depending on the set of regulatory/institutional variables that we use (116 to 292 depending on which variables are include in the regression). For example, most low income countries and many lower-middle income countries drop out of the regression samples. On the other hand, a large number of upper-middle and high income countries and Western European countries remain in the regression samples. Therefore, the regression results should be seen as most relevant to middle and high income countries¹⁸.

Table 4 shows the distribution of country/year observations across income groups and regions in three different regression samples that use three different sources for the regulation/institution variables. That is, Table 4 replicates Table 1 for these three regression sub-samples. The largest sample, with 292 observations, is for the regression that uses the Heritage Foundation Economic Freedom Index (HF). The sub-components of the HF are available for substantially fewer years and countries; the HF sub-component sample includes 154 observations. The number of observations for the Fraser Institute World Economic Freedom Index (FI) is also smaller than the sample for the HF index, at 196. In the FI sample, and in the HF sub-component sample, almost all low income countries drop from the sample. Around half of the lower-middle income countries also drop out of the sample, as well as a smaller but substantial percentage of the upper-middle income countries. Almost all high income and Western European countries remain in the sample. The sample of Doing Business (DB) variables is the smallest, only 117 observations. There are no low income countries and few lower-middle income countries in the DB sample. In general, the countries in all regression samples are disproportionately upper-middle and high income countries from Western Europe, Latin America and Central and Eastern Europe.

Comparing the panels of Table 4 with Table 1 shows that the mean earnings penalty estimates is similar between the regression samples and the full sample for upper-middle and high income countries. However, for low and lower-middle income countries the value of the mean self-employed premium/penalty estimates is substantially different between regression samples and for the regression samples compared to Table 1. Again this suggests that our regression results are most relevant to upper-middle and high income countries.

Does the self-employment premium have a discernible relationship with the overall measures of the regulatory/institutional environment taken from the Heritage Foundation Economic Freedom Index (HF) and the Fraser Institutes Economic Freedom of the World index (FI)? The results of both random and fixed effects specifications of the regressions are presented in the first two columns of Table 5 and Table 6, respectively. In both the random effects and fixed effects specifications, the coefficients on both indices of

¹⁸ Almost the entire regression samples come from three regions: Latin America, Western Europe and Eastern Europe & Central Asia.

economic freedom are negative and statistically significant (at the 10% level and below). The interpretation of a negative coefficient is that in “freer,” or less regulated, economies workers are more likely to face a larger self-employment earnings penalty. This suggests that in an economy with more regulations that restrict economic freedom, the earnings of the self-employed are higher relative to employees, while fewer regulations tend to decrease the earnings of the self-employed relative to employees. That is, a more regulated economic environment makes it more likely that workers will face a self-employment earnings premium. In particular, a 10 percent increase in the strength of regulations is associated with an increase in the self-employment premium of roughly 4 to 9 percentage points, depending on the specification. No other variable in the fixed effects regression is significant. This set of results does not support the hypothesis that an increase in regulations causes the self-employment wage penalty to increase. On the contrary, our results suggest that self-employed workers are paid more, relative to employees, in more-regulated economies.¹⁹ This finding is consistent with the view that regulations impose costs on firms, which are partly passed on to wage employees.

To examine in more detail which types of regulations and constraints on economic activity are driving the result that the self-employment earnings premium is larger in a more-regulated (less “free”) economy, we replace the economic freedom index in the regressions with sub-components capturing the rule of law, labor regulation freedom, business regulation freedom, credit market freedom, trade freedom and the size of government expenditures. These results are presented in the third (for the HF index) and fourth (for the FI index) columns of tables 5 and 6. For both specifications, the coefficients on the rule of law and credit market freedom are negative and generally statistically significant in the random effects specification, and remain statistically significant even after controlling for fixed effects in the FI specification. These results imply that an improvement in the rule of law index is associated with roughly a fall in the self-employment earnings premium (and an increase in self-employment earnings penalties). Similarly, these results suggest that a reduction in credit market regulations²⁰ is associated with a fall in the self-employment earnings premium (and an increase in self-employment earnings penalties). These results might suggest that workers may be taking advantage of self-employment as a way of avoiding the costs of regulations imposed on employees, especially in an environment where the rule of law is weak.

These coefficients on the rule of law and credit market freedom variables are the only two sub-components of the economic freedom indices where the coefficients are consistently of the same signs and statistically significant across specifications and in both the fixed effects and random effects estimates. No other coefficients are statistically

¹⁹ We also re-estimated the equations using the same specifications of the independent variables as in Tables 5 and 6, but replacing the dependent variable with the percent of self-employed. We found no statistically significant relationship between regulations and the percent of workers that are self-employed. Again, this result is not consistent with the traditional “exclusion” view of self-employment in developing countries.

²⁰ It should be noted that in a 2011 IMF study, countries with more liberal credit market regulation (i.e. countries who received higher ratings and therefore favor liberalization in credit markets) suffered more in output growth during the late-2000s financial crisis and global recession.

significant at the 10% level in the fixed effects specifications. In the random effects specifications the coefficient on labor regulation freedom variable is unstable; negative and insignificant in the FI specification and positive and significant in the HF specification. However, the coefficients are not statistically significant in the fixed effects estimates. Therefore, the specifications using the economic freedom indices do not provide consistent evidence that labor market regulations affect self-employment earnings penalties/premiums.

In the specification that uses regulation/institution variables from the Doing Business surveys (DB—column 5), the coefficient on the rigidity of employment index is positive and statistically significant in both the fixed and random effects estimates. The interpretation of the positive coefficient is that more regulated and rigid labor regulations are associated with a bigger earnings premium for self-employed workers (or smaller earnings penalty). It may be that the rigidity of employment index is a proxy for the overall regulatory environment. If that were true, then this result is consistent with the previous result that a more regulated economy is correlated with a bigger earnings premium for self-employed workers (or smaller earnings penalty).

To explore whether the impact of the regulatory environment affects the self-employment earnings penalty/premium differently for different demographic groups, we re-estimated equation (2) using, as dependent variables, the median self-employment earnings premium for men and women, rural and urban areas, agriculture and non-agriculture and by education level. The results of the fixed effects estimates for our two Economic Freedom indices are presented in Table 7. For both measures of economic freedom, the impact of “economic freedom” on the self-employment earnings premium is not statistically different for: men compared to women, rural compared to urban workers, or agricultural compared to non-agricultural workers.

The impact of “economic freedom” on the self-employment earnings premium/penalty is different by education level. Specifically, the coefficients on the economic freedom indices are statistically significant for workers at the lowest education levels (primary incomplete and primary graduates), but are smaller and statistically insignificant for workers at the highest education levels (secondary and university graduates). This suggests that a more regulated (less free) economy is correlated with a larger self-employment earnings premium (or a lower penalty), but only for less-educated workers.

Table 8 presents the estimates of the impact of the regulatory environment for workers in different parts of the monthly earnings distribution. The results presented in table 8 present evidence that the regulatory environment has a larger impact on workers at the bottom of the earnings distribution than on workers at the upper part of the distribution. This again suggests that “economic freedom” or the regulatory environment has a larger impact on less-skilled workers than on more-skilled workers.

Finally, Table 9 presents the fixed effects estimates of the Doing Business (DB) specification for workers at different parts of the distribution and for workers at different education levels. As noted previously, the only statistically significant coefficients are on

the rigidity of employment index. This coefficient is largest and most likely to be significant for workers at the lowest education level, again suggesting that regulations affect the self-employment wage differentials for low-skilled workers but not for high-skilled workers. Specifically, a more regulated economic environment (less “economic freedom”) is correlated with a larger self-employment earnings premium for less-skilled workers but not more-skilled workers.

VII. Conclusion

In this paper we calculate self-employment earnings premiums/penalties across countries and examine how they are correlated with various measures of regulations. We find no evidence of systematic and widespread wage penalties in developing economies. For example, we estimate that 85% of workers in low income countries would earn more as self-employed workers than as employees. In middle income countries we do not find strong evidence of either a systematic self-employment earnings premium or a penalty. On the other hand, we find self-employed workers are much more likely to be penalized in high income countries compared to less-developed countries; over 90% of workers in high income countries are estimated to face an earnings penalty.

In low income countries, workers with lower levels of education are more likely to face a self-employment earnings premium. The pattern with respect to education persists, to a lesser extent, in middle-income countries. We find no evidence of a systematic difference between any other demographic groups.

Using a country-level panel data set to estimate regressions examining the relationship between a more-regulated economic environment (less “economic freedom”) and self-employment earnings premiums/penalties, we find evidence that, relative to employees, the self-employed are paid higher earnings in more regulated economies. That is, after controlling for country-level fixed-effects, GDP per capita and other macroeconomic variables, the self-employed are more likely to face a earnings premium in more-regulated economies and a penalty in economies with fewer regulations. In particular, we find that the level of property rights and credit markets have a statistically significant impact on the self-employment wage gap; workers are more likely to face a self-employment earnings penalty if property rights are well-enforced and if credit markets are more regulated. We further find that these regulations have a bigger impact on the self-employment wage gap for less-skilled workers compared to more-skilled workers. Note that because the samples used to estimate these regressions include mostly upper-middle and high-income countries, these results tell us most about the impact of regulations and institutions in upper-middle- and high-income countries.

These results clearly do not support the traditional “exclusion” or labor market segmentation hypothesis, which implies that workers in developing economies should face a self-employment earnings penalty. On the contrary, our results suggest a positive self-employment premium in low income countries, and the absence of a substantial penalty in middle-income countries. In the traditional view, poorly educated workers and

less-skilled workers are most likely to have been rationed out of more productive wage employment opportunities. Yet our results indicate that the self-employment premium in low-income countries is largest for these groups. Finally, the traditional view holds that labor market segmentation exists because labor market and other regulations limit the opportunities available for formal sector employment. However, we find no evidence from the regressions that government regulations, especially labor market regulations, create earnings penalties for self-employed workers. If anything our results suggest that workers in more regulated economies are more likely to face earnings premiums for self-employment, and workers in less-regulated economies are more likely to face earnings penalties for self-employment (after controlling for GDP per capita, inflation, etc.).²¹

Our evidence is consistent with the view that earnings gaps between the self-employed and employees are due to efficiency wages and the sharing of quasi-rents. It is likely that firms in low-income countries are less productive, compared to those in more developed countries, and offer fewer resources that boost worker productivity. Therefore, there are fewer firm rents in low-income countries to share with workers. Then, as countries develop and firms gain access to innovative technologies, the productivity of employees in firms increases and they are able to share more of their quasi-rents with workers, increasing the wages of employees relative to the self-employed. It is also reasonable to expect that the bargaining power of employees will increase as countries develop. If the bargaining power of workers is positively correlated with level of development and labor productivity, then the relationship between the worker's share of quasi-rents with development and productivity will be even stronger. Further, if education and innovation are complementary inputs into production, then we would expect that quasi-rents are more likely to be shared with more educated workers, compared to the less-educated. Thus we might expect the earnings premiums for self-employment to be higher for the less-skilled, and lower for the more-skilled, in low-income countries.

These results have important policy implications. Reforming labor regulations is politically challenging in almost every setting and in some cases regulations can help compensate for imperfect or incomplete markets. Before investing large amounts of political capital in uncertain efforts to loosen labor regulations, it is important to be confident that these regulations are in fact major causes of segmented labor markets. We find no evidence that regulations are an important cause of segmented labor markets in developing economies. Instead, ensuring appropriate levels of regulation, particularly with respect to property rights and credit markets, can help more workers benefit from

²¹ Also in the traditional view countries with more restrictive regulations should exhibit a larger self-employed sector. To examine this issue we estimated the same regulation regressions as in the paper but use the percent self-employed as the dependent variable. There is no evidence from these regressions that increased regulations lead to a larger self-employed sector.

the productivity advantages provided by firms.

References:

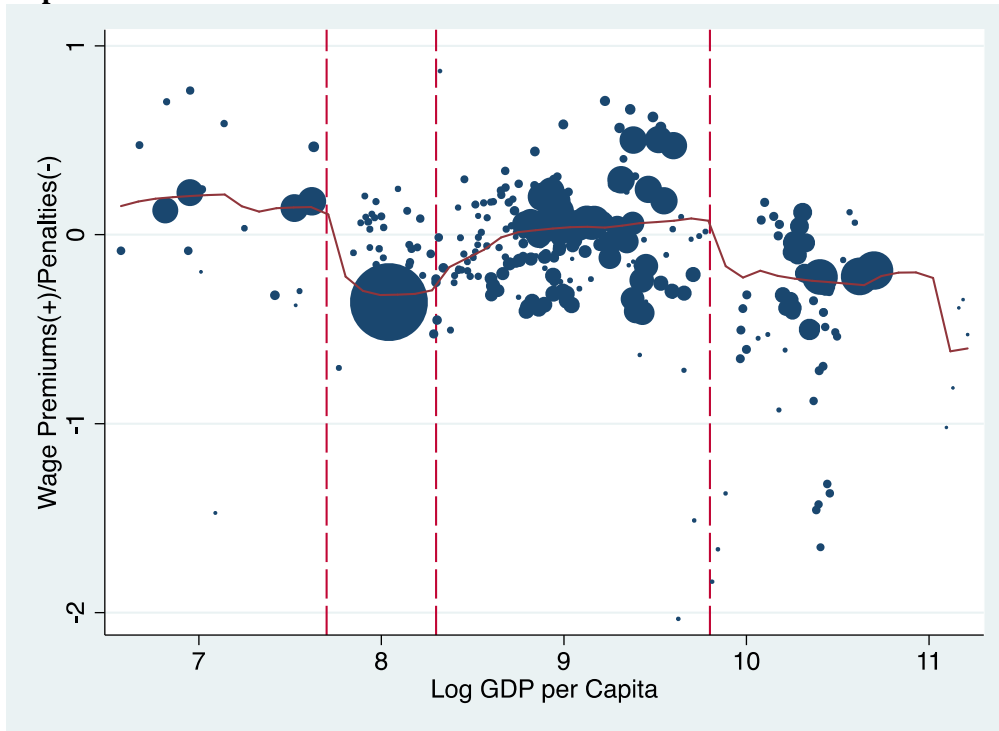
- Abowd, John, Francis Kramarz, Paul Lengermann, Kevin McKinney and Sebastien Roux (2012), "Persistent inter-industry wage differences: rent sharing and opportunity costs," *IZA Journal of Labor Economics*, 1:7.
- Aleksynska, M., and M. Schindler. 2011. "Labor Market Institutions in Advanced and Developing Countries: A New Panel Database." *IMF Working Paper No. 11/154*.
- Ardagna, Silvia, and Annamaria Lusardi. 2008. "Explaining International Differences in Entrepreneurship: The Role of Individual Characteristics and Regulatory Constraints." *NBER Working Paper No. 14012*.
- . 2010. "Heterogeneity in the Effect of Regulation on Entrepreneurship and Entry Size." *Journal of the European Economic Association* 8 (2-3): 594–605.
- Arias, Omar, and Melanie Khamis. 2009. "Comparative Advantage, Segmentation and Informal Earnings: A Marginal Treatment Effects Approach." *IZA Discussion Paper No. 3916*.
- Bargain, Olivier, and Prudence Kwenda. 2011. "Earnings Structures, Informal Employment, And Self-Employment: New Evidence From Brazil, Mexico, And South Africa." *Review of Income and Wealth* 57 (s1): S100–S122.
- Basch, Michael, and Ricardo D. Paredes-Molina. 1996. "Are There Dual Labor Markets in Chile?: Empirical Evidence." *Journal of Development Economics* 50 (2): 297–312.
- Becker, Gary S. 1962. "Investment in Human Capital: A Theoretical Analysis." *The Journal of Political Economy* 70 (5): 9–49.
- Besley, Timothy, and Robin Burgess. 2004. "Can Labor Regulation Hinder Economic Performance? Evidence from India." *The Quarterly Journal of Economics* 119 (1): 91–134.
- Bryan, Gharad, Shyamal K. Chowdhury, and Ahmed Mushfiq Mobarak. Seasonal migration and risk aversion. Centre for Economic Policy Research, 2012.
- Botero, J., S. Djankov, R. La Porta, F. Lopez-de-Silanes, and A. Shleifer. 2004. "The Regulation of Labor." *The Quarterly Journal of Economics* 119 (4): 1339–82.
- Busse, Matthias, and Jose Luis Groizard. 2008. "Foreign Direct Investment, Regulations and Growth." *The World Economy* 31 (7): 861–86.
- Cahuc, Pierre, Fabien Postel-Vinay, and Jean-Marc Robin. "Wage bargaining with on-the-job search: Theory and evidence." *Econometrica* 74.2 (2006): 323-364.
- Cuñat, Alejandro, and Marc J. Melitz. 2011. "Volatility, Labor Market Flexibility, and the Pattern of Comparative Advantage." *Journal of the European Economic Association* 10 (2): 225–54.
- De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2010. "Who Are the Microenterprise Owners? Evidence from Sri Lanka on Tokman versus De Soto." In *International Differences in Entrepreneurship*, 63–87. University of Chicago Press.
- De Soto, H. 1989. *The Other Path: The Economic Answer to Terrorism*. New York: HarperCollins.

- Dickens, William, and Lawrence F. Katz. "Inter-Industry Wage Differences and Industry Characteristics." *Unemployment and the Structure of Labor Markets*, Basil. 1987.
- Djankov, Simeon, T. Ganser, C. McLiesh, R. Ramalho, and A. Shleifer. 2008. "The Effect of Corporate Taxes on Investment and Entrepreneurship." *NBER Working Paper No. 13756*.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer. 2002. "The Regulation of Entry." *Quarterly Journal of Economics* 117 (1): 1–37.
- Djankov, Simeon, and R. Ramalho. 2009. "Employment Laws in Developing Countries." *Journal of Comparative Economics* 37 (1): 3–13.
- Eslava, Marcela, John Haltiwanger, Adriana Kugler and Maurice Kugler. 2010. "Facrot Adjustments after Deregulation: Panel Evidence from Colombian Plants," *The Review of Economics and Statistics* 92(2): 378-391.
- Feldmann, Horst. 2009. "The Unemployment Effects of Labor Regulation around the World." *Journal of Comparative Economics* 37 (1): 76–90.
- Fields, G. S. 2005. "A Guide to Multisector Labor Market Models." *World Bank, Social Protection Working Paper No. 0505*.
- . 2009. "Segmented Labor Market Models in Developing Countries." In *The Oxford Handbook of Philosophy of Economics*, 476–510. New York: Oxford University Press.
- Freeman, R. 2009. "Labor Regulations, Unions, and Social Protection in Developing Countries: Market Distortion or Efficient Institutions." *NBER Working Paper No. 14789*.
- Freund, Caroline, and Bineswaree Bolaky. 2008. "Trade, Regulations, and Income." *Journal of Development Economics* 87 (2): 309–21.
- Freund, Caroline and Bob Rijkers (2013), "Employment Miracles," mimeo, The World Bank, Washington, April.
- Frölich, Markus, and Blaise Melly. 2010, "Estimation of quantile treatment effects with Stata." *Stata Journal* 10 (3): 423.
- Gallagher, Mary, John Giles, Albert Park and Meiyang Wang. 2013. "China's 2008 Labor Contract Law: Implementation and Implications for China's Workers," *World Bank Policy Research Working Paper No. 6542*, July.
- Gindling, T. H. 1991. "Labor Market Segmentation and the Determination of Wages in the Public, Private-Formal, and Informal Sectors in San Jose, Costa Rica." *Economic Development and Cultural Change*, 585–605.
- Gindling, T. H., and David Newhouse. 2013. "Self-Employment in the Developing World." *World Bank Policy Research Working Paper No. 62101*.
- Hallward-Driemeier, Mary, and David Stewart. 2004. "How Do Investment Climate Conditions Vary Across Countries, Regions and Types of Firms?" *Background Paper Prepared for the World Development Report 2005: A Better Investment Climate for Everyone*. The World Bank, Washington, DC.
- Harris, John R. & Todaro, Michael P. (1970), "Migration, Unemployment and Development: A Two-Sector Analysis", [*American Economic Review*](#) 60 (1): 126–142.

- Heckman, James J. (1979). "Sample selection bias as a specification error," *Econometrica* 47 (1): 153–61.
- Heckman, James J., and V. Joseph Hotz. 1986. "An Investigation of the Labor Market Earnings of Panamanian Males: Evaluating the Sources of Inequality." *Journal of Human Resources* 21 (4): 507–42.
- Heckman, James J., and Carmen Pagés. 2004. *Carmen Pages, eds.(2004) Law and Employment: Lessons from Latin America and the Caribbean*. New York: University of Chicago Press.
- Helpman, Elhanan, and Oleg Itskhoki. 2010. "Labour Market Rigidities, Trade and Unemployment." *Review of Economic Studies* 77 (3): 1100–1137.
- Hurst, Erik, Geng Li and Benjamin Pugsley, 2010. "Are Household Surveys Like Tax Forms: Evidence from Income Underreporting of the Self Employed," *NBER Working Papers* 16527.
- Jensen, Robert. "Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India." *The Quarterly Journal of Economics* 127.2 (2012): 753-792.
- Krueger, Alan B., and Lawrence H. Summers. "Efficiency Wages and the Inter-industry Wage Structure." *Econometrica* 56.2 (1988): 259-93.
- Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *The American Economic Review* 45 (1): 1–28.
- La Porta, Rafael, and Andrei Shleifer. 2008. "The Unofficial Economy and Economic Development." *Brookings Papers on Economic Activity*, no. 2 (August): 275–352.
- Launov, Andrey. 2006. "Competitive and Segmented Informal Labor Markets." *IZA Discussion Paper No. 2349*.
- Lee, Eddy. 1998. *The Asian Financial Crisis: The Challenge for Social Policy*. International Labour Organization.
- Lee, Sangheon, Deirdre McCann, and Nina Torm. 2009. "The World Bank's 'Employing Workers' Index: Findings and critiques—A Review of Recent Evidence." *International Labour Review* 147 (4): 416–32.
- Lehmann, Hartmut, and Alexander Muravyev. 2012. "Labor Market Institutions and Informality in Transition and Latin American Countries." *IZA Discussion Paper No. 7035*.
- Maloney, W. F. 1999. "Does Informality Imply Segmentation in Urban Labor Markets? Evidence from Sectoral Transitions in Mexico." *The World Bank Economic Review* 13 (2): 275–302.
- . 2004. "Informality Revisited." *World Development* 32 (7): 1159–78.
- Meghir, Costas, Renata Narita, and Jean-Marc Robin. 2012. "Informality in Developing Countries." *NBER Working Paper No. 18347*.
- Micco, Alejandro, and Carmen Pagés. 2006. "The Economic Effects of Employment Protection: Evidence from International Industry-Level Data." *IZA Discussion Paper No. 2433*.
- Mincer, Jacob. 1962. "On-the-Job Training: Costs, Returns, and Some Implications." *The Journal of Political Economy* 70 (5): 50–79.

- Montenegro, C. E., and M. L. Hirn. 2009. "A New Disaggregated Set of Labor Market Indicators Using Standardized Household Surveys from Around the World." *Background Paper for the World Development Report 2009*.
- Nguyen, Huu, Christophe Nordman, and Francois Roubaud. 2013. "Who Suffers the Penalty? A Panel Data Analysis of Earnings Gaps in Vietnam." *IZA Discussion Paper 7149*.
- Perry, Guillermo, William Maloney, Omar Arias, Pablo Fajnzylber, Andrew Mason, and Jaime Saavedra. 2007. "Informality: Exit and Exclusion, World Bank Latin America and Caribbean Studies." *World Bank, Washington DC*.
- Pierre, Gaëlle, and Stefano Scarpetta. 2004. "Employment Regulations through the Eyes of Employers: Do They Matter and How Do Firms Respond to Them?" *IZA Discussion Papers 1424*.
- Roy, Andrew D. (1951), "Some Thoughts on the Distribution of Earnings," *Oxford Economic Papers*, 3:135-146.
- Saavedra, Jaime, and Alberto Chong. 1999. "Structural Reform, Institutions and Earnings: Evidence from the Formal and Informal Sectors in Urban Peru." *The Journal of Development Studies* 35 (4): 95–116.
- Sabirianova Peter, Klara. 2009. "Income Tax Flattening: Does It Help to Reduce the Shadow Economy?" *IZA Discussion Papers 4223*.
- Schneider, F., A. Buehn, and C. E. Montenegro. 2010. "New Estimates for the Shadow Economies All over the World." *International Economic Journal* 24 (4): 443–61.
- Schultz, Theodore W. 1961. "Investment in Human Capital." *The American Economic Review* 51 (1): 1–17.
- Smith, James P., Duncan Thomas, Elizabeth Frankenberg, Kathleen Beegle, and Graciela Teruel. 2002. "Wages, Employment and Economic Shocks: Evidence from Indonesia." *Journal of Population Economics* 15 (1): 161–93.
- Tokman, Victor E. 1978. "An Exploration into the Nature of Informal—formal Sector Relationships." *World Development* 6 (9): 1065–75.
- Tokman, Víctor E. 1984. "Wages and Employment in International Recessions: Recent Latin American Experience." *Helen Kellogg Institute for International Studies, University of Notre Dame* 11.
- Van Reenen, John (1996), "The Creation and Capture of Rents: Wages and Innovation in a Panel of U.K. Companies," *The Quarterly Journal of Economics*:195-226.
- Van Stel, André, David Storey, and A. Thurik. 2007. "The Effect of Business Regulations on Nascent and Young Business Entrepreneurship." *Springer, Small Business Economics* 28 (2): 171–86.
- World Bank. 2013. "Doing Business 2013: Smarter Regulations for Small and Medium-Size Enterprises". Washington, DC: World Bank Group.

Figure 1: Median Self-Employment Earnings Premiums(+)/Penalties(-) and Per Capita Gross Domestic Product



Notes: Each dot represents a country/year observation. The larger the dot, the larger the population and the greater weight that observation is given in the non-parametric estimate of the relationship between the earnings premium/penalty and the log GDP per capita. The vertical dotted lines represent income of \$2,500, \$4,000 and \$16,500 respectively.

Table 1: Self-Employment Earnings Premiums & Penalties, by Income Group and Regions of the World

	Percent Workers with Earnings Penalty	Mean Premium(+)/Penalty(-) (Local Linear Regressions)	Mean Premium(+)/Penalty(-) (OLS)	Number of Surveys (countries/year)	Number of Countries
Total sample	44.46	-0.02	-0.02	338	67
Income group					
Low Income	15.06	0.22	0.20	33	20
Low Middle Income	49.84	-0.08	-0.07	128	24
Upper Middle Income	27.09	0.07	0.07	112	23
High Income	91.03	-0.25	-0.25	65	16
REGION					
<i>Latin America & Caribbean</i>	34.32	0.01	0.00	212	19
<i>Western Europe</i>	85.61	-0.27	-0.27	54	12
<i>Eastern Europe & Central Asia</i>	17.98	0.24	0.23	46	18
<i>Other Regions:</i>	62.11	-0.08	-0.08	26	18
<i>East Asia & Pacific</i>	60.07	-0.13	-0.12	2	2
<i>Middle East & North Africa</i>	3.35	0.41	0.40	2	2
<i>North America</i>	99.92	-0.21	-0.21	3	1
<i>South Asia</i>	10.75	0.23	0.22	4	2
<i>Sub-Saharan Africa</i>	78.24	-0.07	-0.12	15	11

Notes: Overall, income group and region averages are the population-weighted means. Eastern European and Central Asian countries include former socialist countries, which extend east from the border of Germany and south from the Baltic Sea to the border with Greece. They also include four former socialist countries in Central Asia (Azerbaijan, Tajikistan, Turkmenistan, Kyrgyz Republic). Western European countries include high-income countries only. High Income countries include all 54 Western European countries, the U.S. and Puerto Rico, and Slovenia and Estonia in Eastern Europe.

Table 2: Self-Employment Earnings Premiums (+) and Penalties (-) at Different Points in the Distribution of Earnings, by Income Group and Regions of the World

	Mean Premium (+)/Penalty (-) (Local Linear Regressions)	Earnings premium (+)/Penalty (-) at Different Points in the Earnings Distribution	
		At 5th percentile	At 95th percentile
Total Sample	-0.02	-0.03	-0.04
Income group			
Low Income	0.22	0.29	0.19
Low Middle Income	-0.08	-0.08	-0.15
Upper Middle Income	0.07	0.05	0.07
High Income	-0.25	-0.28	-0.21
Region			
Latin America & Caribbean	0.00	-0.01	0.01
Western Europe	-0.27	-0.28	-0.25
Eastern Europe & Central Asia	0.24	0.20	0.25
Other	-0.08	-0.06	-0.18

Notes: Overall, income group and region averages are the population-weighted means. Central and Eastern European countries includes former socialist countries, which extend east from the border of Germany and south from the Baltic Sea to the border with Greece. It also includes four former socialist countries in Central Asia (Azerbaijan, Tajikistan, Turkmenistan, Kyrgyz Republic). Western European countries include high-income countries only. High Income countries include all 54 Western European countries, the U.S. and Puerto Rico, and Slovenia and Estonia in Eastern Europe.

Table 3: Mean Self-Employment Earnings Premiums (+) and Penalties (-), By Population Subgroups, Income Group and Regions of the World

	Female	Male	Rural	Urban	Agriculture Sector	Non-Agriculture	Primary Inc. Educ.	Primary Grad.	Secondary Grad. and Univ. Inc. Educ.	Univ. Grad.
Total sample	-0.02	-0.03	0.00	-0.06	0.04	-0.06	0.03	-0.03	-0.05	-0.08
Income group										
Low Income	0.14	0.23	0.24	0.16	0.37	0.13	0.24	0.20	0.13	0.08
Low Middle Income	-0.03	-0.11	-0.03	-0.18	0.10	-0.20	0.01	-0.09	-0.14	-0.13
Upper Middle Income	0.07	0.07	0.08	0.08	0.06	0.07	0.07	0.06	0.06	0.01
High Income	-0.27	-0.24	-0.25	-0.25	-0.22	-0.25	-0.16	-0.26	-0.26	-0.24
Region										
Latin America & Caribbean	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Western Europe	-0.28	-0.26	-0.27	-0.27	-0.26	-0.27	-0.09	-0.27	-0.28	-0.27
Eastern Europe & Central Asia	0.25	0.24	0.25	0.26	0.19	0.25	0.25	0.21	0.23	-0.13
Other	-0.05	-0.12	-0.01	-0.23	0.24	-0.28	0.05	-0.11	-0.19	-0.20

Note: Primary Inc. Educ. represents less than 6 years of education; Primary Grad. represents 6 to 11 years of education; Secondary Grad. And Univ. Inc. Educ. represents 12 to 15 years of education; and Univ. Grad. represents 16 or more years of education. Overall, income group and region averages are the population-weighted means. Eastern European & Central Asian countries include former socialist countries, which extend east from the border of Germany and south from the Baltic Sea to the border with Greece. They also include four former socialist countries in Central Asia (Azerbaijan, Tajikistan, Turkmenistan, Kyrgyz Republic). High Income countries include all 54 Western European countries, the U.S. and Puerto Rico, and Slovenia and Estonia in Eastern Europe.

Table 4: For Different Regression Samples: Self-Employment Earnings Premiums & Penalties, by Income Group and Region of the World

	% Workers with Earnings Penalty	Mean Premium (+)/Penalty(-) (OLS)	Mean Premium (+)/Penalty(-) (Local Linear Regressions)	Number of Surveys (countries/year)
Full HF Sample	47.71	-0.04	-0.04	292
Income group				
Low Income	13.47	0.21	0.23	19
Low Middle Income	53.34	-0.10	-0.10	111
Upper Middle Income	30.86	0.06	0.06	99
High Income	90.03	-0.25	-0.25	63
REGION				
Latin America & Caribbean	42.89	-0.03	-0.03	177
Western Europe	85.61	-0.27	-0.27	54
Eastern Europe & Central Asia	60.02	0.23	0.24	43
Sub-Saharan Africa	84.55	-0.14	-0.13	10
Other	49.34	-0.06	-0.06	8
Full FI Sample	53.95	-0.10	-0.10	196
Income group				
Low Income	1.95	0.28	0.30	6
Low Middle Income	49.49	-0.10	-0.10	64
Upper Middle Income	40.51	-0.05	-0.05	65
High Income	88.32	-0.26	-0.26	61
REGION				
Latin America & Caribbean	42.89	-0.07	-0.06	111
Western Europe	85.61	-0.27	-0.27	54
Eastern Europe & Central Asia	60.02	-0.19	-0.19	24
Sub-Saharan Africa	84.55	-0.11	-0.10	4
Other	49.34	0.05	0.05	3
DB Sample	50.78	-0.05	-0.05	117
Income group				
Low Income	--	--	--	--
Low Middle Income	81.77	-0.14	-0.14	27
Upper Middle Income	34.77	0.04	0.05	53
High Income	84.06	-0.27	-0.27	37
REGION				
Latin America & Caribbean	51.11	-0.08	-0.07	58
Western Europe	83.84	-0.26	-0.26	31
Eastern Europe & Central Asia	17.45	0.22	0.23	23
Sub-Saharan Africa	83.54	-0.27	-0.25	5
Other	--	--	--	--

Table 5: Random Effects Estimates of the Impact of Regulations/Institutions on the Self-Employment Earnings Premium(+)/Penalty(-)

Dependent Variable: Median Earnings premium(+)/Penalty(-)					
<i>SPECIFICATIONS:</i>	Random Effects				
<i>All Independent Variables are Logged</i>	Model 1 Economic Freedom Indices		Model 2 Subcomponents of Economic Freedom Indices		Model 3 Doing Business Specification
	(HF)	(FI)	(EF)	(FI)	(DB)
Economic Freedom index	-0.528*** (0.145)	-0.490* (0.272)			
Rule of law/Property Rights			-0.201 (0.151)	-0.315** (0.132)	
Labor Regulations Freedom			0.427** (0.180)	-0.144 (0.119)	
Business Regulations Freedom			-0.114 (0.108)	0.147 (0.144)	
Credit Markets Freedom			-0.226*** (0.086)	-0.255* (0.136)	
Trade Freedom			-0.262** (0.123)	0.159 (0.193)	
Government Size			-0.076 (0.076)	-0.048 (0.107)	
Rigidity of Employment Index					0.130* (0.066)
Procedures to start a business (number)					0.182 (0.167)
Credit to Private Sector (% of GDP)(WDI)					0.218 (0.150)
Total Tax Rate (% profit)					-0.352* (0.199)
Trade (% of GDP)					-0.216 (0.155)
GDP per capita	-1.550** (0.710)	1.658 (1.830)	4.681 (2.948)	4.315 (3.265)	-1.183 (4.943)
GDP^2 per capita	0.089** (0.039)	-0.092 (0.102)	-0.267 (0.164)	-0.210 (0.183)	0.062 (0.270)
Inflation rate	0.060 (0.128)	-0.199 (0.208)	-0.232 (0.392)	0.094 (0.277)	-0.436 (0.495)
Employment to Population Ratio	-0.402 (0.254)	0.308 (0.424)	0.203 (0.452)	0.015 (0.450)	-0.031 (0.633)
<i>Year Dummies</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Region Dummies</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	292	196	154	180	116
Number of Countries	57	43	44	36	36
R2 (within)	0.183	0.213	0.201	0.311	0.189

Note: The R2 reported refer to variation within countries. The Economic Freedom Index in Model 1 refers to the Heritage Foundation's Index of Economic Freedom (equation 1) and to the Economic Freedom of the World Index from the Frasier Institute (equation 2). Standard errors in parentheses * p<0.10, ** p<0.05, ***p<0.01

Table 6: Fixed Effects Estimates of the Impact of Regulations/Institutions on the Self-Employment Earnings Premium (+)/Penalty (-)

Dependent Variable: Median Earnings premium (+)/Penalty(-)					
SPECIFICATIONS:	Fixed Effects				
<i>All Independent Variables are Logged</i>	Model 1 Economic Freedom Indices		Model 2 Subcomponents of Economic Freedom Indices		Model3 Doing Business Specification (DB)
	(HF)	(FI)	(HF)	(FI)	
Economic Freedom index	-0.389*	-0.853**			
	(0.229)	(0.386)			
Rule of law/Property Rights			-0.145	-0.409**	
			(0.221)	(0.156)	
Labor Regulations Freedom			0.272	-0.177	
			(0.179)	(0.136)	
Business Regulations Freedom			-0.108	0.158	
			(0.175)	(0.114)	
Credit Markets Freedom			-0.192	-0.231**	
			(0.127)	(0.099)	
Trade Freedom			-0.288	0.054	
			(0.349)	(0.160)	
Government Size			-0.206	-0.111	
			(0.210)	(0.117)	
Rigidity of Employment Index					0.257**
					(0.100)
Procedures to start a business (number)					-0.424
					(0.361)
Credit to Private Sector (% of GDP)(WDI)					0.010
					(0.270)
Total Tax Rate (% profit)					-0.262
					(0.293)
Trade (% of GDP)					-0.194
					(0.271)
GDP per capita	0.992	2.431	4.356	2.331	-9.755
	(1.514)	(2.817)	(6.735)	(4.176)	(9.004)
GDP^2 per capita	-0.026	-0.082	-0.272	-0.064	0.575
	(0.089)	(0.164)	(0.380)	(0.239)	(0.510)
Inflation rate	0.098	-0.236	-0.539	0.162	-1.308**
	(0.123)	(0.167)	(0.367)	(0.157)	(0.597)
Employment to Population Ratio	-0.147	-0.187	1.099	-0.471	-1.231
	(0.443)	(0.506)	(1.315)	(0.483)	(1.898)
Year Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	292	196	154	179	116
Number of Countries	57	43	44	36	36
R2 (within)	0.231	0.291	0.222	0.337	0.240

*Note: Fixed estimates report standard errors robust to heteroskedasticity. The R2 reported refer to variation within countries. Standard errors in parentheses * p<0.10, ** p<0.05, ***p<0.01*

Table 7: Fixed Effects Estimates of the Impact of Regulations and Economic Growth on the Self-Employment Earnings Premium (+)/Penalty(-), for Different Demographic Groups

Dependent Variable: Median Earnings premium (+)/Penalties (-) (by subgroups)										
Fixed Effect Regressions	Female	Male	Rural	Urban	Agriculture Sector	Non-Agri-Culture	Primary Inc. Educ.	Primary Grad.	Sec. Grad. & Univ. Inc. Educ.	Univ. Grad.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Economic Freedom index (HF)	-0.391 (0.238)	-0.382* (0.222)	-0.460 (0.279)	-0.518** (0.249)	-0.242 (0.211)	-0.397* (0.236)	-0.360 (0.265)	-0.389* (0.228)	-0.330 (0.243)	-0.158 (0.195)
Log GDP per capita	2.201 (1.680)	-0.013 (1.345)	2.056 (1.732)	-3.344* (1.967)	2.887 (2.316)	-1.778 (1.667)	2.716 (1.932)	0.820 (1.445)	-2.207* (1.315)	1.671 (1.692)
Log GDP^2 per capita	-0.091 (0.096)	0.028 (0.079)	-0.087 (0.098)	0.209* (0.111)	-0.126 (0.126)	0.124 (0.096)	-0.113 (0.108)	-0.016 (0.086)	0.155** (0.076)	-0.056 (0.099)
Log Inflation	0.105 (0.127)	0.096 (0.119)	0.181 (0.190)	0.111 (0.141)	0.216 (0.192)	0.115 (0.126)	0.315* (0.185)	0.084 (0.121)	0.249* (0.126)	0.119 (0.093)
Log Employment to Population Ratio	-0.164 (0.454)	-0.010 (0.407)	-0.260 (0.445)	-0.048 (0.389)	0.022 (0.428)	-0.118 (0.402)	-0.402 (0.510)	-0.210 (0.445)	-0.124 (0.350)	0.092 (0.397)
Year Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	292	292	281	281	292	291	244	291	289	279
Countries	57	57	56	56	57	57	48	57	56	54
R2	0.238	0.240	0.245	0.255	0.257	0.227	0.314	0.235	0.238	0.260

Fixed Effect Regressions	Female	Male	Rural	Urban	Agriculture Sector	Non-Agri-Culture	Primary Inc. Educ.	Primary Grad.	Sec. Grad. & Univ. Inc. Educ.	Univ. Grad.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Economic Freedom index (FI)	-0.895** (0.397)	-0.808** (0.365)	-0.992** (0.374)	-0.774* (0.390)	-0.799** (0.346)	-0.796** (0.389)	-1.089** (0.454)	-0.860** (0.392)	-0.609 (0.396)	-0.458 (0.387)
Log GDP per capita	3.306 (3.137)	2.277 (2.706)	3.985 (2.987)	1.860 (2.712)	10.953** (4.196)	1.940 (2.748)	7.170* (4.212)	1.798 (2.731)	0.804 (2.666)	2.239 (2.170)
Log GDP^2 per capita	-0.129 (0.182)	-0.075 (0.158)	-0.161 (0.175)	-0.055 (0.158)	-0.557** (0.238)	-0.059 (0.160)	-0.340 (0.242)	-0.047 (0.160)	-0.003 (0.154)	-0.092 (0.124)
Log Inflation	-0.221 (0.168)	-0.228 (0.162)	-0.220 (0.174)	-0.231 (0.158)	-0.241 (0.194)	-0.230 (0.158)	-0.236 (0.205)	-0.257 (0.165)	-0.219 (0.150)	-0.225 (0.150)
Log Employment to Population Ratio	-0.247 (0.511)	-0.105 (0.507)	-0.254 (0.557)	-0.212 (0.490)	0.197 (0.577)	-0.200 (0.495)	-0.639 (0.693)	-0.211 (0.519)	-0.035 (0.387)	0.093 (0.351)
Year Dummies	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	196	196	192	192	196	196	150	196	196	195
Countries	43	43	41	41	43	43	34	43	43	42
R2	0.275	0.307	0.312	0.280	0.361	0.269	0.404	0.290	0.241	0.237

*Note: Fixed estimates report standard errors robust to heteroskedasticity. The R2 reported refer to variation within countries. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

Table 8: Impact of Regulations and Economic Growth on the Self-Employment Earnings Premium (+)/Penalty (-), at Different Points in the Distribution of Monthly Earnings

Dependent Variable: Median Earnings Premium (+)/Penalty (-)					
<i>SPECIFICATIONS:</i>	Fixed Effects				
<i>Position in the Distribution of Monthly Earnings</i>	<i>ALL</i>	<i>5th</i>	<i>10th</i>	<i>90th</i>	<i>95th</i>
	(1)	(2)	(3)	(4)	(5)
Economic Freedom index (HF)	-0.389*	-0.440	-0.442*	-0.009	0.004
	(0.229)	(0.293)	(0.249)	(0.266)	(0.252)
Log GDP per capita	0.992	-3.845**	-3.053*	2.255	2.003
	(1.514)	(1.762)	(1.569)	(2.487)	(2.620)
Log GDP ² per capita	-0.026	0.284***	0.227***	-0.099	-0.081
	(0.089)	(0.097)	(0.084)	(0.139)	(0.146)
Log Inflation	0.098	0.447	0.411	0.094	0.098
	(0.123)	(0.325)	(0.255)	(0.235)	(0.236)
Log Employment to Population Ratio	-0.147	-0.439	-0.462	-0.136	-0.295
	(0.443)	(0.514)	(0.472)	(0.497)	(0.567)
<i>Year Dummies</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
Observations	292	292	292	292	291
Number of Countries	57.000	57.000	57.000	57.000	57.000
R2 (within)	0.231	0.270	0.265	0.328	0.340
Economic Freedom index (FI)	-0.853**	-1.254**	-1.070**	-0.568	-0.753**
	(0.386)	(0.529)	(0.460)	(0.353)	(0.368)
Log GDP per capita	2.431	-1.716	-0.957	11.451*	10.903
	(2.817)	(3.703)	(3.253)	(5.958)	(6.579)
Log GDP ² per capita	-0.082	0.195	0.142	-0.611*	-0.574
	(0.164)	(0.220)	(0.189)	(0.335)	(0.370)
Log Inflation	-0.236	0.286	0.292	-0.449**	-0.475**
	(0.167)	(0.312)	(0.314)	(0.212)	(0.210)
Log Employment to Population Ratio	-0.187	-1.053*	-1.102*	0.540	0.427
	(0.506)	(0.542)	(0.553)	(0.540)	(0.602)
<i>Year Dummies</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	196	196	196	196	195
Number of Countries	43.000	43.000	43.000	43.000	43.000
R2 (within)	0.291	0.298	0.280	0.399	0.395

*Note: Fixed estimates report standard errors robust to heteroskedasticity. The R2 reported refer to variation within countries. Standard errors in parentheses * p<0.10, ** p<0.05, ***p<0.01*

Table 9: Impact of Regulations and Economic Growth on the Self-Employment Earnings Premium (+)/Penalty (-)

Dependent Variable: Median Earnings Premium (+)/Penalty(-)									
SPECIFICATIONS:									
	Fixed Effects								
<i>FI</i>	<i>ALL</i>	<i>5th</i>	<i>10th</i>	<i>90th</i>	<i>95th</i>	<i>Primary Inc. Educ.</i>	<i>Primary Grad.</i>	<i>Secondary Grad. and Univ. Inc. Educ.</i>	<i>Univ. Grad.</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP per capita	-9.755 (9.004)	-12.849 (16.229)	-5.934 (9.556)	-0.764 (7.315)	4.942 (6.915)	-36.237*** (11.946)	-9.627 (8.468)	-17.817 (12.578)	1.056 (7.136)
GDP^2 per capita	0.575 (0.510)	0.758 (0.941)	0.346 (0.553)	0.077 (0.422)	-0.251 (0.406)	1.971*** (0.635)	0.572 (0.479)	1.029 (0.706)	-0.039 (0.402)
Inflation	-1.308** (0.597)	-1.999 (1.232)	-1.078 (0.789)	-1.942** (0.768)	-1.669** (0.818)	-0.591 (0.539)	-1.286** (0.563)	0.020 (0.439)	0.008 (0.750)
Employment to Population Ratio	-1.231 (1.898)	-1.658 (2.080)	-1.044 (1.869)	-1.637 (1.938)	-1.134 (2.033)	0.719 (2.755)	-1.325 (1.828)	-1.561 (2.090)	-0.315 (1.788)
Rigidity of Employment Index (DB)	0.257** (0.100)	0.087 (0.126)	0.104 (0.094)	0.019 (0.098)	-0.063 (0.093)	0.302*** (0.053)	0.263*** (0.093)	0.222* (0.128)	0.058 (0.076)
Procedures to start a business (number)	-0.424 (0.361)	0.033 (0.410)	-0.045 (0.365)	-0.106 (0.314)	-0.005 (0.296)	-0.352 (0.375)	-0.436 (0.360)	-0.468 (0.481)	-0.193 (0.210)
Credit to Private Sector (% of GDP)	0.010 (0.270)	0.013 (0.387)	0.223 (0.328)	-0.098 (0.269)	-0.174 (0.299)	0.446 (0.386)	0.061 (0.257)	0.027 (0.265)	-0.092 (0.268)
Total Tax Rate (% profit)	-0.262 (0.293)	0.281 (0.556)	0.289 (0.460)	-0.004 (0.359)	0.257 (0.437)	0.142 (0.420)	-0.260 (0.294)	-0.222 (0.277)	-0.215 (0.350)
Trade (WDI)	-0.194 (0.271)	-0.369 (0.458)	-0.324 (0.383)	0.099 (0.325)	0.188 (0.343)	-0.222 (0.312)	-0.173 (0.258)	-0.286 (0.246)	-0.190 (0.264)
<i>Year Dummies</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
Observations	116	116	116	116	116	87	115	115	108
Number of Countries	36.000	36.000	36.000	36.000	36.000	27.000	36.000	36.000	34.000
R2 (within)	0.240	0.096	0.066	0.246	0.207	0.430	0.282	0.247	0.037

*Note: Fixed estimates report standard errors robust to heteroskedasticity. The R2 reported refer to variation within countries. Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

APPENDIX

Table A1: Percent Self-Employed, by Income Group, Region of the World and Demographic Group

<i>Percent Self-Employed</i>	Obs	All	Female	Male	Urban	Rural	Agr. sector	Non- Agr. sector	Pri. Inc. Ed.	Pri. Grad. Ed.	Sec. Grad. and Univ. Inc. Ed.	Univ. Grad.
Total	685	36.16	30.28	38.09	29.42	47.16	53.04	30.45	46.87	36.37	24.37	20.44
Income group												
Low Income	130	51.78	43.05	53.43	40.18	56.15	63.08	42.64	57.13	53.65	32.46	26.98
Low Middle Income	264	37.43	31.7	39.26	30.12	50.22	50.94	31.72	50.06	38.65	26.86	17.95
Upper Middle Income	172	25.99	22.42	27.93	23.08	43.57	48.46	22.68	40.48	25.91	18.21	20.79
High Income	117	12.28	8.42	15.29	11.8	16.96	45.81	11.69	11.11	13.22	11.73	12.94
Region												
East Asia & Pacific	76	37.9	35.49	38.96	28.36	61.35	51.38	30.8	55.63	41.52	24.02	11.17
Europe & Central Asia	191	17.49	12.64	20.13	13.32	26.33	54.51	13.48	33.17	21.25	13.99	11.96
Latin America & Caribbean	261	32.49	29.1	34.5	28.96	46.7	51.35	28.71	44.3	27.67	21.34	26.41
Middle East & North Africa	30	29.49	27.68	29.38	21.9	36.38	58.97	20.42	41.94	24.92	14.62	10.15
North America	8	9.7	6.24	12.34	9.43	11.68	41.69	9.4	9.54	9.8	9.44	11.87
South Asia	32	43.77	29.37	47.11	36.17	46.43	51.93	37.32	43.63	46.7	34.81	29.02
Sub-Saharan Africa	87	69.04	72.54	66.17	55.74	83.55	76.41	54.97	75.15	61.86	28.22	19.43

Table A2. Variables Definitions and Data Sources

Variable	Description	Source
Economic Freedom Index; Heritage Foundation (HF)	The index ranges from 0 to 100, with 0 indicating the least “free” (most regulated/constrained) economic environment and 100 indicating the most “free” (least regulated/constrained) economic environment. Components of the index are described below.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Labor Regulation Freedom	The Labor freedom index measures various aspects of the legal and regulatory framework of a country’s labor market, including regulations concerning minimum wages, laws inhibiting layoffs, severance requirements, and measurable regulatory restraints on hiring and hours worked. Countries are given scores from 0 to 100, with lower scores indicating rigid labor regulations while higher scores indicate less rigid labor regulations.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Rule of Law/ Property Rights	The indicator measures the ability to accumulate private property and wealth as well as excessive and redundant regulations, which lead to corruption through bribery and graft. A higher score indicates greater rule of law.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Business Regulation Freedom	Measures the efficiency of government business regulation. The composite score is derived from 10 components measuring the ease of starting, operating, and closing a business. Countries are given scores from 0 to 100, with 100 indicating the freest business environment. A higher score indicates less rigid business regulations.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Government Size	Measures the burden imposed by government expenditures, which includes consumption by the state and all transfer payments related to various entitlement programs.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Trade Freedom	Measures the extent of tariff and non-tariff barriers that affect imports and exports of goods and services. A higher score indicates fewer trade barriers.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Credit Market Freedom	Measures financial freedom through government regulation and interference with the financial sector, ownerships of banks, government influence on the allocation of credit, and openness to foreign competition. A higher score indicates a less regulated credit market.	Economic Freedom Index, Heritage Foundation (http://www.heritage.org/)
Economic Freedom of the World Index; Fraser Institute (FI)	“Measures the degree to which the policies and institutions of countries are supportive of economic freedom” (Fraser Institute, 2013). The composite index includes 24 components measured on a scale between 0 and 10. a higher value for the overall index implies that government policies and institutions lead to a less regulated /constrained economic environment.	Economic Freedom of the World, Fraser Institute (http://www.freetheworld.com)
Labor Regulation Freedom	The labor market regulation index measures the extent to which there are labor regulation restrictions on an economy. The index is defined on a scale from 0 to 10, with higher scores indicating the “least regulations”. In order to earn high marks, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription.	Economic Freedom of the World, Fraser Institute (http://www.freetheworld.com)

Rule of law/Property Rights	Measures the effectiveness of the legal system in a country. The index includes security of property rights protected by the rule of law, independent and impartial judiciary system, effective law enforcement, regulatory restrictions on sale of real property and business cost of crime. A higher score indicates greater rule of law.	Economic Freedom of the World, Frasier Institute (http://www.freetheworld.com)
Business Regulation Freedom	Measures the extent to which regulations and bureaucratic procedures restrict business creation. The index includes administrative and bureaucratic costs, starting a business, bribes, licensing and tax compliance costs. A higher score indicates less rigid business regulations.	Economic Freedom of the World, Frasier Institute (http://www.freetheworld.com)
Government Size	Measures four components of central government's involvement in the economy. The first two components measure government consumption as a share of total consumption and transfers and subsidies as a share of GDP. The third component measures the extent to which countries use private investment and enterprises while the final component measures the top marginal income tax rate.	Economic Freedom of the World, Frasier Institute (http://www.freetheworld.com)
Trade Freedom	Measures restraints, which can affect international exchange. These include tariffs, quotas, administrative restraints, and controls on exchange rates and capital. A higher score indicates fewer trade barriers.	Economic Freedom of the World, Frasier Institute (http://www.freetheworld.com)
Credit Market Freedom	The credit market regulation index measures private ownership of banks, private sector credit (government crowding out private borrowing), and market determined interest rates. A higher score indicates a less regulated credit market.	Economic Freedom of the World, Frasier Institute (http://www.freetheworld.com)

Doing Business Indicators (DB)

GDP per capita	Gross domestic product converted to international dollars using purchasing power parity rates. Data are in constant 2005 international dollars.	World Development Indicators
Inflation	Inflation as measured by the annual growth rate of the GDP implicit deflator.	World Development Indicators
Employment to Population Ratio	The proportion of a country's population, ages 15 and older, that is employed.	World Development Indicators
Rigidity of Employment Index	Measures the regulation of employment, specifically the hiring and firing of workers and the rigidity of working hours (0=less rigid to 100=more rigid)	World Bank, Doing Business project (http://www.doingbusiness.org/)
Procedures to start a business (number)	The number of procedures required to start a business in a given year.	World Bank, Doing Business project (http://www.doingbusiness.org/)
Credit to Private Sector (% of GDP)	Domestic credit to private sector measures the availability of domestic credit and financial resources, provided by financial corporations, to the private sector as a percent of GDP. This includes loans, purchases of nonequity and trade credits that establish a claim for repayment. In some countries, credit is extended to public enterprises.	World Development Indicators

Total Tax Rate (% profit)	The amount of taxes and mandatory contributions payable by businesses after accounting for allowable deductions and exemptions as a share of commercial profits.	World Bank, Doing Business project (http://www.doingbusiness.org/)
Trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	World Development Indicators
<u>Other Control Variables</u>		
GDP per capita	Gross domestic product converted to international dollars using purchasing power parity rates. Data are in constant 2005 international dollars.	World Development Indicators
Inflation	Inflation as measured by the annual growth rate of the GDP implicit deflator.	World Development Indicators
Employment to Population Ratio	The proportion of a country's population, ages 15 and older, that is employed.	World Development Indicators
<p><i>Notes: All components of the Economic Freedom Index are measured on a scale between 0 and 100, with lower scores indicating rigidity of regulations/environment while higher scores indicate lax regulations/environment. All components of Economic Freedom of the World Index are measured on a scale between 0 and 10 with higher scores indicating the fewer regulation and better economic environment.</i></p>		

Table A3: Cross-Country Summary Statistics By Income Group and Regions

	Percent Self-employed	Mean Earnings premium(+)/penalty(-)	GDP per capita	Total tax rate	Inflation	Employment to population ratio	Overall Economic Freedom Indices	
							<i>Economic Freedom index (HF)</i>	<i>Economic Freedom index (FI)</i>
Total sample	28.89	-0.02	\$12,194	58.3	97.57	60.52	59.92	6.58
Income group								
Low Income	45.15	0.22	\$1,597	--	13.45	57.04	52.53	5.49
Low Middle Income	37.41	-0.08	\$5,636	52.38	31.79	65.95	58.37	6.27
Upper Middle Income	29.8	0.07	\$9,867	58.14	184.92	59.52	57.84	6.1
High Income	13.32	-0.25	\$33,564	61.53	2.67	54.94	70.11	7.73
Region								
Latin America & Caribbean	33.15	0.01	\$8,264	60.35	167.74	61.22	60.15	6.12
Western Europe	15.48	-0.27	\$29,776	61.77	2.39	51.57	66.61	7.5
Eastern Europe & Central Asia	16.96	0.24	\$12,891	50.56	16.17	55.24	53.58	7.1
Other Regions	21.44	-0.08	\$13,680	40.23	2.76	65.97	58.83	7.23
	Labor Market Regulations			Money		Rule of Law		
	<i>Rigidity of Employment Index (DB)</i>	<i>Labor market regulations Index (FI)</i>	<i>Labor Freedom Index (HF)</i>	<i>Monetary Freedom (HF)</i>	<i>Sound Money (FI)</i>	<i>Property Rights (HF)</i>	<i>Corruption (HF)</i>	<i>Legal System & Property Rights (FI)</i>
Total sample	33.5	5.26	62.95	72.22	7.69	47.7	39.56	5.43
Income group								
Low Income	--	6.39	--	73.23	6.16	30.82	19.15	2.85
Low Middle Income	32.76	4.67	54.41	80.32	7.75	37.34	33.19	4.11
Upper Middle Income	31.77	4.92	61.84	61.13	6.48	45.19	34.37	5.04
High Income	38.98	6.21	69.02	84.21	9.59	77.38	69.98	7.59
Region								
Latin America & Caribbean	33.5	4.77	59.93	64.88	6.89	46.51	35.56	4.6
Western Europe	38.87	5.39	62.21	83.46	9.53	71.99	67.85	7.47
Eastern Europe & Central Asia	28.15	5.86	61.11	67.64	8.94	32.91	27.88	6.06
Other Regions	41.34	8.01	92.76	84.09	8.35	44.29	38.64	6.06

Table A3 (Cont.)

	Trade			Credit Markets			Business Regulations		
	<i>Trade Freedom (HF)</i>	<i>Freedom to Trade Internationally (FI)</i>	<i>Trade in services (% of GDP) (WDI)</i>	<i>Financial Freedom (HF)</i>	<i>Credit Market Regulations (FI)</i>	<i>Credit to private sector (% of GDP)</i>	<i>Procedures to start a business (number)</i>	<i>Business Freedom (HF)</i>	<i>Business regulations (FI)</i>
Total sample	65.42	7.14	9.32	51.17	7.74	62.86	64.76	5.48	38.3
Income group									
Low Income	47.58	4.3	--	36	7.22	23.5	52.4	4.67	43.67
Low Middle Income	58.54	7.05	8.32	47.19	7.27	62.35	61.24	5.13	40.93
Upper Middle Income	66.52	6.74	7.21	48.45	7.11	40.98	62.63	5.02	38.88
High Income	80.9	8.27	13.62	69.8	9.15	133.71	80.21	6.47	34.23
Region									
Latin America & Caribbean	66.3	6.83	6.23	53.52	7.08	38.37	64.23	5.01	40.53
Western Europe	81.66	8.18	15.76	65.3	9.06	119.68	78.12	6.35	34.5
Eastern Europe & Central Asia	64.93	7.4	10.27	41.12	8.7	36.12	58.31	5.9	36.64
Other Regions	55.28	6.94	5.93	\$43	\$9	\$109	\$62	\$7	\$38

Notes: Overall, income group and region averages are the population-weighted means. Central and Eastern European countries includes former socialist countries, which extend east from the border of Germany and south from the Baltic Sea to the border with Greece. It also includes four former socialist countries in Central Asia (Azerbaijan, Tajikistan, Turkmenistan, Kyrgyz Republic). Western European countries include high-income countries only. High Income countries include all 54 Western European countries, the U.S. and Puerto Rico, and Slovenia and Estonia in Eastern Europe.

Table A4:**Latin America**

Bolivia, 1997, 0.01	Colombia, 2004, -0.35	Dominican Republic, 2010, 0.25	Honduras, 2001, -0.18
Bolivia, 1999, -0.4	Colombia, 2005, -0.34	Ecuador, 1994, -0.13	Honduras, 2002, -0.08
Bolivia, 2000, -0.14	Colombia, 2006, -0.29	Ecuador, 1995, -0.01	Honduras, 2003, 0.05
Bolivia, 2001, -0.47	Colombia, 2007, -0.28	Ecuador, 1998, 0.12	Honduras, 2004, -0.22
Bolivia, 2002, -0.43	Colombia, 2008, -0.3	Ecuador, 1999, -0.15	Honduras, 2005, -0.32
Bolivia, 2003, -0.21	Colombia, 2009, -0.35	Ecuador, 2000, 0.14	Honduras, 2006, -0.28
Bolivia, 2005, 0.02	Colombia, 2010, -0.34	Ecuador, 2003, -0.04	Honduras, 2007, -0.24
Bolivia, 2007, -0.11	Costa Rica, 1990, 0.07	Ecuador, 2004, -0.01	Honduras, 2008, -0.04
Bolivia, 2008, -0.15	Costa Rica, 1991, -0.01	Ecuador, 2005, -0.05	Honduras, 2009, -0.04
Brazil, 1981, 0.03	Costa Rica, 1992, 0.01	Ecuador, 2006, 0.01	Mexico, 1989, 0.06
Brazil, 1982, 0.06	Costa Rica, 1993, 0.17	Ecuador, 2007, -0.09	Mexico, 1992, 0.02
Brazil, 1983, 0.08	Costa Rica, 1994, 0.17	Ecuador, 2008, -0.13	Mexico, 1994, 0.01
Brazil, 1984, 0.1	Costa Rica, 1995, 0.16	Ecuador, 2009, -0.22	Mexico, 1996, -0.05
Brazil, 1985, 0.09	Costa Rica, 1996, 0.02	Ecuador, 2010, -0.25	Mexico, 1998, 0.04
Brazil, 1986, 0.25	Costa Rica, 1997, 0.15	El Salvador, 1991, -0.13	Mexico, 2000, 0.06
Brazil, 1988, 0.07	Costa Rica, 1998, 0.06	El Salvador, 1995, 0	Mexico, 2002, -0.05
Brazil, 1989, 0.21	Costa Rica, 1999, 0.06	El Salvador, 1996, -0.19	Mexico, 2004, -0.35
Brazil, 1990, 0.22	Costa Rica, 2000, 0.05	El Salvador, 1998, -0.1	Mexico, 2005, -0.41
Brazil, 1993, 0.1	Costa Rica, 2001, 0	El Salvador, 1999, -0.01	Mexico, 2006, -0.44
Brazil, 1995, 0.18	Costa Rica, 2002, 0.03	El Salvador, 2000, 0.03	Mexico, 2008, -0.19
Brazil, 1996, 0.18	Costa Rica, 2003, 0.01	El Salvador, 2001, 0.17	Mexico, 2010, -0.27
Brazil, 1997, 0.12	Costa Rica, 2004, 0	El Salvador, 2002, 0.08	Nicaragua, 1998, -0.1
Brazil, 1998, 0.11	Costa Rica, 2005, 0.02	El Salvador, 2003, 0.14	Nicaragua, 2001, -0.05
Brazil, 1999, 0.09	Costa Rica, 2006, 0.05	El Salvador, 2004, 0.19	Nicaragua, 2005, -0.12
Brazil, 2001, 0.06	Costa Rica, 2007, 0.11	El Salvador, 2005, -0.05	Panama, 1991, -0.33
Brazil, 2002, 0.08	Costa Rica, 2008, 0.08	El Salvador, 2006, -0.12	Panama, 1995, -0.11
Brazil, 2003, 0.03	Costa Rica, 2009, 0.06	El Salvador, 2007, 0.05	Panama, 1997, -0.19
Brazil, 2004, 0.06	Dominican Republic, 1996, 0.3	El Salvador, 2008, 0.17	Panama, 1998, -0.1
Brazil, 2005, 0.04	Dominican Republic, 1997, 0.16	El Salvador, 2009, 0.03	Panama, 2001, 0.18
Brazil, 2006, 0.05	Dominican Republic, 2000, 0.26	Guatemala, 2000, -0.54	Panama, 2002, -0.28
Brazil, 2007, 0.07	Dominican Republic, 2001, 0.19	Guatemala, 2002, -0.23	Panama, 2003, -0.3
Brazil, 2008, 0.06	Dominican Republic, 2002, 0.18	Guatemala, 2003, -0.27	Panama, 2004, -0.29
Brazil, 2009, 0.05	Dominican Republic, 2003, 0.23	Guatemala, 2004, -0.46	Panama, 2005, -0.3
Chile, 1990, 0.44	Dominican Republic, 2004, 0.34	Guatemala, 2006, -0.21	Panama, 2006, -0.28
Chile, 1992, 0.58	Dominican Republic, 2005, 0.26	Haiti, 2001, 0.16	Panama, 2009, 0.24
Chile, 1996, 0.71	Dominican Republic, 2006, 0.24	Honduras, 1991, 0.03	Panama, 2010, -0.2
Chile, 2000, 0.57	Dominican Republic, 2007, 0.22	Honduras, 1992, 0.05	Paraguay, 1990, 0.2
Chile, 2003, 0.67	Dominican Republic, 2008, 0.24	Honduras, 1993, 0.07	Paraguay, 1995, -0.2
Chile, 2006, 0.62	Dominican Republic, 2009, 0.28	Honduras, 1994, 0.2	Paraguay, 1997, -0.06
Colombia, 2001, -0.39		Honduras, 1995, 0.06	Paraguay, 1999, -0.09
Colombia, 2002, -0.37		Honduras, 1996, 0.05	Paraguay, 2001, -0.17
Colombia, 2003, -0.34		Honduras, 1997, 0.12	Paraguay, 2002, -0.5
		Honduras, 1998, 0.15	Paraguay, 2003, -0.21
		Honduras, 1999, 0.07	Paraguay, 2004, -0.19
			Paraguay, 2005, -0.21

Paraguay, 2006, -0.17	Austria, 2007, -0.46	Sweden, 2006, -0.61	Russian Federation, 2007, 0.21
Paraguay, 2007, -0.19	Austria, 2008, -0.51	Sweden, 2007, -1.31	Russian Federation, 2008, 0.47
Paraguay, 2008, -0.18	Belgium, 2004, -0.33	Sweden, 2008, -1.58	Russian Federation, 2009, 0.52
Paraguay, 2009, -0.19	Belgium, 2005, -0.44	Sweden, 2009, -1.55	Slovenia, 2005, -0.55
Paraguay, 2010, -0.1	Belgium, 2006, -0.74	United Kingdom, 2005, -0.28	Slovenia, 2006, -0.53
Peru, 1997, -0.25	Belgium, 2007, -0.73	United Kingdom, 2006, -0.28	Slovenia, 2007, -0.91
Peru, 1998, -0.23	Belgium, 2008, -0.46		Slovenia, 2008, -0.61
Peru, 1999, -0.19	France, 2004, -0.11	Eastern & Central Europe	Tajikistan, 1999, 0.66
Peru, 2000, -0.23	France, 2005, -0.02	Albania, 2005, 0.01	Tajikistan, 2003, 0.56
Peru, 2001, -0.3	France, 2006, 0.05	Azerbaijan, 1995, 0.21	Turkmenistan, 1998, 0.26
Peru, 2002, -0.19	France, 2007, -0.04	Azerbaijan, 2002, 0.01	
Peru, 2003, -0.17	France, 2008, -0.22	Bosnia and Herzegovina, 2001, 0.12	Other Regions
Peru, 2004, -0.15	Germany, 2005, -0.48	Bulgaria, 2007, 0.4	Bangladesh, 1999, 0.15
Peru, 2005, -0.12	Greece, 2004, 0.11	Bulgaria, 2008, 0.33	Bangladesh, 2003, 0.14
Peru, 2006, -0.11	Greece, 2005, 0.19	Croatia, 2004, -0.05	Chad, 2002, 0.66
Peru, 2007, -0.1	Greece, 2006, 0.14	Estonia, 2004, -1.98	China, 2002, -0.13
Peru, 2008, -0.07	Greece, 2007, 0.05	Estonia, 2005, -1.53	Comoros, 2004, -0.16
Peru, 2009, -0.08	Greece, 2008, -0.02	Estonia, 2006, -1.88	Djibouti, 1996, -0.31
Peru, 2010, -0.05	Ireland, 2004, -0.12	Estonia, 2007, -1.43	Gabon, 2005, -0.26
Puerto Rico, 1970, 0.47	Ireland, 2005, 0.08	Estonia, 2008, -1.62	Guinea, 1994, 0.52
Puerto Rico, 1980, 0.04	Ireland, 2006, 0.05	Kosovo, 2003, 0.2	Mali, 1994, -0.13
Puerto Rico, 1990, 0.1	Ireland, 2007, -0.2	Kyrgyz Republic, 1997, 0.17	Mauritius, 1999, -0.16
Puerto Rico, 2000, 0.14	Ireland, 2008, -0.21	Latvia, 2005, -0.14	Mauritius, 2008, -0.19
Puerto Rico, 2005, 0.08	Italy, 2004, -0.09	Latvia, 2006, -0.28	Mauritius, 2009, -0.15
Uruguay, 2006, 0	Italy, 2005, -0.07	Latvia, 2007, -0.04	Mauritius, 2010, -0.61
Uruguay, 2007, -0.02	Italy, 2006, -0.11	Latvia, 2008, -0.65	Mauritius, 2011, -0.46
Uruguay, 2008, 0.01	Italy, 2007, -0.09	Lithuania, 2005, -0.05	Namibia, 1993, 0.65
Uruguay, 2009, -0.07	Italy, 2008, -0.06	Lithuania, 2006, 0.1	Pakistan, 2001, 0.24
Uruguay, 2010, -0.02	Luxembourg, 2004, -1.02	Lithuania, 2007, -0.01	Pakistan, 2004, 0.36
Venezuela, RB, 1989, 0.1	Luxembourg, 2005, -0.88	Lithuania, 2008, 0	Sao Tome and Principe, 2000, 0.29
Venezuela, RB, 1992, 0.29	Luxembourg, 2006, -0.45	Macedonia, FYR, 2003, -0.02	Senegal, 2011, -0.21
Venezuela, RB, 1995, 0.07	Luxembourg, 2007, -0.58	Macedonia, FYR, 2004, -0.03	South Africa, 2000, -0.25
Venezuela, RB, 1998, 0.09	Luxembourg, 2008, -0.38	Macedonia, FYR, 2005, 0.01	Timor-Leste, 2001, -1.23
Venezuela, RB, 1999, 0.06	Portugal, 2004, -0.76	Moldova, 2002, -0.28	United States, 1990, -0.23
Venezuela, RB, 2000, 0.03	Portugal, 2005, -0.46	Moldova, 2005, -0.59	United States, 2000, -0.2
Venezuela, RB, 2001, 0.01	Portugal, 2006, -0.55	Poland, 2005, -0.29	United States, 2005, -0.21
Venezuela, RB, 2002, -0.04	Portugal, 2007, -0.42	Poland, 2006, -0.29	Yemen, Rep., 1998, 0.44
Venezuela, RB, 2003, -0.05	Portugal, 2008, -0.68	Poland, 2007, -0.27	Zambia, 1998, -0.06
Venezuela, RB, 2004, -0.12	Spain, 2004, -0.33	Poland, 2008, -0.21	
Venezuela, RB, 2005, -0.07	Spain, 2005, -0.4	Romania, 2007, 0.02	
Venezuela, RB, 2006, -0.07	Spain, 2006, -0.34	Romania, 2008, -0.06	
Western Europe	Spain, 2007, -0.39	Russian Federation, 2004, 0.26	
Austria, 2004, -1.37	Spain, 2008, -0.38	Russian Federation, 2005, 0.54	
Austria, 2005, -0.39	Sweden, 2004, -1.04	Russian Federation, 2006, 0.3	
Austria, 2006, -0.28	Sweden, 2005, -1.52		

