Working Paper

ENFORCEMENT MATTERS: THE EFFECTIVE REGULATION OF LABOR

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Enforcement Matters:

The Effective Regulation of Labor[*]

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Abstract

This paper provides, to our knowledge for the first time, cross-country measures of enforcement of labor law across almost every country in the world. The distinction between *de jure* and *de facto* regulation is well understood in theory, but almost never implemented in cross-country empirical work because of lack of data. As a result, influential papers like the one by Botero et. al. (2004) published in the *Quarterly Journal of Economics*, which have shaped the policy debate by finding strong negative consequences of labor regulation on labor market outcomes, are based entirely on measures of *de jure* stringency of regulations. We show that this neglect of regulation enforcement matters. There is, on average, a negative correlation between the stringency of labor regulation and the intensity of its enforcement. The strong results of Botero et. al. (2004) on the consequences of labor regulation, and the hypotheses of La Porta et. al (2008) on the legal origin theory of regulation stringency, no longer hold for *effective* labor regulation.

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1.   Introduction

The causes and consequences of labor regulation have received substantial attention from economists and social scientists. Theory stresses that the relevant concept to study is *effective* labor regulation, that is, the combination of both *de jure* regulations and state enforcement efforts. Country specific studies confirm the importance of non-compliance with labor regulations, especially in developing countries.[1] And yet cross-country studies invariably use *de jure* measures of labor regulation stringency. This is true, in particular, of the highly influential study by Botero et. al. (2004) whose findings have been used to argue for the negative consequences of labor regulation.[2] At the same time, the study by La Porta et. al. (2008) proposes and confirms "the legal origin theory" as an explanation for cross-country variations of labor regulation, once again using *de jure* measures of labor regulation stringency.

The cross-country econometric studies which use *de jure* measures of labor regulation recognize the importance of enforcement, but in effect say that they are forced to use the *de jure* measures because they do not have measures of enforcement. But how can we credibly assess the consequences of labor regulation if we only consider the letter of the law, ignoring the possibility that enforcement is lower in those places where the law is more stringent? These are not purely hypothetical questions. Noncompliance with labor regulations is pervasive around the world. Furthermore, noncompliance is particularly high in developing countries, and at the same time, those countries tend to have the most stringent regulations. Is it correct to assume that state intervention in the labor market is more stringent in Venezuela or Angola, where labor laws are quite protective but enforcement and compliance are very low, than in Canada or New Zealand, where the opposite occurs? The existing cross-country empirical research, however, usually makes such an unrealistic assumption because of lack of data on enforcement.

The first contribution of this paper is that it fills this data gap. It provides, to our knowledge for the first time, new measures of enforcement of labor law across almost every country in the world. The second contribution of the paper is that it establishes a negative

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[1] Studies that analyze the consequences of enforcement include Ashenfelter and Smith, (1979), Almeida and Carneiro (2012), Bhorat et al. (2012), Pires (2008), and Ronconi (2010); and studies that analyze its determinants include Amengual (2010), Piore and Schrank (2008), Murillo et al. (2009), and Ronconi (2012).

[2] For other studies in this vein, see Djankov and Ramalho (2009), Galli and Kucera (2004), Heckman and Pages (2004) and Feldmann (2009). The equally influential study by Besley and Burgess (2004) is for India, but for a cross section of Indian states.

correlation between stringency of labor regulation on paper and the intensity of its enforcement on the ground. The third and perhaps most important contribution of this paper is that when the same methods of Botero et. al, (2004) and La Porta et. al. (2008) are applied to ask the same questions, their findings no longer hold. *Effective* labor regulation does not appear to have the negative consequences for a range of economic outcomes which are ascribed to labor regulation by Botero et. al (2004), and variations in *effective* labor regulation across countries cannot be explained by the legal origin theory of La Porta et. al. (2008).

The plan of the paper is as follows. Section 2 presents the development of our new data set on enforcement of labor law across more than 100 countries of the world. Section 3 shows the negative relationship across countries between stringency in the letter of the law and the intensity of its enforcement. Section 4 tests the La Porta et. al. (2008) legal origin theory for *effective* regulation, which combines the *de jure* provisions used by them with measures of enforcement. It is shown that serious doubts are thrown on the legal origin theory. Section 5 revisits the influential findings of Botero et. al. (2004) on the negative consequences of labor regulation, but using *effective* rather than *de jure* regulation. The strong results of Botero et. al. (2004) no longer hold. Section 6 concludes the paper with a discussion of areas for further research.

2.   Measuring Enforcement of Labor Law

This section presents new proxies for state enforcement of labor law across countries.[3]Conceptually, the objective is to measure state actions to achieve compliance with labor regulations. State actions can be categorized into two groups: first activities that affect the probability of finding employers who violate the law, and second, actions that determine the expected penalty. Public campaigns that provide workers with information about their rights, access to the judiciary, and government inspections are in the first group. The penalties set in the code, and their effective implementation by labor inspectors and judges are in the second group. This paper covers a subset of the above actions.

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[3] A full description of data sources and variable construction is provided in the Appendix.

2.1   *Inspection*

One of the main policy instruments to enforce labor regulations is government inspection. Labor inspectorates present substantial institutional heterogeneity across countries. In some countries there is a single inspection agency in charge of enforcing all types of labor standards, such as in France; in other countries there are two agencies, one enforcing safety and health and the other covering employment standards; and in a few countries, such as the United States or the United Kingdom, there are three or more agencies, each focusing on a relatively small number of provisions. Piore and Schrank (2008) describe them as the Latin "generalist" approach to labor inspection and the Anglo-American "diffuse" approach.

There is no single source of information to measure labor inspection agencies' resources and activities across countries. The relatively new ILOSTAT database, for example, only provides information about labor inspection for 53 countries. Therefore, we compiled data and statistics from governments' websites, from reports produced by the International Labor organization (ILO), the U.S. Department of Labor, and the U.S. State Department.

The first variable we construct is *Inspector* which is simply the number of labor inspectors in a country. To count the number of inspectors we follow the definition suggested in ILOSTAT, according to which a labor inspector is a public official responsible for securing enforcement of the legal provisions relating to wages, safety and health, hours, the employment of children, and other connected matters. The second variable we construct is *Inspections*, defined as the number of labor inspections conducted per year. To make the values comparable across countries, both variables are divided by the labor force in each country.

The figures cover the period from 2000 to 2012, but for the majority of countries the collected data only covers the last three years (2010 to 2012). In case of conflicting information across sources, we take the average. The constructed variables cover 197 countries and territories in the case of *Inspectors* and 131 in the case of *Inspections*.

The simple average across countries is 8.24 inspectors per 100,000 workers and 76.61 inspections per year per million workers. The averages, however, are substantially lower when countries and territories with a population below 1 million in 2011 are excluded from the sample. In this case, the simple averages are 5.46 inspectors and 62.70 inspections. Table 1 presents the figures by region. Countries in Europe, the Middle East and North Africa present the highest values and Sub-Saharan Africa, and Central and South Asia the lowest.

Table 1. Number of Labor Inspectors and Inspections per Worker by Region (>1 million)

Region	Inspectors		Inspections	
	Average	No. countries	Average	No. countries
Europe	9.30	37	90.75	33
Middle East & North Africa	7.77	18	98.00	13
East Asia & Pacific	6.18	19	61.90	13
North America	4.72	2	62.91	2
Latin America & Caribbean	4.13	22	52.64	22
Central & South Asia	2.70	14	14.62	13
Sub-Saharan Africa	2.35	41	31.61	17
World	5.46	153	62.70	113

Notes: This table presents the simple average across countries of the number of labor inspectors per 100,000 workers, and the number of labor inspections conducted per year per million workers. Countries with a population below one million in 2011 are excluded. Figures are for the period 2000-2012.

2.2   Penalties

The penalty structures for labor law violation are highly varied across countries, and differ by type of regulation. Given the data sources, we focus on penalties for violations of regulations with wage provisions. Specifically, we construct a measure of penalties specified in the law in case of noncompliance with the minimum wage assuming the following: i) the employer is a first-time offender, ii) the offense committed is paying one employee during one month a salary 20 percent below the legal minimum, iii) the employer does not obstruct the work of the inspector, iv) the employer corrects the problem after receiving a notice from the enforcement authority, and v) the employer does not retaliate against the employee. In countries with no minimum wage, we take the penalty that applies to violations of wage provisions.[4] With these assumptions we can build a penalties schedule using the ILO TRAVAIL legal database, and country legislation. It covers 187 countries and their relevant penalties in 2011.

Penalties typically take the form of financial fines, either set as a monetary amount or as a proportion of the minimum wage. Some countries set a single fine, while others set a minimum and a maximum, and others only set a maximum. But penalties can also include criminal fines.

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[4] Some countries set sectorial minimum wages through collective bargaining. In this case, we take the penalty that applies to violations of the minimum wage set in the collective agreement.

In almost one out of four countries around the world, the applicable legislation stipulates imprisonment. Finally, in some countries the legislation explicitly requires inspectors to notify the employer before issuing any penalty; fines can only be applied to employers who did not correct the violation.

We construct measures of de jure penalties for three alternative scenarios: low, medium and high penalties, and convert criminal penalties into a money metric by assuming that the cost for an employer of serving one year in prison equals 10 times GDP per worker. The *Low total penalty* scenario assumes a 10 percent probability of receiving the minimum financial fine and a 5 percent probability of receiving the minimum term in prison.[5] The *Medium total penalty* scenario assumes a 50 percent probability of receiving a medium financial fine and a 25 percent probability of receiving the medium term in prison.[6] Finally, the *High total penalty* scenario assumes a 100 percent probability of receiving the maximum financial fine and a 50 percent probability of serving 50 percent of the maximum term in prison.

Table 2 presents these measures by region. The simple average across countries for the medium financial fine equals U$ 1,171 and for the medium prison term equals 0.19 years. Financial fines tend to be higher in more developed regions, and imprisonment varies substantially from basically zero in Europe to more than four months in Sub-Saharan Africa, East Asia and the Pacific.

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[5] The minimum financial fine in countries that do not establish a minimum is assumed to be 50% of the maximum, and the minimum term in prison is 25% of the maximum.

[6] The medium financial fine is the average between the minimum and the maximum fine, and the medium term in prison is the average between the minimum and maximum terms.

Table 2. De Jure Penalties in Case of Minimum Wage Violation by Region

Region	Medium Financial Fine (2011 U$)	Medium Imprisonment (years)	No. of countries
Europe	1,546	0.01	41
Middle East & North Africa	426	0.05	20
East Asia & Pacific	2,095	0.45	28
North America	9,225	0.21	3
Latin America & Caribbean	1,442	0.08	35
Central & South Asia	205	0.10	13
Sub-Saharan Africa	163	0.36	47
World	1,171	0.19	187

Notes: The table presents the simple average across countries of de jure penalties in case of violation of the minimum wage in 2011. The medium financial fine is defined as the average between the minimum and the maximum fine and converted to US$ using the official exchange rate. The medium term in prison is the average between the minimum and the maximum terms and it is expressed in years.

The measures presented above have several shortcomings. First, the penalties only refer to violations of the minimum wage. Second, there are a number of state actions aimed at enforcing the law that are not covered, such as providing information to workers about their labor rights and ensuring access to the judiciary. But the most important limitation, of course, is lack of data about the actual implementation of penalties. Our assumptions show the difficulties of converting the mass of enforcement information into a number that can be compared across countries in monetary terms. But this is the route that will have to be taken if we are to bring enforcement measures into cross-country econometric analysis.

3. *The Stringency of Law and The Intensity of Its Enforcement*

This section empirically explores the relationship between de jure employment regulation and labor enforcement across countries. First, using the World Bank Doing Business database for the year 2011, and following a similar methodology as Botero et al. (2004), we create the *Employment law index* (see Appendix).[7] This index is available for 189 countries. Second, we

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[7] There are two main differences. First, we include the ratio of the minimum wage to the average value added of workers (also obtained from WBDB) as a component of the employment law index while Botero et al. (2004) do

combine the inspection and penalties measures and construct two variants of an *Enforcement index*. The first is defined as the average of the normalized variables *Medium total penalty* and *Inspector per worker*, the second index uses instead *Inspections per worker*, and they are available for 180 and 121 countries respectively.

A key stylized fact that emerges is that countries with more stringent employment regulations tend to enforce less. As Panel A Table 3 shows, there is a negative correlation between the de jure employment index and the enforcement index that holds across different specifications, samples and the inclusion of controls (i.e., income per capita), although it is imprecise.

Table 3. The Relationship between de Jure Regulations and Enforcement of Labor

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Enforcement index 1	Enforcement index 1	Enforcement index 1	Enforcement index 2	Enforcement index 2	Enforcement index 2
Employment law index	-0.129***	-0.120**	-0.065	-0.056	-0.042	-0.113
	(0.045)	(0.047)	(0.044)	(0.071)	(0.078)	(0.070)
N	172	161	131	118	109	94
R2	0.19	0.20	0.26	0.14	0.16	0.17
Panel B	Enforcement index 3	Enforcement index 3	Enforcement index 3	Enforcement index 4	Enforcement index 4	Enforcement index 4
Employment law index	-0.185***	-0.179***	-0.106**	-0.219**	-0.200*	-0.266**
	(0.049)	(0.052)	(0.048)	(0.104)	(0.110)	(0.120)
N	172	161	131	118	109	94
R2	0.16	0.16	0.18	0.17	0.18	0.20
Sample	Sample A	Sample B	Sample C	Sample A	Sample B	Sample C

Notes: The four measures of the dependent variable (*Enforcement index*) are (1) the average of the normalized variables Medium Total Penalty and Inspector per worker, (2) the average using Inspection per worker, (3) using Inspector per worker-regulation, and (4) using Inspection per worker-regulation. All models control for log GDP per capita in 2011. Sample A only includes countries with data for de jure employment index, labor inspectors and fines; sample B excludes colonizers; and sample C excludes countries with less than one million people in 2011. Robust standard errors are in parentheses.
* Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

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not. Second, Botero et al. (2004) computed not only an index of employment law, but also an index of collective relations law and an index of social security law.

One technical concern is that a country that regulates many aspects of the employment relationship needs to devote more resources compared to a country that regulates fewer aspects in order to achieve the same level of enforcement. This line of reasoning suggests using the labor force times the number of employment regulations as the denominator for inspectors and inspections. [8] Panel B in Table 3 shows that the two additional enforcement indexes that result from combining the penalty data with either the number of *Inspectors per worker-regulation* or *Inspections per worker-regulation* are also negatively and significantly correlated with the stringency of the employment law.

Figure 1 is a scatter plot that illustrates the negative correlation using rankings based on the above measures of de jure regulation and enforcement. Countries with more stringent labor codes (i.e., with higher ranking positions based on the *Employment law index*) tend to enforce less (i.e., lower ranking position based on the *Enforcement index*).

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[8] The *Number of Regulations* is obtained from WBDB. The variable can take values from 0 to 10 and it is the sum of ten regulations (see appendix). Notice that this variable does not include variation in the stringency of each regulation and so it differs from the *Employment law index*. For example, severance pay is compulsory in both the Central African Republic and South Africa, and so both countries add one point to the *Number of Regulations* variable, although in the former country severance equals 17 monthly salaries for a worker with one year of tenure compared to one monthly salary in the latter.

Figure 1. The Negative Correlation across Countries between Enforcement and Labor Law
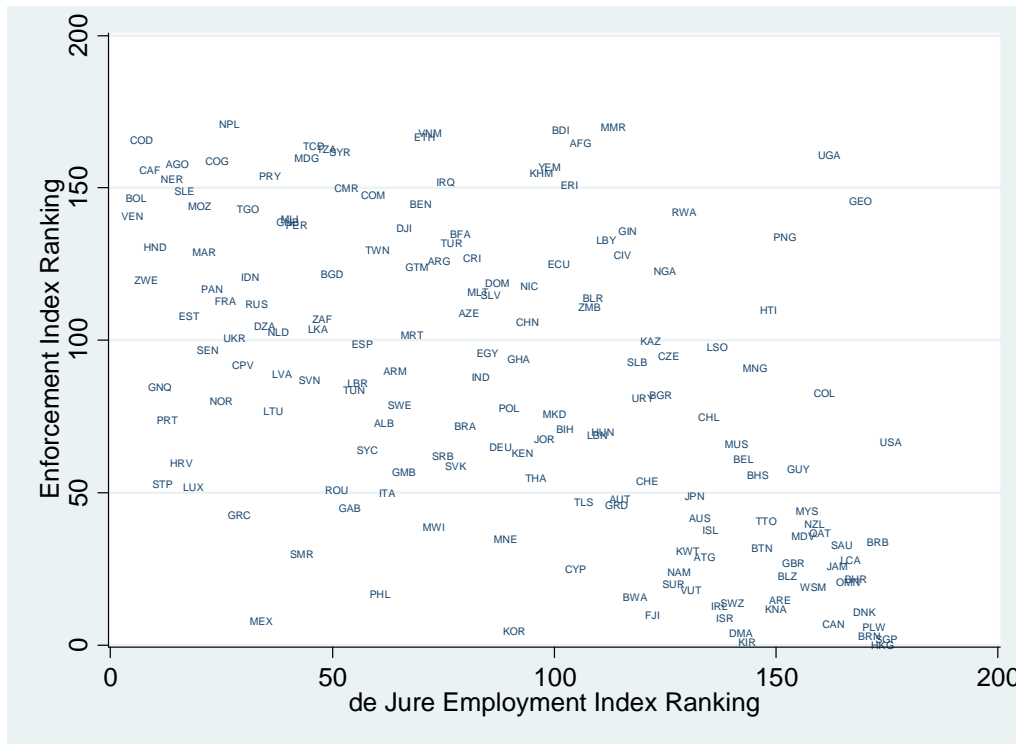
Notes: The horizontal axis is a ranking based on the de jure employment index wherein countries with more protective regulations have a higher ranking. The vertical axis is a ranking based on the enforcement index wherein countries with higher enforcement (labor inspectors and fines) have a higher ranking. The linear model between these variables equals *Ranking Enforcement Index = 130.7 – 0.53*Ranking Employment Law Index*.

The negative correlation between the letter of the law and enforcement efforts has been generally unnoticed in the literature, but its implications are potentially very important. Cross-country studies that attempt either to explain the causes of effective regulation or estimate its effects relying only on the letter of the law are likely to be biased. The next sections show that legal origin theory fails to account for variation in enforcement across countries, and that the correlation between employment law and labor market outcomes changes substantially when enforcement is included into the analysis.

3.   Legal Origin Theory and Enforcement of Labor Law

Legal origin theory stresses that there is a fundamental difference in the strategy of social control of business between common and civil law countries. "Common law [seeks a balance between private disorder and public abuse of power] by shoring up markets, civil law by restricting them or even replacing them with state commands" (La Porta, López-de-Silanes and Shleifer, 2008: 307). This theory, when applied to the regulation of labor, predicts, first, that civil law countries have more protective formal legal rules; and second, it predicts that those formal rules are enforced in both legal traditions but particularly so in civil law countries because of the higher dislike for unregulated market outcomes. Furthermore, because civil law countries regulate more aspects of the employment relationship, differences in the nature of the enforcement task suggests more inspection resources and activities in civil law countries compared to common law.

Botero et al. (2004) collected an impressive amount of information and showed that the first prediction holds. Common Law countries –compared to civil law – have less stringent employment, collective relations and social security laws. Their sample only covers 85 countries (including former colonizers). But, thanks to their influential work and the World Bank Doing Business (WBDB) initiative, it is now possible to easily access measures of employment regulations for almost every country in the world.

We first replicate their work, running a similar cross-country regression model, but for a larger sample using the *Employment law index* obtained from the WBDB database. As shown below, Botero et al.'s (2004) finding holds: common law counties have less protective de jure labor regulations as predicted by legal origin theory. However, the relationship between common law and enforcement (which so far as not been tested) runs in the opposite direction. Therefore, it is not clear whether common law countries have less stringent effective labor regulations.

Panel A in Table 4 presents the cross-country OLS regression of de jure *Employment law index* on legal origin. *Common law* is an indicator equal to 1 if the country has a common law legal tradition and zero otherwise.[9] The model in column 1 includes all countries for which the dependent variable is observed; in column 2 the sample is restricted to countries with available data on de jure regulations, inspectors and penalties; we further reduce the sample by excluding

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[9] Countries are categorized as in La Porta, López-de-Silanes and Shleifer (2008).

former colonizers (column 3), and countries with less than one million people in 2011 (column 4). All models include as controls income per capita, total population, country size (in square kilometers), and the urbanization rate, all in 2011.[10]

Table 4. Legal Origin and de Jure Regulation of Labor

	(1)	(2)	(3)	(4)
Panel A	Employment law index	Employment law index	Employment law index	Employment law index
Common Law	-0.13***	-0.12***	-0.11***	-0.08***
	(0.02)	(0.02)	(0.02)	(0.02)
N	188	172	161	131
R2	0.29	0.28	0.29	0.23
Panel B	ILO Inspection Convention	ILO Inspection Convention	ILO Inspection Convention	ILO Inspection Convention
Common Law	-0.84***	-0.86***	-0.76***	-0.68***
	(0.17)	(0.18)	(0.18)	(0.20)
N	205	172	161	131
R2	0.15	0.21	0.19	0.17
Sample	All	Sample A	Sample B	Sample C

Notes: OLS cross-country regressions. The dependent variables are de jure employment index in Panel A, and signature of ILO inspection conventions No. 81 and 129 in Panel B. Common Law is an indicator equal to one if the country has a common law legal tradition and 0 otherwise. Robust standard errors are in parentheses. Column 1 includes all countries; Column 2 only includes countries with data for de jure employment index, labor inspectors and fines (Sample A); Column 3 excludes from sample A colonizers (sample B); and Column 4 excludes from sample B countries with less than one million people in 2011 (sample C). All models control for log GDP per capita, urbanization rate, country size and population in 2011.
*** Statistically significant at the 0.01 level.

As a supplement, and in the same spirit, we also consider the signing of ILO conventions regarding labor inspection. This is, of course, a declaration of intention, not a measure of actual enforcement efforts. The variable *ILO Inspection Convention* takes a value from 0 to three. It is equal to three if the country signed convention No. 129 (i.e., labor inspection in agriculture) and both parts of convention No. 81 (i.e., labor inspection in the industrial and service sector). The results are in Panel B Table 4. Consistent with the legal origin theory, civil law countries signed,

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[10] Botero et al. (2004) only control for income per capita. We include the additional controls because they affect the nature of the enforcement task, but excluding them does not affect the results in any substantive matter.

on average, almost one inspection convention more than common law countries. However, as we see below, this tells us very little about concrete enforcement efforts.

Panel A and B in Table 5 presents the results using the measures of actual inspection resources and activities. In columns 1 and 2 the dependent variable is the number of inspectors and inspections per worker. Column 1 includes all countries and column 2 excludes countries with a population below one million people. Although the results are imprecise, they suggest that, contrary to the legal origin theory, civil law countries tend to enforce less, not more. Common law countries have about five inspectors more per 100,000 workers, but the difference becomes close to zero when the smallest countries are excluded from the analysis. Common law countries also conduct more inspections per worker, but in this case the difference is higher when the sample is restricted to larger countries.

Table 5. Legal Origin and Labor Inspection Resources and Activities

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Inspector per worker	Inspector per worker	Inspector per worker-regulation	Inspector per worker-regulation	Inspector per worker-regulation	Inspector per worker-regulation
Common Law	5.88***	0.68	5.75***	5.85***	6.04***	2.13*
	(2.18)	(1.06)	(1.97)	(2.04)	(2.13)	(1.18)
N	196	152	182	172	161	131
R2	0.19	0.41	0.15	0.15	0.16	0.25
Panel B	Inspections per worker	Inspections per worker	Inspections per worker-regulation	Inspections per worker-regulation	Inspections per worker-regulation	Inspections per worker-regulation
Common Law	8.07	37.88*	33.42**	35.78**	36.1**	46.22**
	(23.2)	(20.7)	(16.0)	(16.7)	(17.2)	(19.55)
N	130	112	127	119	110	95
R2	0.14	0.26	0.23	0.24	0.26	0.32
Sample	All	Pop > 1 million	All	Sample A	Sample B	Sample C

Notes: OLS cross-country regressions. The dependent variables are: inspector (inspections) per worker in columns 1-2 panel A (B); and inspector (inspections) per worker-regulation in columns 3-6 panel A (B). Common Law is an indicator equal to one if the country has a common law legal tradition and 0 otherwise. All models control for log GDP per capita, urbanization rate, country size and population in 2011. Sample A only includes countries with data for de jure employment index, labor inspectors and fines; sample B excludes colonizers; and sample C excludes countries with less than one million people in 2011. Robust standard errors are in parentheses.
* Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

These results, however, underestimate the positive correlation between common law and inspections because they do not take into account differences across countries in the nature of the task. In a number of common law countries (i.e., Bangladesh, India, Malaysia, Nepal and Pakistan) the labor code explicitly excludes smaller firms. Labor inspectors therefore only have to cover the portion of the workforce employed in large firms, which in some of these countries is quite small. Second, common law countries tend to regulate fewer aspects of the employment relationship, and therefore labor inspectors have a lighter workload. Again, ignoring differences in the nature of the enforcement task across countries tends to underestimate enforcement efforts in common law countries. Therefore, a more adequate measure to test whether civil law countries enforce more would be the number of inspectors per legally covered worker (or firm), and per regulation. We attempt to approximate this concept using the total labor force times the number of employment regulations as the denominator, and construct the variables *Inspectors per worker-regulation* and *Inspections per worker-regulation*. Columns 3 to 6 present the results using inspector and inspection per worker-regulation as the dependent variable. The positive correlation between common law and labor inspection, as expected, becomes stronger.

Table 6 presents the results for de jure penalties in case of a minimum wage violation. Each column represents a different dependent variable (i.e., financial fine, prison term, and total penalty under the three alternative scenarios), and Table 7 presents the results using the medium total penalty as dependent variable for the different samples of countries. The results indicate that common law countries set higher penalties, both financial and criminal.

Table 6. Legal Origin and de Jure Penalties

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Min Financial Fine	Max Financial Fine	Medium Financial Fine	Max Imprisonment	Min Total Penalty	Max Total Penalty
Common Law	257***	2,908*	1,371**	0.57***	1,763**	63,624**
	(96)	(1,555)	(616)	(0.18)	(745)	(28,846)
N	187	187	187	187	187	187
R2	0.17	0.22	0.21	0.09	0.10	0.09
Sample	All	All	All	All	All	All

Notes: OLS cross-country regressions. The dependent variables are measures of de jure penalties in case of violation of the minimum wage. All variables refer to 2011 and are in measured in US$ using the official exchange rate (except for maximum imprisonment, which is measured in years). Common Law is an indicator equal to one if the country has a common law legal tradition and 0 otherwise. All models control for log GDP per capita, urbanization rate, country size and population in 2011. Robust standard errors are in parentheses.
 * Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 7. Legal Origin and de Jure Medium Total Penalty

		(1)	(2)	(3)	(4)
		Medium Total Penalty	Medium Total Penalty	Medium Total Penalty	Medium Total Penalty
Common Law		20,312**	25,805**	25,158**	28,059**
		(9,066)	(10,966)	(11,169)	(13,866)
N		187	172	161	131
R2		0.09	0.12	0.13	0.14
Sample		All	Sample A	Sample B	Sample C

Notes: OLS cross-country regressions. The dependent variable is the medium total penalty in case of violation of the minimum wage. It refers to 2011 and is measured in U$ using the official exchange rate. Common Law is an indicator equal to one if the country has a common law legal tradition and 0 otherwise. All models control for log GDP per capita, urbanization rate, country size and population in 2011. Sample A only includes countries with data for de jure employment index, labor inspectors and fines; sample B excludes colonizers; and sample C excludes countries with less than one million people in 2011. Robust standard errors are in parentheses.
** Statistically significant at the 0.05 level.

As mentioned above, however, there is a lack of data about the actual implementation of penalties, which raises the following concern: what if countries with a civil law legal tradition are more likely to effectively penalize labor violations and collect fines from non-compliers

compared to common law countries? In that case, the results could even reverse. Although there is very little research on this matter, Piore and Schrank (2008: 4) suggest the contrary. Labor inspectors in the former colonies of France, Portugal or Spain "hope to coach, coax and, only occasionally, coerce firms into compliance with the letter and the spirit of the law." In what the authors call the "Latin model" of labor inspection, the approach is more pedagogical, less punitive than in the Anglo-American model.

Finally, we analyze the four variants of the *Enforcement index* described in the previous section. The results in Table 8 clearly reject the legal origin theory: civil law countries enforce their employment codes less, not more.

Table 8. Legal Origin and Enforcement of Labor

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Enforcement index 1	Enforcement index 1	Enforcement index 1	Enforcement index 2	Enforcement index 2	Enforcement index 2
Common Law	0.058***	0.058***	0.037**	0.045*	0.043*	0.060**
	(0.017)	(0.018)	(0.016)	(0.023)	(0.024)	(0.027)
N	172	161	131	118	109	94
R2	0.27	0.28	0.32	0.20	0.22	0.26
Panel B	Enforcement index 3	Enforcement index 3	Enforcement index 3	Enforcement index 4	Enforcement index 4	Enforcement index 4
Common Law	0.070***	0.071***	0.048**	0.095**	0.094**	0.115**
	(0.018)	(0.019)	(0.018)	(0.039)	(0.040)	(0.046)
N	172	161	131	118	109	94
R2	0.24	0.25	0.26	0.26	0.28	0.32
Sample	Sample A	Sample B	Sample C	Sample A	Sample B	Sample C

Notes: OLS cross-country regressions. The four measures of the dependent variable (*Enforcement Index*) are: (1) the average of the normalized variables Medium Total Penalty and Inspector per worker, (2) the average using Inspection per worker, (3) using Inspector per worker-regulation, and (4) using Inspection per worker-regulation. Common Law is an indicator equal to one if the country has a common law legal tradition and 0 otherwise. All models control for log GDP per capita, urbanization rate, country size and population in 2011. Sample A only includes countries with data for de jure employment index, labor inspectors and fines; sample B excludes colonizers; and sample C excludes countries with less than one million people in 2011. Robust standard errors are in parentheses.
* Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Overall, the evidence indicates that the relationship between legal tradition and effective labor regulation is mixed. On the one hand, former colonies of France, Spain, and the other continental Europe colonizers presently have more stringent de jure labor regulations than former British colonies, as the legal origin theory predicts. On the other hand, they enforce less. These results suggest, at the very least, that a more nuanced version of the legal origin theory is needed.

4.   Employment Regulation and Labor Market Outcomes

In the last part of Botero et al.'s (2004) paper, the authors regress the employment law index on eight labor market outcomes: size of the unofficial economy, employment in the unofficial economy, male/female participation in labor force, total unemployment, youth male/female unemployment, and wages of machine operators over wages of clerks (as a proxy of the relative wages of protected and unprotected workers). They run OLS cross country regressions and only control for average years of schooling. They find a statistically significant correlation in four cases: More stringent employment law is positively correlated with total unemployment, youth male and youth female unemployment, and negatively correlated with male participation in the labor force. Based on their finds they conclude "heavier regulation of labor has adverse consequences for labor force participation and unemployment, especially the young" (page 1379). [11]

There are a number of potential problems when interpreting these cross country correlations as causal effects. One of them is that they do not control for enforcement. As the theory of the firm suggests, employers react not only to the letter of the law, but also to the expected fine in case of noncompliance (for a formal model see Basu et al. 2010). How could we credibly measure the effects of employment regulation if we only consider the letter of the law ignoring the possibility that enforcement is lower in those places where the law is more stringent? These are not purely hypothetical questions. As noted earlier, noncompliance with labor regulations is widespread, particularly in developing countries, and at the same time, those countries tend to have the most stringent regulations. As shown above, countries with more

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[11] For other cross-country studies which only look at the letter of the law, see Djankov and Ramalho (2009), Galli and Kucera (2004), and Feldmann (2009). As noted earlier, Besley and Burgess (2004) studies the consequences within-India cross-state variation in de jure labor regulation, and has been very influential in the development literature.

stringent labor codes tend to enforce less, suggesting that cross country estimates that only consider the letter of the law are likely to provide biased estimates of the effects of labor regulations on labor market outcomes.

We show below that the results in Botero et al. (2004) tend to disappear once we control for enforcement. We begin with replication, by using the same sample of countries, the same outcomes and the same measure of employment law stringency as in Botero et al.'s paper. That is, a maximum of 85 countries, and measures of labor outcomes and regulation for the 1990's. The coefficients in panel A Table 9 are identical to those in page 1376-1377 in Botero et al.'s paper. They show that countries with more stringent law tend to have worse outcomes. Panel B runs the same models but using the enforcement index instead of the de jure index. The correlations between enforcement and labor market outcomes are usually positive. Countries with more inspections and higher fines tend to have lower unemployment, a smaller informal economy, and a smaller wage gap between protected and unprotected workers. Panel C includes both the employment law index and the enforcement index; and panel D uses instead an *Effective labor regulation index* defined as the average of the normalized variables *Employment law index* and *Enforcement index*.

Only one of the correlations in Botero et al. (2004) hold after controlling for enforcement: More stringent effective regulation is negatively correlated with male labor force participation. Interestingly, some outcomes go in the opposite direction. Countries with more enforcement have lower levels of unemployment, particularly among young females. We do not claim to find causal effects. But we show that, using the same methods, the results of an influential paper tend to disappear, and in some cases reverse, when enforcement is taken into account.

Table 10 presents the estimates running the same specifications (i.e., OLS cross country regression controlling only for average years of schooling), but using a larger sample of countries and more actual data. Coefficients are usually statistically insignificant except for a positive (negative) relationship between the size of the unofficial economy and the letter of the employment code (enforcement). Overall, these results indicate that there is no clear evidence of either a positive or a negative correlation across countries between effective labor regulation and labor market outcomes.

Table 9. Regulation and Labor Market Outcomes using Botero et al.'s database

	Size unofficial economy 90's	Employment unofficial economy 90's	Male LFP 1990-94	Female LFP 1990-94	Unemployment rate 1991-2000	Unemployment rate youth male 1991-2000	Unemployment rate youth female 1991-2000	Wage machine/wage clerks 1990-1999
Panel A: Results shown by Botero et al. (2004) Table VIII page 1376-1377								
Employment law index (B)	3.55	-5.28	-6.19***	10.41	5.76**	14.63***	18.01***	0.22
	(7.01)	(11.79)	(1.81)	(10.04)	(2.85)	(4.46)	(6.59)	(0.15)
N	85	46	78	78	65	52	52	52
Panel B:								
Enforcement index	-19.58	-74.41	1.16	-16.50	-10.41***	-16.77**	-23.85***	-0.52**
	(12.47)	(70.08)	(5.93)	(16.53)	(3.58)	(6.59)	(8.03)	(0.21)
N	82	44	75	75	63	50	50	50
Panel C: Replicate Panel A but including Enforcement Index as additional control								
Employment law index (B)	1.94	-7.64	-6.07***	6.34	4.15	11.80**	14.15*	0.23
	(7.51)	(13.40)	(1.88)	(11.23)	(3.09)	(4.97)	(7.48)	(0.16)
Enforcement index	-18.46	-88.47	-2.20	-12.98	-7.96*	-9.92	-15.65*	-0.42**
	(12.74)	(81.17)	(5.39)	(18.97)	(4.11)	(6.91)	(9.38)	(0.18)
N	82	44	75	75	63	50	50	50
Panel D: Replicate Panel A but using the Effective Labor Regulation Index								
Effective Regulation index (B)	-0.22	-9.08	-7.39***	5.41	3.33	10.20	11.36	0.15
	(9.40)	(17.55)	(2.42)	(14.61)	(4.03)	(6.65)	(9.88)	(0.20)
N	82	44	75	75	63	50	50	50

Notes: All variables are from Botero et al (2004) except for the enforcement index and the effective regulation index. OLS regressions of the cross sections of countries. All models control for average years of schooling as in Botero et al. (2004). *** Significant at the 0.01, ** 0.05, * 0.1 level.

Table 10. Regulation and Labor Market Outcomes using full sample

	Size unofficial economy 2007	Employment unofficial economy 2010-13	Male LFP 2003-13	Female LFP 2003-13	Unemployment rate 2003-13	Unemployment rate youth male 2003-13	Unemployment rate youth female 2003-13
Panel A:							
Employment law index	27.17***	15.10	-7.68	4.85	0.53	1.53	-6.79
	(7.86)	(22.44)	(5.11)	(9.07)	(2.98)	(5.05)	(7.64)
N	138	41	142	142	141	141	141
Panel B:							
Enforcement index	-20.74**	-37.43	3.07	-9.51	-5.74	-4.89	-15.36
	(9.94)	(72.56)	(5.48)	(10.67)	(4.88)	(8.62)	(11.97)
N	130	39	134	134	134	134	134
Panel C: Replicate Panel A but including Enforcement Index as additional control							
Employment law index	24.27***	17.19	-5.85	4.18	-0.12	1.17	-8.19
	(8.35)	(23.58)	(5.09)	(9.99)	(3.16)	(5.44)	(8.38)
Enforcement index	-8.14	-36.50	-0.11	-7.85	-6.09	-4.87	-20.29
	(9.10)	(67.70)	(5.66)	(11.92)	(4.89)	(8.72)	(12.48)
N	130	39	133	133	133	133	133
Panel D: Replicate Panel A but using the Effective Labor Regulation Index							
Effective Regulation index	22.31**	16.93	-5.73	2.81	-1.11	0.35	-11.33
	(9.27)	(25.72)	(5.28)	(10.80)	(3.76)	(5.78)	(9.17)
N	130	39	133	133	133	133	133

Notes: All variables are described in the appendix. OLS regressions of the cross sections of countries. All models control for average years of schooling as in Botero et al. (2004). *** Significant at the 0.01, ** 0.05, * 0.1 level.

6.   Conclusion

This paper provides, to our knowledge for the first time, measures of enforcement of labor law across almost every country in the world. The distinction between *de jure* and *de facto* regulation is well understood in theory, but almost never implemented in cross-country empirical work because of lack of data. As a result, influential papers like the one by Botero et. al. (2004) published in the *Quarterly Journal of Economics*, which have shaped the policy debate by finding strong negative consequences of labor regulation, are based entirely on measures of *de jure* stringency of regulations. We show that this neglect of regulation enforcement matters. There is, on average, a negative correlation between the stringency of labor regulation and the intensity of its enforcement. The strong results of Botero et. al. (2004) on the consequences of labor regulation, and those of La Porta et. al (2008) on the legal origin theory of regulation stringency, no longer hold for *effective* labor regulation.

Of course, this paper has its limitations. Our *Inspectors* and *Inspections* measures capture inputs to enforcement, and cannot possibly address the issue of inspectors "turning a blind eye" to violations or being paid off by violators. Our measures of penalties are themselves de jure measures calculated from the regulations, and we have further had to make somewhat heroic assumptions to transform legal penalties into monetary equivalents. Nevertheless, we believe that our results stand as a strong caution to those who would use de jure measures of labor law and regulation in studies which in turn lead to strong policy conclusions on the impact of these laws. Future research should go beyond the letter of the law and focus on effective regulation. Enforcement matters.

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Appendix

Variables	Description
	Employment Laws
Alternative employment contract	Measures the existence and cost of alternatives to the standard employment contract, computed as the average of (1) a dummy equal to one if fixed-term contracts are prohibited, (2) the normalized maximum duration of fixed-term contracts.
Cost of increasing hours worked	Measures the cost of increasing the number of hours worked, computed as the average of (1) the normalized maximum of working days per week, (2) a dummy equal to one if the workweek for a single worker can be extend to 50 hours per week (including overtime) for 2 months each year to respond to a seasonal increase in production, (3) a dummy equal to one if there are restrictions on night work, (4) a dummy equal to one if there are restrictions on weekly holiday work, (5) the normalized paid annual leave.
Cost of firing workers	Measures the cost of firing 20 percent of the firm's workers for redundancy. The cost of firing a worker is calculated as the sum of the notice period, severance pay and penalties for a worker with five years of tenure with the firm (except for the penalty which is the average for 1, 5 and 10 years of tenure). If dismissal is illegal, the cost of firing is assumed to be equal to the annual wage. The cost of firing workers is computed as the ratio of new wage bill (defined as the normal wage of the remaining workers and the cost of firing) to the old wage bill.
Dismissal procedures	Measures worker protection against dismissal. It is the average of the following seven dummy variables which equal one if (1) the employer must notify a third party before dismissing one redundant worker, (2) the employer needs the approval of a third party in order to dismiss one redundant worker, (3) the employer must notify or consult a third party prior to a collective dismissal (9 employees), (4) the employer must obtain prior approval from a third party before a collective dismissal, (5) there is a retraining or reassignment obligation before an employer can make a worker redundant, (6) there are priority rules that apply to redundancy dismissals or lay-offs, (7) there are priority rules applying to re-employment.
Minimum wage	The normalized ratio of the minimum wage to value added per worker.
Employment law index	Measures the protection of employment laws as the average of the above five variables (1) alternative employment contract, (2) cost of increasing hours worked, (3) cost of firing workers, (4) dismissal procedures, (5) minimum wage. The figures refer to the year 2011. Source: World Bank Doing Business.
Employment law index (B)	Measures the protection of employment laws as of 1997. Source: Botero et al. (2004)
Number of Regulations	It can take values from 0 to 10 and it is the sum of the following ten employment regulations: Is there a minimum wage? (yes=1, no=0); are fixed-term contracts prohibited? (yes=1, no=0); is there a limit to the cumulative duration of fixed-term contracts? (yes=1, no=0); can the workweek for a single worker extend to 50 hours per week? (yes=0, no=1); are there restrictions on night work? (yes=1, no=0); are there restrictions on "weekly holiday" work? (yes=1, no=0); is it legal for the employer to terminate the employment contract on the basis of redundancy? (yes=0, no=1); does the employer need the approval of a third party in order to dismiss one

Variables	Description
	redundant worker? (yes=1, no=0); is severance pay for redundancy dismissal after one year of continuous employment compulsory? (yes=1, no=0); is paid annual leave compulsory (yes=1, no=0). The figures refer to the year 2011. Source: World Bank Doing Business report.
	Enforcement
Inspector per worker	Number of labor inspectors over the labor force. The data usually refers to the period 2010-2012, but for some countries it includes data since 2000. Sources: Official websites, ILO, US State and Labor department.
Inspection per worker	Number of labor inspections conducted per year over the labor force. The data usually refers to the period 2010-2012, but for some countries it includes data since 2000. Sources: Official websites, ILO, US State and Labor department.
Inspector per worker-regulation	Inspector per worker/Number of regulations
Inspection per worker-regulation	Inspection per worker/Number of regulations
Financial fine	Financial fine as of 2011 in case of noncompliance with the minimum wage assuming: i) the employer is a first-time offender, ii) the offense committed is paying one employee during one month a salary 20 percent below the legal minimum, iii) the employer does not obstruct the work of the inspector, iv) the employer corrects the problem after receiving a notice from the enforcement authority, and v) the employer does not retaliate against the employee. In countries with no minimum wage, we take the penalty that applies to violations of wage provisions. Fines are converted to 2011 US dollars. Source: country legislation and ILO TRAVAIL legal database.
Imprisonment	Years in prison as of 2011 that an employer faces in case of violating minimum wage law. Source: country legislation and ILO TRAVAIL legal database.
Low total penalty	Assumes a 10 percent probability of receiving the minimum financial fine and a 5 percent probability of receiving the minimum term in prison The minimum financial fine in countries that do not establish a minimum is assumed to be 50% of the maximum, and the minimum term in prison is 25% of the maximum. We assume one year in prison equals ten times GDP per worker.
Medium total penalty	Assumes a 50 percent probability of receiving a medium financial fine and a 25 percent probability of receiving the medium term in prison The medium financial fine is the average between the minimum and the maximum fine, and the medium term in prison is the average between the minimum and maximum terms. We assume one year in prison equals ten times GDP per worker.
High total penalty	Assumes a 100 percent probability of receiving the maximum financial fine and a 50 percent probability of serving 50 percent of the maximum term in prison. We assume one year in prison equals ten times GDP per worker.
Enforcement Index	The average of the normalized variables *Medium total penalty* and *Inspector per worker.*

Variables	Description
Enforcement Index 2	The average of the normalized variables *Medium total penalty* and *Inspection per worker.*
Enforcement Index 3	The average of the normalized variables *Medium total penalty* and *Inspector per worker-regulation*
Enforcement Index 4	The average of the normalized variables *Medium total penalty* and *Inspection per worker- regulation*
Effective Regulation	The average of the normalized variables *Employment law index* and *Enforcement index.*
Effective Regulation (B)	The average of the normalized variables *Employment law index (B)* and *Enforcement index.*
ILO Inspection Convention	Number of ILO Inspection Conventions signed by each country as of 2011. Takes a value from 0 to three. It is equal to three if the country signed convention No. 129 (i.e., labor inspection in agriculture) and both parts of convention No. 81 (i.e., labor inspection in the industrial and service sector).
	Outcomes
Size of the unofficial economy	Size of the shadow economy as a percentage of GDP. The figures for the nineties are from Botero et al. (2004). The figures for 2007 are from Schneider et al. (2010).
Employment in the unofficial economy	Share of the total employment in the informal sector. The figures for the nineties are from Botero et al. (2004). The figures for 2004-2013 are from ILOSTAT.
Male (female) participation rate in labor force	Male (female) participation rate as a percentage of the total male (female) population aged 15 to 64. The figures for 1990-1994 are from Botero et al. (2004). The figures for 2003-2013 are from World Development Indicators.
Unemployment rate	Unemployment rate as a percentage of the total labor force. The figures for 1991-2000 are from Botero et al. (2004). The figures for 2003-2013 are from World Development Indicators
Unemployment rate male (female) youth	Unemployed males (females) youth as a percentage of the male (female) youth labor force. The figures for 1991-2000 are from Botero et al. (2004). The figures for 2003-2013 are from World Development Indicators.
Wage machine/wage clerks	Ratio of the average wage of machine operators across industries to the average wage of clerks and workers in craft and related trades. The figures are for 1990-1999 and from Botero et al. (2004).
	Other variables
Common Law	Legal origin of the code of each country. Takes a value equal to one if it is common law. Source: La Porta, López-de-Silanes and Shleifer (2008).
Log of GDP per capita	Natural logarithm of GDP per capita in 2011, PPP, express in constant 2005 international $. Source: World Development Indicators.

Variables	Description
Population	Total population in 2011. Source: World Development Indicators.
Urbanization	Share of the total population in urban areas in 2011. Source: World Development Indicators.
Country Size	Land area in squared kilometers in 2011. Source: World Development Indicators.
Average years of schooling	Years of schooling of the population aged over 25. The figures for 1995-2000 are from Botero et al. (2004). The figures for 2010 are from Barro and Lee (2010).

Notes: This table presents brief definitions of the variables used in the paper. All measures of employment law are from the World Bank's *Doing Business 2011*. Higher values indicate higher worker protection. All dummy variables are equal to one or zero; all normalized variables lie between 0 and 1 where 0 (1) is the minimum (maximum) value in the sample. Measures of inspection are from governments' websites, from reports produced by the International Labor organization (ILO), the U.S. Department of Labor, and the U.S. State Department.

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