Are Labor Market Regulations an Obstacle for Long-Term Growth?[*]

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(Very preliminary. Please do not quote)

First Version: October 2003

Abstract

Labor markets are usually characterized by institutions protecting workers from adverse shocks and preventing private agents to set wages and the amount of labor required in the market. It has been argued that labor regulations create distortions from an ideal competitive setting, thus slowing down wage adjustment and labor reallocation and, hence, becoming an obstacle for economic growth. However, it has also been claimed that the labor markets do not behave competitively, and that regulations are put in place to improve the worker's welfare. In this contest, our main goal in this paper is test whether labor regulations have hindered economic growth. We use a panel data of 76 countries over the 1970-2000 period as well as simple and sophisticated panel data techniques that may help us characterize the link between growth and regulations in the labor markets. Among our main findings, we have: (i) a reduction in the number of regulations seems to have a significant effect on growth, although the degree of enforcement of these regulations is the economically relevant concept. (ii) The link between growth and the extent of labor regulations is mixed. It depends upon the proxy used and the sample of countries.(iii) To achieve significant growth effects from deregulating labor markets, we require significant reforms that could reduce the degree of labor regulations at a higher rate than the one observed during the 1970-2000 period.

JEL Classification: O40, O47, J80

Key Words: Labor regulations, growth, dynamic panel data.

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1. Introduction

Labor markets across the world are usually characterized by having a set of institutions that limit the ability of private agents to determine wages and the amount of labor required, and by tax systems that transfers resources from the working to the non-working population via unemployment benefits, employment protection laws, active employment policies by the government, among other regulations (Saint-Paul, 1999).

One strand of the economic analysis claims that labor institutions reduce the rate of job creation and generates higher unemployment (Salvanes, 1997; Nickell, 1997; Blanchard and Wolfers, 2000). In turn, this has an adverse impact on economic growth (Besley and Burgess, 2002; Forteza and Rama, 2002). Usually, supporters of this approach suggest the reduction or the elimination of labor market regulations in order to foster labor reallocation and higher competition, which in turn will enhance growth (Burki and Perry, 1997). However, reforms in the labor markets have proven to be politically not viable and faced a significant opposition from powerful sectors of the economy (Alesina and Drazen, 1991).

On the other hand, the behavior of labor markets appears to be far from competitive (Freeman, 1993b; Blanchard, 2002). In the presence of market failures, it has been suggested that governments should set up regulations for the good functioning of the labor markets. Usually, labor market regulations are introduced to enhance the welfare of workers and insure them from unexpected shocks. For example, legislation on social security and mandated benefits was designed to secure the workers' income in case of old age, sickness, disability, and work accidents. Also, job security provisions are undertaken to insure an income in the event of workers losing their jobs during economic downturns (Heckman and Pagés, 2000).

The main goal of this paper is to tests whether labor market regulations have been an obstacle to long-run growth. Using two recently developed databases on labor regulation by Rama and Artecona (2002) and Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003), we perform our regression analysis for a sample of 76 countries over the period 1970-2000 in the tradition of empirical growth literature (Barro, 1991, 1997). Our analysis is performed both in a cross-sectional and panel data dimensions, where we additionally control for the likely endogenous regressors. Our set of instruments consists of "external instruments" which are choisen from theories of selection of labor regulations (Botero et al. 2003), and "internal instruments" which are lagged levels or differences in panel data models (Arellano and Bond, 1991; Arellano and Bover, 1995).

Among our cross-sectional results we have: (i) Growth in industrial countries is hampered by thicker labor codes. (ii) The effect of "de facto" labor regulations on growth is mixed, depending upon the data, indicator or sample used. If proxied by the L_1 index, a higher degree labor regulations will hinder growth among developing economies. An analogous result is find for industrial countries if we used the L_2 index. (iii) Regulations stipulated in labor laws regarding employment, industrial relations, and social security seem to have an impact on growth only for industrial economies.

The main results from our panel data regression analysis are:

First, growth among developing countries could be fostered by fewer regulations stipulated in the national labor codes. However, we should note that de-regulation processes in labor markets usually succeed at reducing the number of regulations in labor laws, but they cannot improve the strenght of their enforcement mechanisms.

Second, growth in industrial countries could be enhanced by lower "de facto" regulation as proxied by one of our indices of regulation in practice (L_1). According to our estimates, growth in advanced economies could be higher by 2 percent if there is a one standard deviation decline in the index of labor regulations. We should also note that to achieve these growth effects, it is required an enormous de-regulation effort from industrial countries (especially, European economies). Unfortunately, most European countries have marginally changed their labor institutions (Siebert, 1997).

Third, growth in industrial as well as developing countries could be adversely affected by higher labor regulations —when they are proxied by the L_2 index of regulations. From our regression results, we can infer that growth in developing countries would increase by 0.6 percentage points whenever there is a one standard deviation decrease in the L_2 index. The growth effects for an analogous decline are larger for industrial economies (1.3 percentage points). However, these nations require a substantial reform in the labor markets (i.e. a sharper decline in labor regulations than the one exhibited by the data over the period of analysis).

Finally, the channels of transmission behind the adverse growth effects of higher labor regulations among developing countries are minimum wages and trade unions. Again, we find that the growth effects obtained from one-standard-deviation-reductions in both variables are not plausible unless they embark on serious efforts towards deregulating labor markets.

Our paper is divided in 5 sections. Section 2 presents a brief review on labor regulations and economic performance. Section 3 discusses the data used and the methodology applied. Section 4 evaluates empirically whether labor regulations have hindered long-term growth. Finally, section 5 concludes.

2. Literature Review

There is a vast amount of empirical literature evaluating the effects of economic policy on growth for a cross-section of countries. There is recent evidence that government interventions may have an important effect on growth. Hall and Jones (1999) showed that poor *"social infrastructure"* (approximated by poor contract enforcement and bureaucratic quality, and government repudiation of contracts, among others) is negatively related to long-term growth. The degree and type of government intervention varies across countries. Djankov et al. (2002) analyzes the regulations to start a business across countries, and they find that countries with higher regulations on entry may enlarge their informal sectors and, hence, have a poorer economic performance.[1] However, our focus of attention is to review the literature on the effects of labor market regulations on economic performance, and especially, on economic growth.

In policy circles, there are different points of view regarding the role of labor market regulations in the economic process (Freeman, 1993b). On the one hand, the "distortionist" view argues that government regulations in the labor markets (under the form of minimum wages, social security contributions, job security, and collective bargaining, among others) create distortions in an optimal world (The World Bank, 1990). On the other hand, the "institutionalist" view claims that market failures generate divergences from the ideal world and put emphasis on the benefits of government interventions in the labor markets (ILO, 1991).

According to the *"distortionist"* view, labor market regulations are major obstacles to growth and employment for the following reasons: First, regulations in the labor market prevent wages to equal their marginal product in equilibrium and, hence, will misallocate resources. Second, regulations may hinder the adjustment of labor markets to economic shocks. Finally, labor regulations that redistribute economic rents from capital to labor may reduce investment's profitability (e.g. collective bargaining schemes, and expansionary fiscal programs to fund public employment). In turn, this may discourage investment and, hence, lower growth.[2]

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[1] Djankov and associate argue that this empirical result is consistent with economic regulations legislated and imposed by government officials or insiders that extract rents (Shleifer and Vishny, 1998).
[2] Freeman (1993) argues that arguments from the "distortionist" view are not consistent with macro and micro propositions derived from economic theory. For example, the Ricardian equivalence is rejected by those who argue that social security contributions have a negative impact on investment and savings.

On the other hand, the *"institutionalist"* view argues that labor regulations may fulfill redistributive roles to low-wage workers or constitute an insurance from adverse market outcomes (Standing and Tokman, 1991). Labor standards, on the other hand, forces employers to focus on the enhancement of their labor force whether it is through training or technical innovations (Freeman, 1993a,b). Finally, standards on mandated benefits may help solve moral hazard or selectivity issues that prevent firms to offer socially desirable benefits or contracts (Summers, 1988).

In a recent paper, Forteza and Rama (2002) evaluate the role of labor market regulations in the success of economic reforms. From an economic dimension, wage adjustment and labor reallocation in outward-oriented economies will be faster if labor markets are flexible. International competition in the goods markets will drive down wages in the import-competing sectors and labor costs in the economy, thus making the export sector more competitive. If labor markets are not flexible, the adjusment in the economy would be slower and the rate of uemployment would be higher (Rama, 1997). According to this dimension, current labor laws have been an obstacle to absorb displaced workers from the economic reform (IADB, 1997). Hence, it is usually recommended the elimination of government interventions that make the labor costly and risky (Burki and Perry, 1997).

From a political dimension, potential losers from economic reforms (e.g. workers in the public sector and the unionized labor) usually try to hinder or delay the economic adjustment process (Alesina and Drazen, 1991; Fernández and Rodrik, 1991). High resistance to economic reforms from well-organized groups would lead to generalized protests and strikes. In response, the government may delay the adoption of reforms or launch an insufficient package of reforms, which, in turn, would have an insignificant impact on economic performance. According to this argument, resistance to reforms is weaker the more equal is the distribution of adjustment costs. Also, economic reforms should be complemented with compensation mechanisms for workers affected by the reforms, such as job separation packages, early retirement programs and unemployment benefits (Rama, 1995; Forteza and Rama, 2002).

Forteza and Rama (2002) find that labor regulations are a key determinant for the success or failure of economic reforms for political reasons rather than for economic reasons. Specifically, they find that minimum wages or mandated benefits do not hinder growth neither before nor after adjustment, whereas unionization and government employment are correlated with deeper

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Also, Coase's theorem is not taken into account when distortionist claim that employment laws have efficiency costs.

recessions before adjustment and slower recoveries in the aftermath. Finally, Besley and Burgess (2002) assess the role of labor market regulations in explaining the performance of the Indian manufacturing industry beween 1958 and 1992. They find that regulations to protect workers (in the areas of collective bargaining and labor disputes) were not able to enhance growth and reduce poverty.

3. The Data and Methodology

In the present sections we will discuss: (i) the labor regulation data used in the regression analysis, and (ii) the estimation strategy pursued. First, we describe two recently developed databases on labor regulations and outcomes: (a) the aggregate and invidual measures proposed by Rama (1995) and Rama and Artecona (2002), and (b) the indicators of labor market regulations obtained from labor codes and gathered by Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003). Second, we outline the estimation techniques used in order to test the impact of labor regulations on long-term growth. Our preferred estimation technique is the GMM-IV system estimator (Arellano and Bover, 1995; Blundell and Bond, 1998) which takes into account the unobserved country- and time-specific effects as well as possible endogenous regressors in a dynamic panel data model.

3.1 The Data

Labor Market Regulations.
As stipulated above, we use two different databases on labor market regulation and outcomes. The Rama and Artecona database, which we will denote by RA, has information on a larger sample of countries (121), it has a panel dimension (5-year average observations spanning the 1945-99 period), and allows us to distinguish between regulations in paper and in practice. On the other hand, the database from Botero and associated, which we will denote by BDLLS, covers a smaller sample of countries (85) and contains only cross-sectional information. It specifically gathers information on three types of labor laws (employment, industrial relations, and social security) for the year 1997. Next, we will describe further the main features of these databases.

The RA Database (Rama and Artecona, 2002). Rama and Artecona have collected extensive information on labor market regulations and outcomes for 121 countries. The data is reported in 5-year period averages from 1945-49 to 1995-99. In this database, we can distinguish between:

a) Regulation "in paper" (or "de jure" regulations) approximated by eight (8) indicators of ILO labor standards as ratified and stipulated by legal documents in several countries. These conventions contemplate universal legislation on issues such as child labor, compulsory labor, equal remuneration for male and female workers, equal opportunity, the right of collective bargaining, and organization in unions, among others.

b) Regulation "in practice" (or "de facto" regulations) and labor market outcomes approximated by 36 indicators classified in 6 categories: labor force, employment and unemployment, wages and productivity, conditions of work and benefits, trade unions and collective bargaining, and public sector employment. Here they provide information on regulations in the labor market such as minimum wages, mandated benefits, non-wage costs, collective bargaining, public employment; as well as labor market outcomes (e.g. labor force, unemployment, earnings and productivity).

It is quite important to distinguish between these two groups of regulations —"de jure" vs. "de facto"— given that the enforcement of regulations and norms stipulated in labor codes is quite limited (especially) in developing countries.[3] Hence, we follow Rama (1995) and Forteza and Rama (2002) to define aggregate indices of the overall extent of labor regulations in the economy.

An index of regulation *"de jure"*, which we will denote as L_0, is measured as the cumulative number of ILO conventions ratified by a country's labor code over time. Not only this index reflects the ideal regulatory framework from an *institutionalist* point of view (Freeman, 1993), but also the *thickness* of national labor codes (Rama and Forteza, 2002). This index includes the ratification of ILO conventions on: minimum age of employment (No. 138), force or compulsory labor (No. 29), the abolition of forced labor (No. 105), equal remuneration of for male and female workers (No. 100), discrimination on equality of opportunity or conditions of employment on the basis of race, religion, sex, political opinion or social origin (No. 87), and the right to bargain collectively (No. 98).

However, as we said before, the extent of regulations in the labor market depends on the way these regulations are implemented and enforced. Therefore, we require an indicator that captures the extent and not the number of these regulations. Rama and Artecona (2002) provide measures for regulations in the following four areas: minimum wages (MW), mandated benefits (MB),

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[3] Squire and Suthiwart-Narueput (1997) suggest *"de jure"* regulations that appear to be more distortive in developing countries could be the least enforced in practice.

trade unions (TU) and public sector employment (GE). Unfortunately, there is no data available on job separation costs for a large number of countries.[4]

In order to evaluate the overall effect of labor reforms in these dimensions, we follow Rama (1995) and Forteza and Rama (2002) and we construct two aggregate indices of labor regulations "in practice" —or "de facto"— with both of them including different proxys for these four dimensions. We should note later that the higher degree of correlation between the different dimensions of the labor regulation index prevents us from including all of them in the same regression.

The first aggregate index of regulations in practice, L_1, is the simple average of the following measures: the ratio of the minimum wage to unit labor costs in the manufacturing sector as a proxy for MW, the social security contributions as a percentage of salaries for MB, total trade union membership as a percentage of total labor force for TU, and the share of general government employment in total employment for GE. On the other hand, the second aggregate index of regulations in practice, L_2, is also the simple average of the minimum wage to income per capita as a proxy for MB, the number of days maternity leave for a first child born without complications for MB, the ratification of the ILO convention 87 that allows workers to establish organizations for TU, and the ratio of central government employment to total employment for GE.

In order to make all these variables comparable across countries, we normalized all the labor market regulation indicators in such a way that their values fluctuate between 0 and 1. Countries with the highest (lowest) extent of labor regulation have a score of 1 (0). In addition, the aggregate indices of regulation in practice, L_1 or L_2, are computed for countries with at least 2 of the 4 dimensions involved in the analysis.

The BDLLS Database (Botero, Djankov, La Porta, Lopez de Silanes, and Shleifer, 2003). Botero and associates have recently collected data on labor regulation in 85 countries by analyzing 3 dimensions of the national labor codes: (a) laws governing individual employment contracts (employment laws), (b) laws regulating the adoption, bargaining and enforcement of collective agreements, the organization of trade unions, and the industrial action by workers and employers (industrial and collective relations law), and (c) laws governing the social response to

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[4] Heckman and Pagés (2000) constructed data on job separation costs for Latin America and found that these costs have a substantial impact on the level of employment in the region.

needs and conditions that impact the quality of life such as old age, disability, death, unemployment and maternity (social security law).[5]

We first use the aggregate index of *employment laws*, which regulate aspects of the individual labor contract, terms of reference and termination of the contract. This index covers the restrictions placed on alternative employment contracts, conditions of the employment contract and job security. Next, we have the aggregate index of *industrial relations laws*, which protect workers from employers. These laws contemplate aspects of the worker-employer relationship such as collective bargaining, the participation of workers in management, and collective disputes (e.g. strikes and lockouts). Finally, we have the aggregate index of *social security laws* that cover the risk of old age, sickness and unemployment. Note that since labor laws (instead of outcomes) are used to construct all these indexes, they are more closely in spirit to *"de jure"* labor rigidities in Rama and Artecona (2002).

Growth and its Determinants

Our dependent variable is the growth rate of GDP per capita, and we obtain the data from the Penn World Tables 6.1 as gathered by Heston, Summers and Aten (2002). Specifically, we use the real GDP per capita (chain index prices). We follow the vast existing empirical growth literature to choose the determinants of long-run economic growth.[6] We include the initial GDP per capita (in logs) to test for transitional convergence. In addition we consider structural factors such as: the level of secondary schooling from Barro and Lee (2000) as a proxy of human capital, credit to the private sector as a ratio to GDP to measure financial depth (Beck, Demirguc-Kunt and Levine, 2000), the ratio of real exports and imports to GDP as a measure of trade openness, and the Freedom House index of civil liberties as proxy of governance. Data on the CPI inflation rate and RER overvaluation is obtained from the World Bank's World Development Indicators and they proxy for stabilization policies. Finally, the terms of trade changes (as a proxy for external shocks) are also taken from the World Development Indicators.

3.2 The Empirical Framework

The main goal of the present section is to evaluate the role of labor market rigidities on long-term growth following the traditional empirical growth literature. Our regression framework is specified by the following system:

$$dy^*_{i,t,t-k} = \mu_i + \eta_t + \alpha y_{i,t-k} + X_{it}\beta$$

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[5] Unlike the RA database, we only have cross-sectional information on these variables.

$$dy_{i,t,t-k} = dy^*_{i,t,t-k} + L_{it}\Gamma + \xi_{it}$$

According to the first equation of system (1), the equilibrium growth rate of the economy in country i during the *[t, t-k]* period, $dy^*_{i,t,t-k}$, is a function of the log of output per capita in the initial period t-k, y_{t-k}, a set of growth determinants for country i at time t described by the matrix X_{it}, as well as unobserved country and period-specific effects, μ_i and η_t, respectively. Our set of long-term growth determinants follows the work of Loayza, Fajnzylber y Calderon (2003). The initial level of output per capita (in logs) is included to test for conditional convergence. We consider indicators of human capital, financial depth, trade openness and governance as proxies for structural policies and institutions. The CPI inflation rate and the real exchange rate overvaluation are proxies for stabilization policies and, finally, the terms of trade shocks are an approximation of external shocks.[7]

In the spirit of Rama (1995), our second equation in the system indicates that any deviation in equilibrium long-term growth may be explained by a set of variables that proxy departures from competition in the labor markets, W_{it}. This matrix L, our variable of interest, may comprise different indicators that focus on specific policy or institutions in the labor markets such as minimum wages, mandatory benefits, trade union membership, government employment, social security laws, collective bargaining, among others. We denote by $\left\{\ell^k_{it}\right\}^K_{k=1}$ all the K indicators of labor market rigidities comprised in the matrix L_{it}. Unlike Rama (1995) and Forteza and Rama (2002), we do not assume labor market policies and institutions to be time-invariant. We expect that labor institutions may change over longer horizons. Note that if any of the $\left\{\ell^k_{it}\right\}$ variables equals zero, labor markets are perfectly competitive. Also, the larger the value displayed by any of the $\left\{\ell^k_{it}\right\}$ variables, the greatest the deviation from perfect competition in labor markets. Note that negative values for the $\left\{\gamma_k\right\}$ coefficients in the Γ matrix imply that the reduction of labor rigidities (*i.e.* distortions that depart labor markets from competitive equilibrium) may improve the growth rate in the long-term.

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[6] The set of growth determinants will follow the classification of Loayza, Fajnzylber and Calderón (2003).

[7] We follow the tradition of empirical cross-country and panel growth regression models by focusing on the ultimate policy, structural, and external determinants of factor accumulation and productivity growth. Hence, we exclude capital and any other direct factor of production.

To perform a regression analysis of equation (1) may also bring additional empirical problems. Some of the $\{\ell_{it}^k\}$ variables aree highly correlated with each other, thus leading to problems of multicollinearity. For example, the correlation between trade union membership and government employment is approximately 0.8, whereas mandated benefits and minimum wages have a correlation of 0.5. This problem of colinearity impedes the identification of the parameters of the Γ matrix.

We address the issues of colinearity among labor regulation indicators by aggregating the variables in the matrix L_{it} using the same strategy as Rama (1995) and Forteza and Rama (2002). Before we aggregate them in a single index, we need to normalize them since we want to express them in comparable units. We have defined above our labor market rigidity indicator as ℓ_{it}^k, for $k=1,...,K$. Next, we define $\{\ell_{min}^k\}$ and $\{\ell_{max}^k\}$ as the minimum and maximum deviation from perfect competition that a the labor market in a country can achieve. Hence, we can define our normalized labor market rigidity indicator as $\widetilde{\ell}_{it}^k = \dfrac{\ell_{it}^k - \ell_{min}^k}{\ell_{max}^k - \ell_{min}^k}$.[8] Then, we define our aggregate measure of labor market rigidities as the average of J out of the K relevant labor market ridigities (where $J \leq K$). In principle, this aggregate index also varies between zero and one. But unless all of the labor market rigidities are perfectly correlated with each other, the actual range of variation across countries should be significantly narrower for the aggregate measures than for any of the individual indicators.

Our aggregate index of labor market rigidities, ℓ_{it}^A, is used to test the effects of the overall labor market rigidity on growth. We reformulate our growth equation in system (1) as:

$$dy_{i,t,t-k} = dy_{i,t,t-k}^* + \gamma_A \ell_{it}^A + \xi_{it} \qquad (2)$$

The sign and order of γ_A can be used to check the nature and magnitude of the impact of labor rigidities on growth. However, different labor market rigidities may have consequences of a different sign that cancel each other to some extent. Even if the estimate of the parameter γ_A turned out to be significant, its mere sign might not help identifying the specific policies and institutions that need to be reformulated. Hence, we still need for more information on the sign and order of magnitude of the γ_j parameters.

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[8] Note that, by construction, $\widetilde{\ell}_{it}^k$ will fluctuate between zero and one.

We are tempted to use (2) to test for the effects of particular labor market rigidities. If ℓ_{it}^A is replaced by $\mathcal{T}_{it}^k$ in (2), the coefficient multiplying it would capture the effects of the labor market regulation k, but also (partly) those of all of the other missing rigidities. Since they are likely to be correlated with each other, the value obtained for γ_k might be reflecting the effects of these other rigidities. For example, let us assume that unionized labor does not affect growth, but minimum wages do, and that minimum wages tend to be higher in countries with larger labor unions (actually we find a correlation of 0.5 between these variables). If we include minimum wages in (2) instead of ℓ_{it}^A, we will obtain a significant estimate for this variable even though it should be statistically and economically irrelevant. This problem can be partially corrected by defining the *complementary* labor regulation variable $\mathcal{T}_{it}^{-k}$ as the average of the indicators that are different from k. This complementary variable can be used to control for all other labor market features, apart from $\mathcal{T}_{it}^k$, by using the following model:

$$dy_{i,t,t-k} = dy_{i,t,t-k}^* + \gamma_k \mathcal{T}_{it}^k + \gamma_{-k} \mathcal{T}_{it}^{-k} + \xi_{it} \tag{3}$$

with the coefficient γ_k capturing the effect of labor market regulation k on long-term growth.

2.3 Estimation Techniques

Our growth regression equation specified in (1) is first estimated using pooled OLS. Then, we run our regression using time dummies given that we want to analyze differences in growth experiences across countries due to labor rigidities. However, both methods have not controlled for endogenous regressors. Forces affecting both labor rigidities and growth could be driving the correlation between both variables and our estimates may be biased.

One way to tackle the problem of endogeneity is to instrument for labor rigidities. We follow Botero et al. (2003) in choosing the appropriate instruments for our measures of labor institutions. According to these authors, several theories explain the choice of labor institutions: the efficiency theory, the political power theory and the legal theory.

North (1981) considers that the choice of institutions is driven primarily by *efficiency* considerations. Different institutions arrangements (e.g. reliance on market forces, contract and private litigation, government regulation, etc.) may be appropriate in different circumstances. One version of the efficiency theory focuses on the distinction between regulation and social insurance. Social insurances may be the relatively more efficient way of dealing with market failures in countries with a lower social marginal cost of tax revenues, which presumably are the

richer countries (Becker and Mulligan, 2000). Poor countries must then regulate to protect workers from being fired or mistreated by employers, whereas rich countries provide unemployment insurance, sick leave, early retirement, and so on because they can raise taxes more cheaply to finance such operations (Blanchard, 2000). A second version of the efficiency theory argues the opposite. It holds that the principal cost of regulation, relative to other forms of social control of business, is its potential for abuse of regulated firms by the government and its officials. Labor regulations can be used to force firms to hire and keep excess labor, to empower unions friendly with the government, etc. Hence, rich and better governed countries have a comparative advantage at regulation relative to other forms of social control of business because their governments are less likely to abuse power.

Political power theories argue that institutions are designed to transfer resources from those out of political power to those in power, and to entrench those in political power at the helm (Olson, 1993). Hence, institutions are generally inefficient and designated to be so by political leaders to help themselves and their favored groups. It is argued that regulations protecting workers are introduced by socialist, social-democratic, and more generally leftist governments to benefit their political constituencies (Hicks, 1999). In addition, labor regulations are a response to the pressure from trade unions, and should be more extensive when unions are more powerful, regardless of which government is in charge. Dictatorships are less constrained than democratically elected governments, and therefore will have more redistributive laws and institutions. Constitutions, legislative constraints, and other forms of checks and balances are all conducive to fewer regulations (Djankov et al. 2002). Likewise, economies open to trade may be less likely to introduce expensive regulations, because competition makes it less lucrative for governments to raise firms' regulatory costs (Ades and Di Tella, 1999).

Djankov and associates (2003) argue that countries with different *legal traditions* use different ways for the social control of business. Common law countries tend to rely more on markets and contracts, civil law countries on regulation, and socialist countries on state ownership. [9] This implies that civil law countries and socialist law countries should regulate labor markets more

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[9] Common law emerged in England and is mostly characterized by the importance of decision making by juries, independent judges, and the emphasis on judicial discretion as opposed to codes. Common law was transmitted to the British colonies, including US, Canada, Australia, New Zealand, India, Pakistan, and other countries in Southeast Asia, East Africa, and the Caribbean. On the other hand, civil law evolved from Roman law in Western Europe and was incorporated into civil codes in France and Germany in the 19th century. It is characterized by less independent judiciaries, the relative unimportance of juries and a greater role of both substantive and procedural codes as opposed to judicial discretion. French civil law was transplanted throughout Western Europe, including Spain, Portugal, Italy, Belgium, and Holland, and subsequently to the colonies in North and West Africa, Latin America, and parts in Asia. German codes became accepted in Germanic Western Europe, but also was transplanted to Japan and from there to China, Korea, and Taiwan. Socialist law was adopted in countries that came under the influence of the

extensively than common law countries. Common law countries may also have a less generous social security system since they rely on markets to provide insurance.

Our set of instruments for labor rigidity indicators is the following: we use the (log of) GDP per capita to control for efficiency purposes. To test the political power theories, we use the index of institutionalized autocracy from the Polity IV Codebook (Marshall and Jaggers, 2003) the political orientation of the government and congress to the left (Beck et al. 2001), and measures of trade openness. Finally, to test the legal theory we include dummy variables for countries with British common law, and German civil code (La Porta et al. 1999)

Another way to tackle the endogeneity of labor rigidities is to use the GMM estimators developed by Arellano and Bover (1995) and Blundell and Bond (1998). This technique takes account of the following: First, the presence of unobserved period- and country-specific effects. Time effects are accounted for by the inclusion of period-specific dummy variables, whereas country-specific effects are dealt with via differencing given the dynamic nature of the regression. Second, we control for biases resulting from simultaneous or reverse causation. A more detailed reference to the GMM-IV techniques is presented in the Appendix II.

4. Empirical Assessment

In this section we empirically evaluate whether regulations in the labor market have hindered long-term growth. Our regression analysis will be performed in two dimensions: first, the analysis of a cross-section sample of 76 countries with average figures for the 1970-2000 period, and, second, a panel data analysis for the same sample of countries with 5-year average observations over the same period. Note that we can use both RA and BDLLS databases only for the cross-section, with the former being used also in the panel analysis.

We first present some basic statistics on the extent of labor market regulations and economic growth. Then, we perform a cross-sectional and panel data correlation analysis between growth and labor regulations. Next, we discuss the basic results of the growth regression in the cross-section of countries. And, finally, we present the panel data evidence on growth and labor regulations using different estimation techniques.

4.1. Basic Statistics

USSR, while an indigenous Scandinavian legal tradition developed in Sweden, Norway, Denmark,

In Table 1 we report the simple average of the growth rate in GDP per capita and different indicators of labor market regulation for a cross-section of countries during the 1970-2000 period. In panel I we report the simple averages for the RA indicators, whereas we report the averages of the labor regulations indicators from the BDLLS database in panel II.

In paper, we find that industrial countries are more regulated than developing countries (0.49 vs. 0.25, respectively). Labor markets in Latin America are more regulated than the world sample (0.34 vs. 0.30), whereas East Asia is less regulated than the world sample (0.09). Within the Latin American region, Chile's number of regulations is similar to the regional average, with Uruguay being the countries with the largest number of regulations (0.67). In practice, industrial countries exhibit a larger extent of regulations in the labor markets than developing countries whether we use the L_1 or L_2 index (see figure 1). If we use the L_2 index of regulations in practice, Latin American labor markets are as regulated as labor markets in industrial economies. Also note that Chilean labor markets are less regulated than the Latin American ones regardless of the aggregate index used.

Next, we analyze the components of both aggregate indices of labor regulations in practice (see figures 2 and 3). Regarding *minimum wages*, we find that they are higher (lower) among industrial countries than among developing countries when they are normalized by industrial wages (income per capita). Minimum wages in East Asia are below than in Latin American markets, with Argentina, Chile and Peru achieving the lowest minimum wages in the region (when normalized by the income per capita). In the case of *mandated benefits*, the social security contribution (normalized by total wages) is larger among industrial countries than among developing countries (0.45 vs. 0.35, respectively). Note that Chile's contribution to the social security (0.40) is larger than both the regional average (0.35) and East Asia (0.26). In addition, industrial countries have longer days of *maternity leave* than developing countries, with Chile displaying a larger number of days than the average in East Asia and Latin America. *Trade union membership* in developed economies almost doubled the one in developing countries (0.39 vs. 0.2, respectively). Trade union membership is lower in Latin America and East Asia than the mean of the developing areas. The share of workers affiliated to trade unions is lower in Chile than in the representative Latin American countries, with Argentina and Brazil being the countries with the largest share of unionized workers. Finally, the size of the *public sector employment* is larger in advanced economies than in developing countries, although the difference is significantly larger when we use the general government (0.39 vs. 0.22, respectively). Public employment in Chile is lower than both the average employment in Latin

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Iceland, and Finland (Botero et al. 2003).

America and East Asia, with the largest public employment in Latin America displayed by Argentina and Uruguay.

In panel II we present the simple average of the BDLLS indicators of labor regulation, which complement the measures of regulations on paper in the RA database (see also figure 7). Regarding *employment laws*, developing countries are more regulated than industrial countries (1.60 vs. 1.36), the former being more regulated in the areas of job security and conditions of employment (see figure 8). We also observe that the Chilean labor market is less regulated than the regional average (1.46 vs. 1.79), with Chile being less regulated also in job security and conditions of employment. On the other hand, developing countries are slightly more regulated than industrial countries in the area of *industrial (collective) relations law* (1.26 vs. 1.22), with developing countries being more regulated in the areas of collective bargaining and disputes, and being less regulated in the participation of workers in management (see figure 9). Argentina, Mexico and Peru have the more regulated labor markets in Latin America regarding collective bargaining, followed by Chile and Colombia. Finally, workers in industrial countries are more protected in *social security* issues than in developing countries (2.21 vs. 1.53), with the difference being the largest in unemployment benefits —0.78 vs. 0.38 (see figure 10).

In Table 2 we present the evolution of labor regulations over the decades spanning the 1970-2000 period for different sub-samples of countries (see figures 4 through 6). We observe that the aggregate index of rigidities on paper, L_0, increases over the decades for all sub-groups of countries. This implies that countries across the world have ratified more ILO conventions over time. The extent of rigidities in practice has slightly decreased among industrial countries in the 1990s relative to the 1980s, whereas it has increased among developing countries. Also note that, whether it is measured by the L1 or L2 index, Chilean labor markets have become more regulated in the 1990s.

4.2. Correlation Analysis

Cross-Section Correlations. In Table 3 we present the correlation between economic growth and a wide array of labor regulation indicators for a cross section of countries averaged over the 1970-2000 period. In panel I of Table 3, we present the cross-correlation analysis between growth in GDP per capita and the indicators of labor market regulation in the RA database. We first find that rigidities on paper (L_0) are negatively correlated with economic growth in all samples (-0.12 for the world sample), with the negative association being stronger among developing countries than among industrial countries(-0.28 vs. -0.12, respectively). The

negative correlation between labor regulations and growth is the strongest among East Asian countries (-0.54), and almost negligible in Latin America (-0.001).[10]

The correlation between the L_1 index of labor regulations in practice and economic growth is negative for the world sample (-0.06), as well as among industrial and developing countries (-0.24 and -0.12, respectively).[11] For the L_2 index, we also obtained a negative association between labor regulations and growth. In this case, the correlation is almost similar for both industrial and developing countries (fluctuating around 0.33), and with East Asia displaying the strongest negative correlation (-0.83).

We also find the *minimum wages* are negatively associated with economic growth in industrial economies regarding of the normalization (-0.32 when expressed as a ratio of industrial wages, and –0.34 when expressed as a ratio of income per capita). Only when normalized by income per capita, minimum wages are negatively correlated with growth in the world sample (-0.23) and among developing countries (-0.20). Note that the strongest negative correlation among developing areas is displayed by East Asia with –0.23 when minimum wages are expressed as a ratio of industrial wages, and –0.55 when normalized by income per capita.

In the case of *mandated benefits*, the negative correlation with growth is weaker for the full sample when we consider social security contributions (-0.05) instead of days of maternity leave (-0.12). When considering the contribution to social security, the correlation is positive and small for the group of industrial countries (0.06) and Latin America (0.09). On the other hand, the days of maternity leave have a negative correlation with growth for industrial and developing countries (-0.28 and –0.14, respectively), and with a positive but negligible coefficient for Latin America.

Trade union membership has a negative association with economic growth for the full sample of countries (-0.04), with the negative correlation coefficient being stronger for developing countries and Latin America (-0.11 and –0.18, respectively). On the other hand, the measure of trade union based on the ratification of the ILO convention on organized labor has a negative correlation with growth for all sub-samples. The negative correlation is the strongest among East Asian countries (-0.52), and the weakest among industrial economies and Latin America (with approximately -0.14).

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[10] Scatterplots for these simple correlations are presented in figures 11 through 13.
[11] We report scatterplots for economic growth vs. the indicators conforming the index 1 of "de facto" labor rigidities in Figure 14.

Finally, the *government employment* displayed a positive correlation with growth for the world sample (0.04 if we use general government, and 0.23 when using central government), with the highest positive correlation exhibited by Latin America (0.15 with general government and 0.33 with central government employment). On the other hand, employment in the public sector has a negative association with growth among industrial countries (-0.31 for general government employment, and –0.25 for central government), and for East Asia when considering central government employment (-0.15).

In panel II of Table 3 we present the cross-section correlation analysis between economic growth and the indicators of labor market regulation from the BDLLS database. Note that these variables describe the groups of laws protecting workers in three main areas of the labor code: employment, industrial or collective relations, and social security.

The aggregate index of *employment laws* is negatively associated with growth for the world sample (-0.24), with the negative association being the strongest among developing countries (-0.28) and the weakest in Latin America (-0.04). On the other hand, the correlation becomes positive for industrial countries (0.16). Note that within groups of employment laws, the negative correlation for the full sample is stronger for conditions of employment (-0.28) and job security (-0.21). The same behavior is displayed by developing countries. In addition, laws on job security have the strongest negative correlation with growth for Latin America and East Asia (-0.13 and –0.42, respectively).

Regarding *industrial relations (collective) laws*, we observe a small and negative association with growth for the world sample, with a stronger negative relationship for developing countries, Latin America, and East Asia, and with a positive correlation for industrial countries. We also observe that laws on collective bargaining and laws on collective disputes have a negative correlation for the world sample and the other developing areas, with the strongest correlation being strongest for laws on collective bargaining (e.g. -0.25 for developing countries and -0.35 for East Asia). On the other hand, we find a positive association between growth and the participation of workers in management.

Finally, there is a weak positive correlation between *social security laws* and economic growth for the world sample. However, we find a larger positive correlation for Latin America (0.2) and East Asia (0.35) as well as a negative association for industrial countries (-0.2). We also find that growth is negatively associated to laws contemplating old age, disability, and death benefits, as well as sickness and health benefits for industrial countries (-0.23 and -0.27, respectively), whereas there is a positive association between growth and unemployment

benefits for the same group of countries (0.13). Note that the developing countries showed a completely different correlation pattern: positive for old age and sickness benefits, and negative for unemployment benefits.

Panel Data Correlations. In Table 4 we present the panel correlation analysis between economic growth and the labor regulation indicators in the RA database (the only one with a panel dimension). Not only we present the panel correlation for the 1970-2000 period but also the evolution of these correlation coefficients over the decades. In general we find that rigidities on paper, L_0, are negatively association with growth for all the samples. On the other hand, the correlation between growth and rigidities in practice is negative for industrial countries regardless of the index used, and negative for developing countries when using L_2.

We also find that the degree of negative correlation between growth and L_0 (rigidities on paper) has increased in the 1990s relative to the 1980s for industrial countries (from –0.07 to –0.17), whereas it has declined for developing countries over the same time period (from –0.25 to –0.1). Regarding the aggregate indices of regulation in practice, the negative correlation between L_1 and growth has decreased from –0.17 to –0.13 for industrial countries, while it has remain invariant for L_2 (around -0.28). On the other hand, the correlation between L_1 and growth has become negative in the 1990s respect to the 1980s, and it has remained unchanged for L_2 over the same time period.

Correlation among indicators of labor market regulation. Here we briefly the correlations between the different indicators of labor market regulation that we use in our regression analysis. First, we correlate labor indicators within the RA and the BDLLS database. Then, we correlate different indicators between the database.

We find that countries with higher extent of regulation on paper also display a higher degree of regulations in practice. This is reflected in the positive association between the index L_0 and the aggregate indices of rigidities in practice, L_1 and L_2 (with correlation coefficients of 0.53 and 0.44). On the other hand, both aggregate indices, L_1 and L_2, are positively correlated (0.44).

Next, we analyze the correlation between each aggregate index of regulations in practice and their components. For the index L_1, the proxies of trade unions and government employment have the highest correlation with the aggregate index (approximately 0.78), with minimum wages having the weakest correlation (0.44). In the case of the index L_2, the trade union indicator displays the highest correlation with the aggregate index (0.92), with the rest of the dimensions having a correlation that fluctuates between 0.30 and 0.34. We should also note that

the proxies used in each dimension of the aggregate indices L_1 and L_2 are positively correlated, with the employment in general and central government having a degree of correlation of 0.55. The correlation between minimum wages indicators is 0.35, between measures of mandate benefits is 0.29, and between trade union variables is 0.30.

We also report some correlations for the measures of labor regulation in the BDLLS database. We find that countries with higher regulation in employment laws, also display a larger extent or regulations in industrial relations and social security laws. The positive correlation is the strongest between employment laws and industrial relations laws (0.52), whereas the correlation is the weakest between employment and social security laws (0.1). We also find that the components of each aggregate index proposed by the BDLLS database are highly correlated with the aggregate index. For example, the aggregate index of social security laws is highly correlated with laws on sickness and health benefits (0.84) and unemployment benefits (0.89), while the aggregate index of employment laws is highly correlated with laws on job security (0.81) and on conditions of employment (0.79).

Finally, we evaluate the correlation of labor regulation indicators between databases. First, we find that the index of regulations on paper, L_0, in the RA database is positively associated with the aggregate indices in the BDLLS database. The highest correlation is displayed by L_0 and social security laws (0.46), while the lowest is exhibited by L_0 and employment laws (0.16). Analogously, we find that either the L1 and L2 index of aggregate regulations in practice is positively correlated with the indices in the BDLLS data. The highest correlation is again displayed with social security laws (0.59 with the L_1 index, and 0.3 with the L_2 index).

4.3. Cross-Section Regression Analysis

We first discuss the results for the relationship between labor market regulations and economic growth for a cross-section of countries. Our dependent variable is the annual average growth rate in GDP per capita over the 1970-2000 period. The explanatory variables are the log of GDP per capita in 1970, the average years of secondary schooling in 1970, the ratio of domestic credit to the private sector to GDP, average annual inflation rate, the degree of openness, average annual changes in the terms of trade, the real exchange rate overvaluation, the index of civil liberties as a proxy for governance, and our measures of labor regulations. For reasons of space we only report the coefficient of interest (i.e. the labor regulation coefficient), its standard deviation, the coefficient of determination (R^2) and the number of observations. The full regression results are available from the authors upon request.

In Table 5, we present the estimated coefficient of labor regulation measures in the RA database and its statistical significance for the sample of all countries as well as the sample of developing and industrial countries. There we report not only least squares (OLS) estimates,[12] but also IV estimations for these coefficients. On the other hand, we report the coefficient estimates for labor regulation indicators in the BDLLS database in Table 6. We also run the same experiments as in the previous table.

Results for the RA labor regulation indicators. In panel I of Table 5, we present the OLS estimates for the labor regulation variables in our growth regression framework. We find a negative relationship between growth and regulations on paper, L_0, for all samples of countries. However, this negative relationship is statistically significant only for industrial countries. A negative relationship that is significant only for industrial countries is also found when we use the aggregate index L_2 of rigidities in practice. When we use the L_1 index, we find a negative relationship with growth for industrial countries, and a positive relationship among developing countries. Also note that while the R^2 coefficient fluctuates between 0,44 and 0,73 for the full sample of countries and for developing countries, it fluctuates between 0,82 and 0,91 for the sample of industrial countries.

A close inspection at the regression results for the components of the aggregate indices of regulations in practice (equation 3) yields: first, although the impact of L_1 on growth was positive and not significant for the world sample, employment in the general government (as a ratio to total employment in the economy) has a positive and significant link with economic growth (at the 10 percent level). In addition, regarding the L_2 index, we find that trade unions (i.e. ratification of the ILO convention 87) have a negative and significant relationship with growth for the world sample, whereas central government employment has a negative and significant relationship with growth. Hence, we can argue that we may find a significant relationship with growth attributed to the political dimension of labor regulations (i.e. trade unions and public sector employment). Second, the negative relation ship between growth and L_1 for industrial countries is mainly driven by negative and significant coefficients for minimum wages and social security contributions (i.e. the "economic dimension" of labor market regulations according to Forteza and Rama, 2002). In addition, the negative relationship between the L_2 index and growth in advanced economies is attributed to minimum wages and mandated benefits (as proxied by the number of days of maternity leave), as well as to employment in the central government. Finally, we find that the positive relationship between L1 and growth in developing countries is attributed to the positive and significant coefficient of

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[12] The coefficient estimates and standard errors robust to autocorrelation and heteroskedasticity according to White (1980).

general government employment. Regarding L2, we find that the non-significant relationship between growth and labor regulations could be attributed to dimensions that are significant but that have different signs. That is, trade unions with a negative and significant coefficient and public sector employment with a positive and significant relationship.

In panel II of Table 5, we present the IV estimates for the coefficient of labor market regulations. As we stated in section 3.3, we instrument for the labor market regulations following Botero, Djankov, La Porta, Lopez de Silanes and Shleifer (2003). In summary, we find that the degree of labor market regulations on paper (L_0) or in practice (L_1 and L_2) is higher in richer countries, and in countries with left-oriented governments. On the other hand, the extent of regulations is lower in countries with common law tradition. [13]

We find that *"de jure"* regulations have a negative impact, although statistically negligible, on long-run growth for the world sample and for developing countries. However, we find that "thicker" labor may have a negative impact on growth in industrial countries. If regulations in the Spanish labor codes (i.e. the most regulated in the OECD during the 1995-99 period) were reduced to the average levels (i.e. exhibited by Greece and Portugal), its growth would increase by 1 percentage point per year.

In addition, we also find that the impact of labor regulations in practice is negligible for the world sample. For the sample of industrial countries, we find that only changes in the L_2 index may have a significant impact on long-term growth. Economically speaking we find that if Sweden (the countries with the highest degree of regulations according to this index during 1995-99) reduces its labor rigidities to Switzerland's level (the representative country in the sample of advanced economies), its growth rate may increase by 0.7 percentage points per year. On the other hand, we obtain that a reduction in labor regulations, as captured by a decline in the L_1 index, has a negative and significant impact on growth for the sample of developing countries. Our regressions imply that if Argentina (the country with the highest degree of labor regulations in Latin America during the 95-99 period) were to reduce its level of regulations to the regional average, its growth rate may increase by 1.2 percentage points. Also, if Argentina were to reduce the extent of its labor regulations to the average in East Asia, growth rate in Argentina may increase by 1.6 percentage points.

Finally, we find that the negative effect L_1 on growth in industrial countries may be attributed by negative and significant impacts of minimum wages and social security contributions on

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[13] For the sake of brevity, we do not report the first stage regression results. However, they are available from the authors upon request.

growth, while the negative impact of L2 is also attributed to significant adverse growth effects of minimum wages and mandated benefits (i.e. maternity leave). In the case of developing countries, the significant negative impact of L_1 on growth may be driven by significant adverse growth-effects of higher minimum wages, social security contribution and public employment.

Results for the BDLLS labor regulation indicators. In Table 6, we present the estimated coefficients for the labor regulation indicators in the BDLLS database. The full specification is analogous to the one in the cross-section analysis for the RA database, and although not presented it is available from the authors upon request.

In panel I of Table 6 we present the least squares estimates of the labor regulation variables for different samples of countries. First, we find that the aggregate index of employment laws have no significant relationship with growth in the world sample and for developing countries, although it has a negative and significant relationship with growth in industrial countries. We also find that although stricter regulations on job security are associated negatively with growth, this link is not statistically significant. Second, the negative impact in industrial countries is mainly explained by negative growth-effects of protective regulation to workers on the conditions of employment. Second, the aggregate index of industrial relations laws as well as its components has a negligible relationship with growth for all samples of countries. Finally, the index of social security laws has a positive and significant relationship with growth in the world sample and for developing countries, although the quantitative relevance of this estimated relationship seems to be insignificant.

In panel II of Table 6, we report the estimated IV coefficients for the labor regulation indicators. We find that all three aggregate types of labor laws (employment, industrial relations, and social security) have a negligible impact on growth for the world sample and for developing countries. However, all three aggregate indices have a negative and significant impact on growth among industrial countries. In the case of employment laws, we find that if Portugal (the countries with stricter regulations in 1997) were to reduce its regulations to the level of Austria (country with the average level of regulations), its growth rate will increase by 0.6 percentage points. We should note that an analogous decline in job security (from the countries with the highest levels to the average) might improve growth by almost 3 percentage points. In the case of industrial relations laws, if the extent of regulations in Portugal declines to the average levels in the region (i.e. the Netherlands), its growth rate will also improve by 0.6 percentage points. Finally, if the extent of social security regulations in Denmark and Sweden (*i.e.* the countries with the highest degree of regulations in that area) were to decline to average levels in the region (*e.g.* Switzerland and Italy), their growth rate would be higher by 0.6 percentage points.

4.4 Panel Data Regression Analysis

In the present sub-section we present the panel data estimates of the relationship between labor market rigidities and economic growth. For that reasons we use a panel data of 76 countries with non-overlapping 5-year average observations for the 1970-2000 period. Here, we report three types of estimators: (a) Least-squares-based estimators (pooled OLS, least squares with time effects, and the within-group estimator), (b) Instrumental Variables estimators, where we instrument for labor market regulations following the strategy outlined in sub-section 3.3. We also present a pooled IV estimator as well as IV estimators with time- and country-effects, and. (c) Generalized Method of Moments estimators (Arellano and Bond, 1991; Arellano and Bover, 1995), where we control for unobserved country and time effects as well as for the possibility of endogenous regressors, where we use not only internal instruments (i.e. lagged levels of the variables in our regression framework) but also external ones (i.e. exogenous variables that determine the choice of labor institutions and regulations in the country).

Panel Results from Least-Squares-based Estimators

In Table 7 we present the regression results for the estimated coefficients of the wide array of labor regulation indicators using different least-squared-based techniques (i.e. pooled OLS, LS with time-effects, and LS with country dummy variables) and applied to different samples of countries (i.e. world sample, industrial countries, and developing countries). Note that these estimation techniques do not take into account the possibility of endogenous regressors. Also, note that taking into account unobserved country effects through country dummy variables (like in the within-group estimator) in a dynamic panel data model leads to inconsistent estimates.

In panel I we present the pooled OLS estimates for the labor regulation indicators for different samples of countries. We find that rigidities on paper, L_0, have a negative relationship with economic growth regardless of the sample used. Rigidities in practice, proxied by L_1 or L_2, showed mixed results. Growth and L_1 have a negative and significant relationship only for the sample of industrial countries, whereas L_2 and growth are negatively associated regardless of the sample of countries. Also, we find that the negative association between L_1 and growth for industrial countries is mainly attributed to the negative association between growth and minimum wages, while the relationship between L_2 and growth among industrial economies is attributed to the negative relationship between growth and minimum wages as well as between growth and central government employment. In the case of developing countries, the negative correlation between L_2 and growth may be related to the relationship with trade unions.

In panel II of Table 7 we show the time-effects estimates. There we run least squares regressions with time dummies (identifying each of the six 5-year period in our panel dataset with a dummy variable). Our reason to present this estimator is twofold. First, the relatively low variability of the labor rigidity indicators over time may imply that labor rigidities may very well proxy for idiosyncratic differences in growth experiences among countries. Second, we would like to evaluate to what extent cross-country growth differences are attributed to differences in labor market rigidities across nations. After accounting for the unobserved time effects, we find that our results are qualitatively similar to the ones find in the pooled OLS, with the coefficients being slightly smaller and the R^2 coefficients being higher. We now interpret our results as countries with higher extent of labor regulations (*e.g.* measured by the L_2 index) displaying lower growth rates than countries with more flexible labor markets.

Finally, we present the country-effects estimates in panel III of Table 7. We include country dummies in our original pooled estimation to account for unobserved country effects. We should note that this estimation is consistent in a dynamic panel data model only if the time dimension is very large (Nickell, 1981). Therefore, we should take interpret results cautiously. Here we find that labor regulations, either on paper or in practice, have no significant relationship with economic growth for all the samples of countries evaluated. The only robust results that we find are that: (a) minimum wages have a negative relationship with growth in industrial countries regardless of the factor of normalization, and (b) general government employment has a negative link with growth in all samples, with the effect being stronger among developing countries than among industrial ones.

Panel Results from Instrumental Variables (IV) Estimators

In Table 8 we present the coefficient estimate of a large set of labor market regulation indicators using IV techniques. We performed pooled IV regressions, IV with time effects, and IV with country effects on the full sample of countries as well as on the samples of industrial and developing countries. We follow the strategy described in section 3.3, that is, we use the output per capita (in logs), trade openness, the government's orientation to the left, common law tradition, German civil code tradition, and institutionalized autocracy as instruments of labor regulation. Our set of instruments was chosen following the comprehensive review of the literature presented by Botero *et al.* (2003). The main results for the panel first stage regressions are: there is a higher propensity to impose labor rigidities and regulations in richer countries, and in countries with a political orientation towards the left. Also, fewer regulations would be

imposed in more open countries, in countries with common law tradition, and in less autocratic governments.

In panel I of Table 8, we present the pooled IV estimations. Here we instrument for the possible endogeneity of labor regulations but we do not take into account for unobserved country- and time-effects. We find a negative and significant impact of regulations on paper, L_0, on long-term growth for the world sample and for developing countries, whereas it is negative and not significant for industrial countries. The aggregate index of regulations in practice L_1 also has a negative and significant impact on growth in the world sample and in developing countries, with all the components of this index (minimum wages, social security contributions, trade unions, and public sector employment) exerting a negative effect on growth. On the other hand, the index L_2 has a negative and significant impact (at the 10 percent level) on growth only for the sample of developing countries. We find here that all the components but trade unions exert a negative impact on growth.

The estimates using IV techniques with fixed effects are qualitatively similar than the OLS results (see panel II in Table 8). For an economic interpretation of our results we will use the time-effects estimator so that we can interpret our results as labor regulations explaining cross-country differences in economic growth among developing countries (the only region with significant coefficient estimates for the aggregate indices). If the country with the highest degree of regulations adjusted by economic, political and legal factors (Argentina) reduces its level of regulations to the average of the region (Peru), its growth rate will increase by 0.5 percentage points. However, if Argentina were to reduce labor regulations to the levels exhibited by the average East Asian country, its growth rate might increase by 1 percentage point.

On the other hand, if regulations in Mexican labor markets (with the highest adjusted degree of labor regulations using the L_1 index) declined to average Latin American levels (e.g. Colombia and Paraguay), the country's growth rate will increase by 1.1 percentage points. If labor regulations in Mexico were to decline to average East Asian levels, the gains in economic growth would be even higher (approximately 1.8 percentage points). In this latter case, the growth-effects of reducing the extent of regulations are larger for minimum wages (2.4 percentage points) and for public sector employment (approximately 3 percentage points). Regarding the L_2 index, our coefficient estimates suggest that if labor regulations in Mexico (highest value for the L_2 index in 1995-99) decline to the levels registered in Peru (i.e. the country with the average value of L_2 over that period), its growth rate would decline only 0.1 percentage points. Growth effects are stronger (approximately 1 percentage points) for reductions in minimum wages. Finally, if regulation in Mexican labor markets declines to the

average levels in East Asia, the growth rate in Mexico will raise by 0.5 percentage points, with declining minimum wages and days of maternity leave contributing to an increase of approximately one percentage point in its GDP per capita.

Finally, we present the country-effects estimation in panel III of Table 8. Movements in the aggregate indices of labor regulations, either on paper or in practice, seem to have no statistically significant impact on growth in the long run. Once we account for country-effects, the impact of minimum wages remains negative and significant, but the effect of government employment becomes positive (at least for industrial countries). However, as we claim before, we should take these results with caution since they do not properly account for the presence of unobserved country-specific effects.

The GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond, 1998)

After characterizing the ling between economic growth and labor regulations using some conventional panel data estimation techniques, we use the GMM-IV system estimator for dynamic panel data proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The reasons behind the application of this methodology are threefold: (i) we need to use an estimator that deals properly with the dynamic nature of our model, (ii) we need to account for (unobserved) country-specific effects within the framework of a dynamic panel data model, and (iii) we should control for the possibility of endogenous regressors. One of the advantages of this estimation technique is that we can compute some specification tests to confirm whether our growth regressions are valid for statistical inference. Further statistical details on the estimation technique can be found in Appendix II.

In Table 9 we present the regression results of our growth equation using the GMM-IV system estimator. The main difference with respect to the IV estimator used above is that not only we use the economic, legal and political determinants of labor regulations but also we use "internal" instruments (lagged levels or differences of the explanatory variables) to account for the endogenous explanatory variables. Before we discuss the results we should mention that our instruments are valid according to the Sargan test, and that we reject the possibility that the error terms display high-order serial correlation.[14] Among the main results for our control variables we find evidence of convergence for the full sample of countries. We also find that growth is enhanced by larger stocks of human capital, better governance, lower inflation and RER

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[14] By construction, the error process should always exhibit first order linear correlation (Arellano and Bover, 1995).
1995).

overvaluation, as well as positive terms of trade shocks. Coefficient estimates of credit to private sector and openness are not robust or display an unexpected sign (see Table 9). Next, we evaluate the significance of the impact of our variable of interest, that is, the effect of labor market regulations.

Labor Market Regulations on paper or "de jure" (index L_0). We find that the index L_0 has a positive and significant coefficient for the world sample and for the sample of developing countries, while it is negative and not statistically significant for the group of industrial countries. This result implies that a simplification of national labor codes may promote growth in developing countries. We find that if the index of labor regulations in paper for a representative developing country declines by one standard deviation (0.16), then its growth rate would increase from the regression sample mean of 1.2 percent to a growth rate of 1.9 percent. Also, if labor market regulations in Argentina (the developing country with the highest value for L_0 in 1995-99) were to be relaxed to levels exhibited by the average developing country (say, the Philippines and Honduras), its growth rate would be 0.8 percentage points higher. We should note that although labor market deregulation might be effective at reducing "de jure" regulations, it might not reduce regulations in practice (Forteza and Rama, 2002).

Index L_1 of labor market regulations in practice or "de facto". From our regression analysis, we find that a higher degree of labor regulations (i.e. higher values of the L_1 index) have a negative and significant impact on economic growth only in the sample of industrial countries (see Table 9). If the index of labor regulations in paper for a representative industrial country declines by one standard deviation (0.14), then its growth rate would increase from the regression sample mean of 2 percent to a growth rate of 4 percent for advanced economies. However, to achieve growth effects of this magnitude, serious efforts should be displayed by industrial countries to deregulted their labor markets.[15]

We should also note that all components of the L_1 index have a negative sign although one of them is not statistically significant (i.e. general government employment). We find that if the level of market regulations in Sweden were to decline to the average level exhibited by the industrial countries, the growth rate will be higher by 0.1 percentage point if the reduction is in minimum wages, and by 0.8 percentage points if the decline is in social security contributions or trade union membership.

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[15] Note that the level of regulations displayed by the average industrial economy over the 1990s is similar to the one exhibited in the 1970s (see the average over decades of aggregate L_1 index in Table 3).

Index L_2 of labor market regulations in practice or "de facto". We find a negative and significant effect of labor regulation on economic growth for the world sample as well as for the sample of industrial and developing countries. A one standard deviation decrease in the index L2 for a industrial country (0.1) will increase its growth rate by 1.3 percentage points, whereas an analogous decline for a developing country (0.15) will raise its growth rate by 0.6 percentage points.

We should also note that the negative impact of a higher degree of labor regulation in industrial economies (as proxied by higher values of L_2) is mainly driven by the negative and significant growth effects of higher minimum wages and higher general government employment. Note that the other dimensions (maternity leave and trade unions) have no statistically significant impact. A one standard deviation decrease in minimum wages among industrial countries (0.12) will increase the growth rate by 0.3 percentage points, while an analogous reduction in public employment (0.11) has a similar growth effect.

Finally, we also find that the negative impact of more regulations in the labor market of developing economies (as proxied by higher values of L_2) may be attributed to minimum wages and trade unions working as significant channels of transmission. Economically speaking, we find that a one standard deviation cut in minimum wages (0.17) may increase the growth rate of a developing country by 0.5 percentage point, whereas an analogous decline in the role of the trade unions (as proxied by the ratification of ILO convention on organized labor) may raise the growth rate of the economy by 2 percentage points.

5. Conclusions

The main goal of the present paper is to assess whether labor market regulations have been an obstacle for long-term growth. For that reason we used two recently developed databases on labor regulations and outcomes: (i) Rama and Artecona (2002), which contains data on labor regulations in paper and in practice for 121 countries and it is organized in 5-year period observations from 1945-49 to 1995-99. (ii) Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003), which analyzes the labor codes for a cross-section of 85 countries. Following the empirical literature on growth, we performed our regression analysis in two dimensions. First, we report the cross-sectional regression results using least squares and instrumental variables. To instrument for labor regulations we follow Botero et al. (2003) in the selection of our instruments (i.e. the level of development, political orientation of the government to the left, trade openness, common law tradition, German civil code tradition, and institutionalized autocracy). Next, we report the panel data regression results using three different types of

estimators: (a) least-squares-based estimators, where we have the pooled OLS, least squares with time-effects, and least squares with country dummies (fixed effects estimator). (b) Instrumental variables (IV) estimators, where we performed a pooled IV, and IV with time- and country-effects. (c) Generalized Method of Moments estimators for dynamic panel data models developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). Here we appropriately control for the presence of unobserved country-effects in a dynamic panel data model, and we account for endogenous regressors with both external and internal instruments. Among our main findings we have:

First, we find that *thicker* labor codes have an adverse impact on long-run growth only for industrial countries when we use the IV estimates in the *cross-section*. The reduction of regulations estipulated in the Spanish national codes were reduced to the levels displayed by the average OECD country, the growth rate in Spain will increase by 1 percentage point. Next, the evidence on the relationship between growth and labor rigidities in practice, as proxied by L_1 and L_2, is mixed. While we find a negative and significant relationship between growth and the L_2 index in industrial countries, we find a negative and significant relationship between growth and the L_1 index in developing countries. Our results for developing countries suggest that if labor regulations in Argentina declined to the average levels in East Asia, its growth rate would increase by 1.6 percentage points.

Second, we find that all three types of labor laws (employment, industrial relations, and social security) analyzed in Botero et al. (2000) have a significant impact on growth only among industrial countries. We should point out that if Portugal reduces the regulations on employment laws to the level observed in the average OECD country, its growth rate will increase by 0.6 percentage points.

Third, our GMM-IV system estimates suggest that less regulated labor codes may foster growth among developing countries. Economically speaking, if the index L0 declines by one standard deviation, the growth rate of a developing country will increase by 0.7 percentage points. We should be very cautious about this result. Labor deregulations efforts are usually successful at simplying labor codes across countries, however, they should not guarantee an improvement in the ability to enforce these laws.

Fourth, the index L_1 of rigidities in practice has a negative and significant relationship only for industrial economies. Our estimates suggest that a one standard deviation increase in the L_1 index may increase the growth rate of advanced economies by 2 percent. However, these growth effects entail a significant effort to deregulate labor markets among industrial economies,

especially since most European countries have only made marginal changes in the labor market institutions (Siebert, 1997).

Fifth, a higher degree of labor regulation (as proxied by higher values in our L_2 index) has an adverse and significant impact on growth in both industrial economies and developing countries. We find that a one standard deviation decline in the L_2 index developing countries (industrial economies) would increase their growth rate by 0.6 (1.3) percentage points.

Finally, the adverse growth-effects of labor regulations among developing countries might be explained by the significant negative growth-effects of minimum wages and trade unions. If minimum wages were to decline by a one standard deviation, the growth rate in developing countries would increase by 0.5 percentage points, whereas the growth rate would be higher by 2 percentage points if an analogous decline is experienced by the role of trade unions. However, we should note that to achieve these growth effects, the efforts towards deregulation in the labor market that should be undertaken by developing countries are quite large.

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Appendix I
Sample of Countries

Industrial Countries (22): Australia, Austria, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, New Zealand, Portugal, Sweden, United States.

Latin America and the Caribbean (21): Argentina, The Bahamas, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Jamaica, México, Nicaragua, Panama, Peru, Paraguay, El Salvador, Trinidad and Tobago, Uruguay, Venezuela.

East Asia and the Pacific (12): China, Hong Kong, Indonesia, Republic of Korea, Mongolia, Malaysia, ,Philippines, Papua New Guinea, Singapore, Thailand, Taiwan, Vietnam.

Eastern Europe and Central Asia (17): Bulgaria, Belarus, Czech Republic, Estonia, Croatia, Hungary, Kazakhstan, Kyrgyz Republic, Lithuania, Latvia, Poland, Romania, Russian Federation, Slovak Republic, Slovenia, Ukraine, Yugoslavia.

Middle East and North Africa (21): United Arab Emirates, Bahrain, Cyprus, Algeria, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Malta, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, Turkey, Yemen.

South Asia (5): Bangladesh, India, Sri Lanka, Nepal, Pakistan

Sub-Saharan Africa (23): Burkina Faso, Botswana, Cote d'Ivoire, Ethiopia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, South Africa, Zambia, Zimbabwe

Appendix II
Estimation Methodology: The GMM-IV System Estimator[16]

The estimation of a growth regression using a panel data set of countries across the world poses some challenges. First, there are some unobserved country- and time-specific effects. We can account for the presence of time-effects by including time-specific dummy variables in our regression. On the other hand, the common methods used to account for country-effects (i.e. "within-group" estimators) are inappropriate given the dynamic nature of the regression equation. Second, most explanatory variables are likely to be jointly endogenous with economic growth, and, thus, we need to control for the biases resulting from simultaneous or reverse causation. The main objective of this appendix is to outline the econometric methodology we use to control for country-specific effects and joint endogeneity in a dynamic model of panel data.

We use the Generalized-Method-of-Moments (GMM) estimators developed for dynamic models of panel data that were introduced by Holtz-Eakin, Newey, and Rosen (1990), Arellano and Bond (1991), and Arellano and Bover (1995). Taking advantage of the panel data set, these estimators are based on, first, differencing regressions and/or instruments to control for unobserved effects, and, second, the use of previous observations of the explanatory variables as instruments (which are called "internal" instruments).

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[16] This appendix draws heavily from Loayza, Fajnzylber and Calderón (2003).

After accounting for time-specific effects, we can rewrite equation (1) as follows,

$$y_{i,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (A.1)$$

In order to eliminate the country-specific effect, we take first-differences of equation (A.1),

$$y_{i,t} - y_{i,t-1} = \alpha\left(y_{i,t-1} - y_{i,t-2}\right) + \beta'\left(X_{i,t} - X_{i,t-1}\right) + \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right) \quad (A.2)$$

The use of instruments is required to deal with, first, the likely endogeneity of the explanatory variables, and, second, the problem that, by construction, the new error term, $\varepsilon_{i,t} - \varepsilon_{i,t-1}$, is correlated with the lagged dependent variable, $y_{i,t-1} - y_{i,t-2}$. Taking advantage of the panel nature of the data set, the instruments consist of previous observations of the explanatory and lagged dependent variables. Given that it relies on past values as instruments, this method only allows current and future values of the explanatory variables to be affected by the error term. Therefore, while relaxing the common assumption of strict exogeneity, our instrumental-variable method does not allow the X variables to be fully endogenous.

Under the assumptions that (a) the error term, ε, is not serially correlated, and (b) the explanatory variables, X, are weakly exogenous (i.e., the explanatory variables are assumed to be uncorrelated with future realizations of the error term), the GMM dynamic panel estimator uses the following moment conditions.

$$E\left[y_{i,t-s} \cdot \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right)\right] = 0 \quad for\ s \geq 2; t = 3,\ldots,T \qquad (A.3)$$

$$E\left[X_{i,t-s} \cdot \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right)\right] = 0 \quad for\ s \geq 2; t = 3,\ldots,T \qquad (A.4)$$

The GMM estimator based on these conditions is known as the *difference* estimator. Notwithstanding its advantages with respect to simpler panel data estimators, there are important statistical shortcomings with the difference estimator. Alonso-Borrego and Arellano (1996) and Blundell and Bond (1997) show that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. Instrument weakness influences the asymptotic and small-sample performance of the difference estimator. Asymptotically, the variance of the coefficients rises. In small samples, Monte Carlo experiments show that the weakness of the instruments can produce biased coefficients.[17]

To reduce the potential biases and imprecision associated with the usual difference estimator, we use a new estimator that combines in a *system* the regression in differences with the regression in levels (developed in Arellano and Bover, 1995, and Blundell and Bond, 1997). The instruments for the regression in differences are the same as above. The instruments for the regression in levels are the lagged *differences* of the corresponding variables. These are appropriate instruments under the following <u>additional</u> assumption: although there may be correlation between the levels of the right-hand side variables and the country-specific effect in equation (2), there is no correlation between the *differences* of these variables and the country-specific effect. This assumption results from the following stationarity property,

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[17] An additional problem with the simple *difference* estimator relates to measurement error: differencing may exacerbate the bias due to errors in variables by decreasing the signal-to-noise ratio (see Griliches and Hausman, 1986).

$$E[y_{i,t+p} \cdot \eta_i] = E[y_{i,t+q} \cdot \eta_i] \quad and$$

$$E[X_{i,t+p} \cdot \eta_i] = E[X_{i,t+q} \cdot \eta_i] \quad for \ all \ p \ and \ q \tag{A.5}$$

The additional moment conditions for the second part of the system (the regression in levels) are:[18]

$$E[(y_{i,t-1} - y_{i,t-2}) \cdot (\eta_i + \varepsilon_{i,t})] = 0 \tag{A.6}$$

$$E[(X_{i,t-1} - X_{i,t-2}) \cdot (\eta_i + \varepsilon_{i,t})] = 0 \tag{A.7}$$

Thus, we use the moment conditions presented in equations (4), (5), (7), and (8) and employ a GMM procedure to generate consistent and efficient parameter estimates.

Using the moment conditions presented in equations (A.3), (A.4), (A.6), and (A.7), we employ a Generalized Method of Moments (GMM) procedure to generate consistent estimates of the parameters of interest and their asymptotic variance-covariance (Arellano and Bond, 1991; Arellano and Bover, 1995). These are given by the following formulas:

$$\hat{\theta} = (\overline{X}'Z\hat{\Omega}^{-1}Z'\overline{X})^{-1}\overline{X}'Z\hat{\Omega}^{-1}Z'\overline{y} \tag{A.8}$$

$$AVAR(\hat{\theta}) = (\overline{X}'Z\hat{\Omega}^{-1}Z'\overline{X})^{-1} \tag{A.9}$$

where θ is the vector of parameters of interest (α, β), $\overline{y}$ is the dependent variable stacked first in differences and then in levels, $\overline{X}$ is the explanatory-variable matrix including the lagged dependent variable (y_{t-1}, X) stacked first in differences and then in levels, Z is the matrix of instruments derived from the moment conditions, and $\hat{\Omega}$ is a consistent estimate of the variance-covariance matrix of the moment conditions.[19]

The consistency of the GMM estimators depends on whether lagged values of the explanatory variables are valid instruments in the growth regression. We address this issue by considering two specification tests suggested by Arellano and Bond (1991) and Arellano and Bover (1995). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. Failure to reject the null hypothesis gives support to the model. The second test examines the null hypothesis that the error term $\varepsilon_{i,t}$ is not serially correlated. As in the case of the Sargan test, the model specification is supported when the null hypothesis is not rejected. In the *system* specification we test whether the differenced error term (that is, the residual of the regression in differences) is second-order serially correlated. First-order serial correlation of the differenced error term is expected even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk. Second-order serial correlation of the differenced residual indicates that the original error term is serially correlated and follows a moving average process at least of order one. This would reject the appropriateness of the proposed instruments (and would call for higher-order lags to be used as instruments).

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[18] Given that lagged levels are used as instruments in the differences specification, only the most recent difference is used as instrument in the levels specification. Using other lagged differences would result in redundant moment conditions (see Arellano and Bover, 1995).

[19] In practice, Arellano and Bond (1991) suggest the following two-step procedure to obtain consistent and efficient GMM estimates. First, assume that the residuals, $\varepsilon_{i,t}$, are independent and homoskedastic both across countries and over time. This assumption corresponds to a specific weighting matrix that is used to produce first-step coefficient estimates. Then, construct a consistent estimate of the variance-covariance matrix of the moment conditions with the residuals obtained in the first step, and use this matrix to re-estimate the parameters of interest (i.e. second-step estimates). Asymptotically, the second-step estimates are superior to the first-step ones in so far as efficiency is concerned.

Table 1

Basic Statistics for Labor Market Regulations and Economic Growth, 1970-2000

Simple Average across Groups of Countries

Variable	Full Sample	Industrial Economies	Developing Countries	East Asia	Latin America	Chile
GDP per capita growth	1.6%	2.2%	1.4%	4.3%	0.9%	2.4%
I. Indicators of Labor Market Rigidity (Rama and Artecona, 2002)						
(0) "De Jure" Index	0.30	0.49	0.25	0.09	0.34	0.33
(1) "De Facto" Index 1	0.28	0.36	0.25	0.18	0.25	0.17
Minimum Wage 1/	0.23	0.24	0.22	0.22	0.21	0.14
Social Security Contribution	0.37	0.45	0.35	0.26	0.35	0.40
Trade Union Membership	0.24	0.39	0.20	0.15	0.18	0.11
General Govt. Employment	0.27	0.39	0.22	0.16	0.25	0.05
(2) "De Facto" Index 2	0.29	0.32	0.28	0.14	0.32	0.08
Minimum Wage 2/	0.14	0.09	0.16	0.10	0.10	0.06
Maternity Leave (# days)	0.16	0.19	0.15	0.13	0.13	0.18
Ratification of ILO Conv. 87	0.59	0.79	0.54	0.17	0.78	0.03
Central Govt. Employment	0.16	0.19	0.16	0.11	0.21	0.03
(3) De Jure vs. De Facto						
L1 relative to L0	-0.04	-0.12	-0.01	0.08	-0.09	-0.16
L2 relative to L0	-0.02	-0.17	0.03	0.06	-0.02	-0.26
II. Indicators of Labor Regulation (Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2003)						
(1) Employment Laws	1.53	1.36	1.60	1.39	1.79	1.46
Alternative Employment Contracts	0.56	0.58	0.56	0.57	0.55	0.58
Conditions of Employment	0.62	0.49	0.67	0.52	0.73	0.58
Job Security	0.35	0.28	0.37	0.30	0.50	0.31
(2) Industrial (Collective) Relations Law	1.25	1.22	1.26	1.12	1.44	1.18
Collective Bargaining	0.51	0.46	0.53	0.37	0.68	0.78
Worker Participation in Management	0.23	0.32	0.20	0.27	0.15	0.00
Collective Disputes	0.51	0.44	0.53	0.49	0.60	0.40
(3) Social Security Laws	1.70	2.21	1.53	1.58	1.69	1.98
Old Age, Disability and Death Benefits	0.57	0.68	0.53	0.56	0.53	0.46
Sickness and Health Benefits	0.65	0.75	0.62	0.69	0.74	0.79
Unemployment Benefits	0.48	0.78	0.38	0.33	0.42	0.73

Notes: 1/ Minimum wages are normalized with the average labor cost in the manufacturing sectors. 2/ Minimum wages are normalized with the real income per capita. We should also mention that all labor indicators are normalized as specified in the paper.

Table 2

Basic Statistics for Labor Market Regulations and Economic Growth over the decades

Panel Data of non-overlapping 5-year average observations, 1970-2000

Simple Averages across Groups of Countries

Variables	All Countries			Industrial Countries			Developing Countries			Chile		
	1970s	1980s	1990s	1970s	1980s	1990s	1970s	1980s	1990s	1970s	1980s	1990s
GDP per capita growth	2.36%	1.23%	1.42%	2.49%	2.19%	2.12%	2.32%	0.94%	1.24%	1.20%	1.27%	4.78%
I. Indicators of Labor Market Rigidity (Rama and Artecona, 2002)												
(0) "De Jure" Index	0.27	0.29	0.32	0.44	0.48	0.54	0.23	0.25	0.27	0.32	0.32	0.36
(1) "De Facto" Index 1	0.27	0.27	0.28	0.36	0.37	0.36	0.24	0.25	0.26	0.15	0.17	0.20
Minimum Wage 1/	0.23	0.22	0.23	0.25	0.23	0.22	0.22	0.21	0.23	0.12	0.12	0.19
Social Security Contribution	0.33	0.36	0.41	0.41	0.45	0.49	0.31	0.34	0.39	0.36	0.40	0.45
Trade Union Membership	0.24	0.25	0.23	0.39	0.41	0.37	0.19	0.21	0.19	0.09	0.09	0.13
General Govt. Employment	0.27	0.27	0.26	0.39	0.41	0.38	0.22	0.22	0.22	0.04	0.05	0.04
(2) "De Facto" Index 2	0.28	0.29	0.30	0.31	0.32	0.31	0.27	0.27	0.29	0.06	0.06	0.11
Minimum Wage 2/	0.14	0.14	0.13	0.10	0.09	0.09	0.17	0.16	0.15	0.05	0.06	0.08
Maternity Leave (# days)	0.14	0.15	0.17	0.18	0.19	0.20	0.13	0.14	0.16	0.15	0.15	0.23
Ratification of ILO Conv. 87	0.55	0.58	0.64	0.74	0.82	0.82	0.50	0.53	0.59	0.00	0.00	0.10
Central Govt. Employment	0.18	0.18	0.14	0.21	0.20	0.15	0.17	0.17	0.13	0.02	0.03	0.03
(3) De Jure vs. De Facto												
L1 relative to L0	0.00	-0.02	-0.06	-0.06	-0.11	-0.18	0.01	0.00	-0.03	-0.16	-0.15	-0.16
L2 relative to L0	0.01	-0.01	-0.04	-0.12	-0.16	-0.23	0.05	0.03	0.01	-0.26	-0.26	-0.26

1/ 2/ See footnote in Table 1

Table 3
Cross-Section Correlation Analysis between Labor Regulation and Economic Growth
Sample of Countries for the 1970-2000 period

Variables	Full Sample	Industrial Economies	Developing Countries	Latin America	East Asia
I. Indicators of Labor Market Rigidity (Rama and Artecona, 2002)					
(0) "De Jure" Index	-0.12	-0.13	-0.28	0.00	-0.54
(1) "De Facto" Index 1	-0.06	-0.24	-0.12	0.35	0.28
Minimum Wage 1/	0.03	-0.32	0.11	0.51	-0.23
Social Security Contribution	-0.05	0.06	-0.11	0.09	0.18
Trade Union Membership	-0.04	0.01	-0.11	-0.18	0.50
General Govt. Employment	0.04	-0.31	0.00	0.15	0.08
(2) "De Facto" Index 2	-0.31	-0.34	-0.33	0.11	-0.83
Minimum Wage 2/	-0.23	-0.34	-0.20	0.56	-0.55
Maternity Leave (# days)	-0.12	-0.28	-0.14	0.02	0.22
Ratification of ILO Conv. 87	-0.31	-0.13	-0.37	-0.14	-0.52
Central Govt. Employment	0.23	-0.25	0.25	0.33	-0.15
(3) De Jure vs. De Facto					
L1 relative to L0	0.07	-0.01	0.17	0.17	0.67
L2 relative to L0	-0.11	-0.06	-0.05	0.08	-0.61
II. Indicators of Labor Regulation (Botero, Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2003)					
(1) Employment Laws	-0.24	0.16	-0.28	-0.04	-0.14
Alternative Employment Contracts	-0.01	0.14	-0.04	0.13	0.21
Conditions of Employment	-0.28	0.08	-0.30	-0.05	-0.07
Job Security	-0.21	0.15	-0.23	-0.13	-0.42
(2) Industrial (Collective) Relations Law	-0.06	0.27	-0.11	-0.10	-0.28
Collective Bargaining	-0.19	0.32	-0.25	-0.24	-0.35
Worker Participation in Management	0.14	0.20	0.13	0.05	0.04
Collective Disputes	-0.09	0.07	-0.08	-0.09	-0.36
(3) Social Security Laws	0.04	-0.20	-0.01	0.20	0.35
Old Age, Disability and Death Benefits	0.26	-0.23	0.28	0.24	0.06
Sickness and Health Benefits	0.05	-0.27	0.04	0.13	0.17
Unemployment Benefits	-0.06	0.13	-0.14	0.10	0.45

1/ 2/ See footnote in Table 1

Table 4

Panel Data Correlation Analysis between Labor Market Regulation and Economic Growth

Panel Data of Countries for the 1970-2000 period (5-year non-overlapping observations)

Labor Rigidity Indicators	All Countries				Industrial Countries				Developing Countries			
	Full	1970s	1980s	1990s	Full	1970s	1980s	1990s	Full	1970s	1980s	1990s
(0) "De Jure" Index	-0.06	-0.05	-0.08	-0.03	-0.11	0.07	-0.07	-0.17	-0.15	-0.08	-0.25	-0.10
(1) "De Facto" Index 1	0.04	0.14	0.12	-0.07	-0.15	-0.14	-0.17	-0.13	0.03	0.18	0.08	-0.10
Minimum Wage 1/	0.07	0.02	0.09	0.10	-0.16	-0.13	-0.24	-0.15	0.14	0.06	0.18	0.17
Social Security Contribution	-0.01	0.09	-0.06	-0.01	0.03	0.23	-0.03	0.01	-0.04	0.08	-0.13	-0.03
Trade Union Membership	0.07	0.15	0.19	-0.09	0.00	-0.11	0.05	0.01	0.04	0.19	0.16	-0.16
General Govt. Employment	0.04	0.15	0.06	-0.05	-0.22	-0.36	-0.15	-0.20	0.02	0.26	-0.04	-0.09
(2) "De Facto" Index 2	-0.20	-0.09	-0.25	-0.26	-0.18	0.08	-0.28	-0.28	-0.22	-0.11	-0.27	-0.27
Minimum Wage 2/	-0.15	-0.21	-0.16	-0.10	-0.17	-0.05	-0.40	-0.09	-0.13	-0.23	-0.09	-0.08
Maternity Leave (# days)	-0.04	0.02	-0.04	-0.08	-0.17	-0.24	-0.06	-0.20	-0.05	0.05	-0.14	-0.08
Ratification of ILO Conv. 87	-0.18	-0.08	-0.25	-0.20	-0.07	0.24	-0.16	-0.20	-0.22	-0.11	-0.32	-0.23
Central Govt. Employment	0.09	0.15	0.03	0.07	-0.14	-0.25	-0.12	-0.15	0.12	0.23	0.02	0.10
(3) De Jure vs. De Facto												
L1 relative to L0	0.09	0.12	0.18	-0.03	0.02	-0.18	-0.03	0.09	0.16	0.19	0.33	0.00
L2 relative to L0	-0.09	0.03	-0.10	-0.18	-0.01	-0.08	-0.09	0.03	-0.06	0.04	-0.02	-0.18

1/ 2/ See footnote in Table 1

Table 5
Cross-Section Regression Analysis for Labor Market Regulations and Economic Growth 1/
Labor regulation data: Rama and Artecona (2002)
Effective Sample of 76 Countries, Average 1970-2000

Labor Indicator	All Countries				Industrial Countries				Developing Countries			
	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.
I. Least Squares 2/												
(0) "De Jure" Index	-0.005	(0.01)	0.49	76	-0.012	(0.00) **	0.88	22	-0.010	(0.015)	0.50	54
(1) "De Facto" Index 1	0.019	(0.01)	0.47	75	-0.017	(0.01) **	0.86	22	0.055	(0.021) **	0.51	53
Minimum Wage 1/	0.000	(0.01)	0.47	65	-0.007	(0.00) **	0.87	22	0.015	(0.012)	0.52	43
Social Security Contribution	0.003	(0.01)	0.55	53	-0.010	(0.00) **	0.91	18	-0.005	(0.017)	0.61	35
Trade Union Membership	0.004	(0.01)	0.55	53	0.006	(0.00)	0.92	18	-0.011	(0.027)	0.59	35
General Govt. Employment	0.018	(0.01) *	0.44	67	-0.006	(0.01)	0.86	22	0.038	(0.017) **	0.50	45
(2) "De Facto" Index 2	-0.015	(0.01)	0.48	73	-0.022	(0.01) **	0.86	22	-0.013	(0.012)	0.50	51
Minimum Wage 2/	-0.014	(0.02)	0.49	66	-0.016	(0.01) **	0.87	22	-0.027	(0.024)	0.53	44
Maternity Leave (# days)	-0.012	(0.02)	0.52	59	-0.016	(0.01) **	0.87	21	-0.070	(0.066)	0.56	38
Ratification of ILO Conv. 87	-0.009	(0.01) *	0.53	59	0.000	(0.00)	0.94	21	-0.018	(0.007) **	0.59	38
Central Govt. Employment	0.027	(0.01) *	0.55	66	-0.019	(0.01) **	0.88	21	0.051	(0.020) **	0.58	45
(3) De Jure vs. De Facto												
L1 relative to L0	0.013	(0.01) *	0.73	75	0.006	(0.00) *	0.82	22	0.032	(0.014)	0.51	53
L2 relative to L0	-0.004	(0.01)	0.47	73	0.012	(0.00) **	0.85	22	-0.005	(0.015)	0.49	51
II. Instrumental Variables 3/												
(0) "De Jure" Index	-0.027	(0.03)	0.49	76	-0.026	(0.02) *	0.83	22	-0.042	(0.04)	0.51	54
(1) "De Facto" Index 1	-0.042	(0.03)	0.48	75	-0.022	(0.02)	0.82	22	-0.077	(0.05) *	0.51	53
Minimum Wage 1/	-0.081	(0.03) **	0.53	65	-0.043	(0.02) **	0.83	22	-0.102	(0.04) **	0.58	43
Social Security Contribution	-0.006	(0.02)	0.55	53	-0.041	(0.02) **	0.89	18	-0.013	(0.03)	0.61	35
Trade Union Membership	-0.049	(0.04)	0.57	53	0.018	(0.02)	0.91	18	-0.078	(0.04) *	0.62	35
General Govt. Employment	-0.037	(0.04)	0.43	67	0.086	(0.02) **	0.88	22	-0.120	(0.05) **	0.49	45
(2) "De Facto" Index 2	0.013	(0.04)	0.47	73	-0.036	(0.02) *	0.83	22	-0.005	(0.05)	0.49	51
Minimum Wage 2/	-0.165	(0.07) **	0.51	66	-0.071	(0.03) **	0.86	22	-0.096	(0.10)	0.53	44
Maternity Leave (# days)	-0.075	(0.08)	0.53	59	-0.044	(0.03)	0.84	21	-0.214	(0.17)	0.54	38
Ratification of ILO Conv. 87	0.026	(0.03)	0.52	59	-0.026	(0.01) **	0.87	21	-0.015	(0.03)	0.50	38
Central Govt. Employment	0.036	(0.06)	0.51	66	0.048	(0.02) **	0.87	21	0.007	(0.08)	0.52	45
(3) De Jure vs. De Facto												
L1 relative to L0	0.022	(0.05)	0.46	75	0.064	(0.03)	0.85	22	0.002	(0.06)	0.47	53
L2 relative to L0	0.106	(0.05) **	0.52	73	0.042	(0.03)	0.82	22	0.177	(0.07) **	0.55	51

1/   We report the regression coefficient for the indicator of labor rigidity according to the equation (1). Our control variables are: output per capita (in logs), secondary schooling,
domestic credit to the private sector, trade openness, governance, inflation, real exchange rate overvaluation, terms of trade shocks, and the labor regulation indicator.

2/   We report standard errors robust to autocorrelation and heteroskedasticity (White, 1980)

3/   Our set of instruments for the labor indicators consists of: the level of development, trade openness adjusted by geographic variables, political orientation of the government to the
left, Common Law Tradition, German Civil Code Tradition, and institutionalized autocracy. The set of instruments was chosen from the existing literature, following Botero et al. (2003).
Full regression results and standard errors of the coefficients of the labor regulation variables are not reported for reasons of space, although they are available from the authors upon request.
Finally, * (**) indicates that the indicator of labor regulation is significant at the 10 (5) percent level.

Table 6

Cross-Section Regression Analysis for Economic Growth and Labor Regulations
Labor regulation data: Botero, Djankov, La Porta, Lopez de Silanes and Shleifer (2003)

Effective Sample of 76 Countries, Average 1970-2000

Labor Indicator	All Countries				Industrial Countries				Developing Countries			
	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.
I. Least Squares 2/												
(1) Employment Laws	0.001	(0.00)	0.50	58	-0.004	(0.00) *	0.838	21	-0.002	(0.006)	0.531	37
Alternative Employment Contracts	0.009	(0.01)	0.51	58	0.005	(0.00)	0.866	21	0.007	(0.014)	0.537	37
Conditions of Employment	0.003	(0.01)	0.50	58	-0.009	(0.00) **	0.848	21	0.008	(0.013)	0.538	37
Job Security	-0.010	(0.01)	0.52	58	-0.007	(0.01)	0.840	21	-0.017	(0.010) *	0.560	37
(2) Industrial (Collective) Relations Law	0.001	(0.00)	0.50	58	-0.003	(0.00) *	0.842	21	-0.003	(0.005)	0.533	37
Collective Bargaining	0.000	(0.01)	0.50	58	0.001	(0.00)	0.850	21	-0.004	(0.010)	0.533	37
Worker Participation in Management	0.003	(0.00)	0.50	58	-0.004	(0.00)	0.844	21	0.001	(0.008)	0.535	37
Collective Disputes	-0.003	(0.01)	0.50	58	-0.010	(0.01)	0.848	21	-0.007	(0.011)	0.535	37
(3) Social Security Laws	0.008	(0.00) **	0.55	58	0.002	(0.00)	0.811	21	0.007	(0.003) **	0.562	37
Old Age, Disability and Death Benefits	0.016	(0.01)	0.55	58	0.000	(0.01)	0.812	21	0.030	(0.017) *	0.579	37
Sickness and Health Benefits	0.003	(0.01)	0.56	58	0.004	(0.00)	0.813	21	0.002	(0.006)	0.574	37
Unemployment Benefits	0.013	(0.01) **	0.56	58	-0.001	(0.01)	0.812	21	0.010	(0.007)	0.564	37
II. Instrumental Variables 3/												
(1) Employment Laws	0.004	(0.01)	0.506	58	-0.007	(0.00) *	0.847	21	0.002	(0.01)	0.530	37
Alternative Employment Contracts	0.027	(0.03)	0.511	58	0.044	(0.02) **	0.873	21	-0.035	(0.08)	0.535	37
Conditions of Employment	0.018	(0.02)	0.508	58	-0.029	(0.01) **	0.859	21	0.089	(0.09)	0.547	37
Job Security	-0.040	(0.06)	0.513	58	-0.073	(0.02) **	0.876	21	-0.009	(0.09)	0.531	37
(2) Industrial (Collective) Relations Law	0.004	(0.01)	0.507	58	-0.006	(0.00) **	0.861	21	0.005	(0.01)	0.536	37
Collective Bargaining	0.042	(0.02) **	0.542	58	-0.010	(0.01)	0.861	21	0.061	(0.02) **	0.593	37
Worker Participation in Management	-0.030	(0.02)	0.540	58	-0.018	(0.01) **	0.863	21	-0.032	(0.02)	0.570	37
Collective Disputes	0.047	(0.03)	0.520	58	0.018	(0.01) *	0.872	21	0.025	(0.03)	0.545	37
(3) Social Security Laws	0.002	(0.01)	0.502	58	-0.011	(0.01) **	0.862	21	0.003	(0.01)	0.530	37
Old Age, Disability and Death Benefits	-0.034	(0.07)	0.543	58	-0.131	(0.04) **	0.878	21	-0.088	(0.10)	0.544	37
Sickness and Health Benefits	-0.040	(0.04)	0.516	58	-0.031	(0.01) **	0.884	21	-0.066	(0.06)	0.556	37
Unemployment Benefits	0.033	(0.03)	0.512	58	-0.043	(0.01) **	0.897	21	0.056	(0.04)	0.558	37

See footnotes in Table 5.

Table 7
Panel Data Regression Analysis for Labor Market Regulations and Economic Growth
Dependent Variable: Growth Rate in GDP per capita
Estimation Method: Least Squares

Labor Regulation Indicators	Full Sample				Industrial Countries				Developing Countries			
	Coeff.	Std. Dev.	R^2	Obs.	Coeff.	Std. Dev.	R^2	Obs.	Coeff.	Std. Dev.	R^2	Obs.
I. Pooled Estimator												
(0) "De Jure" Index	-0.010	(0.01) *	0.20	382	-0.014	(0.01) **	0.29	111	-0.021	(0.012) *	0.20	271
(1) "De Facto" Index 1	0.003	(0.01)	0.19	399	-0.015	(0.01) *	0.29	120	0.020	(0.023)	0.19	279
Minimum Wage 1/	0.006	(0.01)	0.22	349	-0.008	(0.00) *	0.30	120	0.022	(0.012) *	0.24	229
Social Security	0.001	(0.01)	0.21	355	-0.006	(0.01)	0.30	105	0.000	(0.010)	0.21	250
Trade Union	-0.001	(0.01)	0.22	366	0.005	(0.01)	0.34	119	-0.016	(0.017)	0.23	247
General Govt. Employment	-0.006	(0.01)	0.19	333	-0.002	(0.01)	0.29	120	0.004	(0.012)	0.20	213
(2) "De Facto" Index 2	-0.024	(0.01) **	0.21	393	-0.024	(0.01) *	0.30	120	-0.025	(0.011) **	0.21	273
Minimum Wage 2/	-0.011	(0.01)	0.24	358	-0.021	(0.01) **	0.31	120	-0.005	(0.014)	0.25	238
Maternity Leave (# days)	0.000	(0.01)	0.21	364	0.009	(0.01)	0.32	117	-0.018	(0.038)	0.21	247
Ratification of ILO Conv. 87	-0.012	(0.01) *	0.22	387	0.019	(0.01) **	0.33	120	-0.024	(0.009) **	0.23	267
Central Govt. Employment	0.011	(0.01)	0.22	335	-0.016	(0.01) *	0.34	119	0.029	(0.016) *	0.24	216
(3) De Jure vs. De Facto												
L1 relative to L0	0.012	(0.01) *	0.20	377	0.008	(0.01)	0.27	111	0.031	(0.01) **	0.21	266
L2 relative to L0	-0.002	(0.01)	0.19	370	0.008	(0.01)	0.27	111	0.001	(0.01)	0.20	259
II. Time-Effects Estimator												
(0) "De Jure" Index	-0.007	(0.01)	0.24	382	-0.011	(0.01) **	0.46	111	-0.015	(0.012)	0.24	271
(1) "De Facto" Index 1	-0.001	(0.01)	0.24	399	-0.013	(0.01) *	0.46	120	0.012	(0.021)	0.23	279
Minimum Wage 1/	0.005	(0.01)	0.29	349	-0.008	(0.00) *	0.47	120	0.019	(0.012) *	0.30	229
Social Security	0.003	(0.01)	0.27	355	-0.004	(0.01)	0.47	105	0.004	(0.010)	0.26	250
Trade Union	-0.007	(0.01)	0.28	366	0.007	(0.01)	0.50	119	-0.028	(0.017) *	0.28	247
General Govt. Employment	-0.007	(0.01)	0.24	333	-0.003	(0.01)	0.46	120	0.001	(0.014)	0.24	213
(2) "De Facto" Index 2	-0.021	(0.01) **	0.25	393	-0.024	(0.01) **	0.47	120	-0.022	(0.010) **	0.25	273
Minimum Wage 2/	0.001	(0.01)	0.30	358	-0.021	(0.01) **	0.48	120	0.012	(0.016)	0.30	238
Maternity Leave (# days)	0.002	(0.02)	0.26	364	0.010	(0.01)	0.49	117	0.001	(0.039)	0.25	247
Ratification of ILO Conv. 87	-0.012	(0.01) *	0.27	387	0.019	(0.01) **	0.50	120	-0.024	(0.009) **	0.28	267
Central Govt. Employment	0.006	(0.01)	0.27	335	-0.017	(0.01) *	0.51	119	0.024	(0.017)	0.28	216
(3) De Jure vs. De Facto												
L1 relative to L0	0.007	(0.01)	0.24	377	0.007	(0.01)	0.44	111	0.022	(0.01) *	0.25	266
L2 relative to L0	-0.004	(0.01)	0.24	370	0.007	(0.01)	0.44	111	-0.002	(0.01)	0.25	259
III. Country-Effects Estimator												
(0) "De Jure" Index	0.017	(0.03)	0.54	382	-0.033	(0.03)	0.57	111	0.017	(0.04)	0.55	271
(1) "De Facto" Index 1	-0.013	(0.03)	0.54	399	-0.010	(0.03)	0.52	120	-0.014	(0.04)	0.55	279
Minimum Wage 1/	0.014	(0.02)	0.57	349	-0.032	(0.02) *	0.53	120	0.024	(0.02)	0.58	229
Social Security	0.030	(0.02)	0.57	355	0.044	(0.03) *	0.54	105	0.025	(0.03)	0.57	250
Trade Union	0.001	(0.02)	0.55	366	0.020	(0.02)	0.52	119	-0.003	(0.03)	0.56	247
General Govt. Employment	-0.040	(0.02) **	0.59	333	-0.034	(0.02) *	0.54	120	-0.053	(0.03) *	0.60	213
(2) "De Facto" Index 2	-0.010	(0.03)	0.54	393	-0.025	(0.03)	0.52	120	0.003	(0.04)	0.55	273
Minimum Wage 2/	-0.049	(0.03)	0.56	358	-0.074	(0.05) *	0.53	120	-0.057	(0.05)	0.57	238
Maternity Leave (# days)	0.051	(0.04)	0.57	364	0.012	(0.04)	0.53	117	0.099	(0.08)	0.58	247
Ratification of ILO Conv. 87	0.022	(0.01) *	0.56	387	0.019	(0.02)	0.53	120	0.024	(0.02)	0.57	267
Central Govt. Employment	-0.024	(0.02)	0.59	335	-0.011	(0.02)	0.51	119	-0.049	(0.05)	0.60	216
(3) De Jure vs. De Facto												
L1 relative to L0	-0.019	(0.02)	0.54	377	0.016	(0.03)	0.57	111	-0.013	(0.03)	0.55	266
L2 relative to L0	-0.005	(0.02)	0.55	370	0.000	(0.03)	0.57	111	0.003	(0.03)	0.56	259

Full regression results and standard errors of the coefficients of the labor regulation variables are not reported for reasons of space, although they are available from the authors upon request.
*The complete specification is detailed in footnote 1 of Table 5.   * (**) indicates that the indicator of labor regulation is significant at the 10 (5) percent level.*

Table 8
Panel Data Regression Analysis for Economic Growth and Labor Regulations
Dependent Variable: Growth Rate in GDP per capita
Estimation Method: Instrumental Variables

Labor Regulation Indicators	Full Sample				Industrial Countries				Developing Countries			
	Coeff.	Std. Dev.	R**2	Obs.	Coeff.	Std. Dev.	R**2	Obs.	Coeff.	Std. Dev.	R**2	Obs.
I. Pooled Estimator												
(0) "De Jure" Index	-0.034	(0.02) **	0.21	381	-0.005	(0.02)	0.26	111	-0.052	(0.03) **	0.21	270
(1) "De Facto" Index 1	-0.064	(0.02) **	0.21	398	0.023	(0.02)	0.29	120	-0.136	(0.04) **	0.23	278
Minimum Wage 1/	-0.078	(0.02) **	0.24	349	0.023	(0.02)	0.29	120	-0.178	(0.04) **	0.28	229
Social Security	-0.032	(0.01) **	0.22	355	-0.019	(0.02)	0.30	105	-0.048	(0.02) **	0.23	250
Trade Union	-0.068	(0.03) **	0.23	366	0.088	(0.02) **	0.39	119	-0.139	(0.04) **	0.25	247
General Govt. Employment	-0.092	(0.03) **	0.21	333	0.068	(0.02) **	0.34	120	-0.274	(0.05) **	0.28	213
(2) "De Facto" Index 2	-0.036	(0.02)	0.20	393	-0.011	(0.03)	0.28	120	-0.056	(0.03) *	0.20	273
Minimum Wage 2/	-0.099	(0.05) **	0.25	358	-0.030	(0.06)	0.30	120	-0.146	(0.06) **	0.27	238
Maternity Leave (# days)	-0.093	(0.05) *	0.22	364	0.115	(0.05) **	0.35	117	-0.188	(0.07) **	0.23	247
Ratification of ILO Conv. 87	-0.008	(0.01)	0.21	387	-0.008	(0.01)	0.30	120	-0.011	(0.01)	0.22	267
Central Govt. Employment	-0.087	(0.06)	0.22	335	0.143	(0.05) **	0.37	119	-0.251	(0.10) **	0.26	216
(3) De Jure vs. De Facto												
L1 relative to L0	0.052	(0.03) *	0.20	376	0.080	(0.05) *	0.30	111	0.051	(0.04)	0.21	265
L2 relative to L0	0.106	(0.03) **	0.22	370	0.003	(0.03)	0.26	111	0.198	(0.05) **	0.24	259
II. Time-Effects Estimator												
(0) "De Jure" Index	-0.030	(0.02) *	0.25	381	-0.007	(0.02)	0.44	111	-0.045	(0.03) *	0.25	270
(1) "De Facto" Index 1	-0.064	(0.02) **	0.26	398	0.014	(0.02)	0.45	120	-0.131	(0.04) **	0.27	278
Minimum Wage 1/	-0.075	(0.02) **	0.30	349	0.014	(0.02)	0.45	120	-0.166	(0.04) **	0.33	229
Social Security	-0.029	(0.02) *	0.27	355	0.004	(0.02)	0.47	105	-0.043	(0.02) **	0.27	250
Trade Union	-0.074	(0.03) **	0.29	366	0.074	(0.03) **	0.53	119	-0.143	(0.05) **	0.30	247
General Govt. Employment	-0.096	(0.03) **	0.26	333	0.059	(0.02) **	0.49	120	-0.281	(0.06) **	0.32	213
(2) "De Facto" Index 2	-0.028	(0.03)	0.24	393	-0.008	(0.02)	0.45	120	-0.040	(0.04)	0.24	273
Minimum Wage 2/	-0.092	(0.05) **	0.31	358	-0.193	(0.09) **	0.47	120	-0.128	(0.07) *	0.31	238
Maternity Leave (# days)	-0.103	(0.05) **	0.27	364	0.093	(0.05) **	0.51	117	-0.176	(0.08) **	0.27	247
Ratification of ILO Conv. 87	-0.005	(0.01)	0.27	387	-0.006	(0.01)	0.47	120	-0.005	(0.02)	0.26	267
Central Govt. Employment	-0.098	(0.06) *	0.28	335	-0.035	(0.02) *	0.53	119	-0.253	(0.09) **	0.30	216
(3) De Jure vs. De Facto												
L1 relative to L0	0.041	(0.03)	0.24	376	0.065	(0.03) **	0.46	111	0.029	(0.04)	0.25	265
L2 relative to L0	0.102	(0.03) **	0.26	370	0.013	(0.03)	0.44	111	0.189	(0.05) **	0.28	259
III. Country-Effects Estimator												
(0) "De Jure" Index	-0.088	(0.08)	0.55	381	-0.069	(0.08)	0.57	111	-0.137	(0.11)	0.56	270
(1) "De Facto" Index 1	-0.049	(0.07)	0.55	398	0.030	(0.06)	0.52	120	-0.146	(0.11)	0.56	278
Minimum Wage 1/	-0.108	(0.07) *	0.57	349	-1.150	(0.19) **	0.66	120	-0.185	(0.12) *	0.58	229
Social Security	-0.082	(0.07)	0.57	355	-0.086	(0.41)	0.52	105	-0.158	(0.10) *	0.58	250
Trade Union	-0.020	(0.05)	0.56	366	1.379	(0.27) **	0.62	119	-0.096	(0.09)	0.57	247
General Govt. Employment	0.000	(0.08)	0.58	333	0.706	(0.19) **	0.58	120	-0.117	(0.14)	0.60	213
(2) "De Facto" Index 2	-0.093	(0.14)	0.54	393	-0.070	(0.20)	0.52	120	-0.057	(0.18)	0.55	273
Minimum Wage 2/	-0.376	(0.16) **	0.57	358	-0.306	(0.15) **	0.54	120	-0.477	(0.24) **	0.58	238
Maternity Leave (# days)	-0.147	(0.13)	0.57	364	0.054	(0.13)	0.53	117	-0.342	(0.21) *	0.58	247
Ratification of ILO Conv. 87	-0.066	(0.04) *	0.56	387	-0.070	(0.05)	0.53	120	-0.055	(0.05)	0.57	267
Central Govt. Employment	0.252	(0.14) *	0.59	335	0.559	(0.13) **	0.59	119	0.057	(0.22)	0.59	216
(3) De Jure vs. De Facto												
L1 relative to L0	0.250	(0.12) **	0.56	376	0.701	(0.14) **	0.67	111	0.137	(0.15)	0.56	265
L2 relative to L0	0.199	(0.11) *	0.56	370	0.163	(0.11) *	0.58	111	0.299	(0.16) *	0.57	259

See footnotes in Table 5.

Table 9

Labor Market Regulations and Long-Term Growth: GMM-IV Regressions for Panel Data

Full Sample of Countries, non-overlapping 5-year observations over 1970-2000

Estimation Method: GMM-IV System Estimator (Arellano and Bond, 1995; Blundell and Bond, 1998)

	All Countries			Industrial Countries			Developing Countries		
	[L0]	[L1]	[L2]	[L0]	[L1]	[L2]	[L0]	[L1]	[L2]
Constant	0.1386 **	0.1851 **	0.1781 **	2.5720 **	1.4924 *	1.6776 *	0.1906 **	0.1733 **	0.1227 **
	(0.06)	(0.02)	(0.02)	(0.60)	(0.96)	(1.07)	(0.04)	(0.04)	(0.04)
Output per capita (logs)	-0.0083	-0.0163 **	-0.0075 **	-0.0691 **	-0.0310 **	-0.0578 **	-0.0176 **	-0.0117 **	-0.0019
	(0.01)	(0.00)	(0.00)	(0.03)	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)
Secondary Schooling	0.0210 *	0.0313 **	0.0177 **	0.0077	0.0493 *	0.1028 *	0.0246 **	0.0243 **	0.0155 **
	(0.01)	(0.00)	(0.00)	(0.04)	(0.03)	(0.06)	(0.01)	(0.01)	(0.01)
Credit to Private Sector	-0.0083	-0.0039 *	-0.0035 *	-0.0010	0.0080	-0.0124	-0.0070 **	-0.0032	-0.0034
	(0.01)	(0.00)	(0.00)	(0.01)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)
Inflation	-0.0209 **	-0.0196 **	-0.0212 **	-0.3660 **	-0.3163 **	-0.2314 **	-0.0182 **	-0.0194 **	-0.0243 **
	(0.01)	(0.00)	(0.00)	(0.10)	(0.10)	(0.11)	(0.00)	(0.00)	(0.00)
Openness	0.0011	-0.0078 **	-0.0089 **	0.0021	0.0290	0.0390	-0.0042	-0.0008	-0.0015
	(0.01)	(0.00)	(0.00)	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
Terms of Trade Shocks	0.0663 *	0.0580 **	0.0615 **	0.1848 **	0.1413 **	0.3543 **	0.0519 **	0.0365	0.0437 *
	(0.04)	(0.02)	(0.02)	(0.02)	(0.03)	(0.18)	(0.02)	(0.02)	(0.02)
RER Overvaluation	-0.0058	-0.0115 **	-0.0108 **	-0.0408 *	0.0336	-0.0856 *	-0.0054	-0.0114 **	-0.0029
	(0.01)	(0.00)	(0.00)	(0.03)	(0.04)	(0.05)	(0.00)	(0.00)	(0.00)
Governance	0.0055 **	0.0038 **	0.0033 **	0.0028	-0.0023	-0.0026	0.0075 **	0.0049 **	0.0027 *
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Labor Regulation	-0.0325	-0.0056	-0.0363 **	-0.0265	-0.1537 *	-0.1329 *	-0.0431 *	0.0093	-0.0404 *
Indicator	(0.02)	(0.01)	(0.01)	(0.03)	(0.09)	(0.08)	(0.02)	(0.04)	(0.02)
No. Countries	71	70	69	20	19	20	51	50	49
No. Observations	220	238	235	64	72	73	156	165	162
R**2	0.184	0.189	0.274	0.472	0.357	0.506	0.135	0.230	0.295
Specification Tests (p-values)									
- Sargan Test	0.634	0.756	0.682	0.498	0.298	0.415	0.889	0.920	0.917
- 2nd Order Correlation	0.156	0.764	0.435	0.445	0.587	0.634	0.314	0.746	0.266

Note: * (**) indicates that the indicator of labor regulation is significant at the 10 (5) percent level.
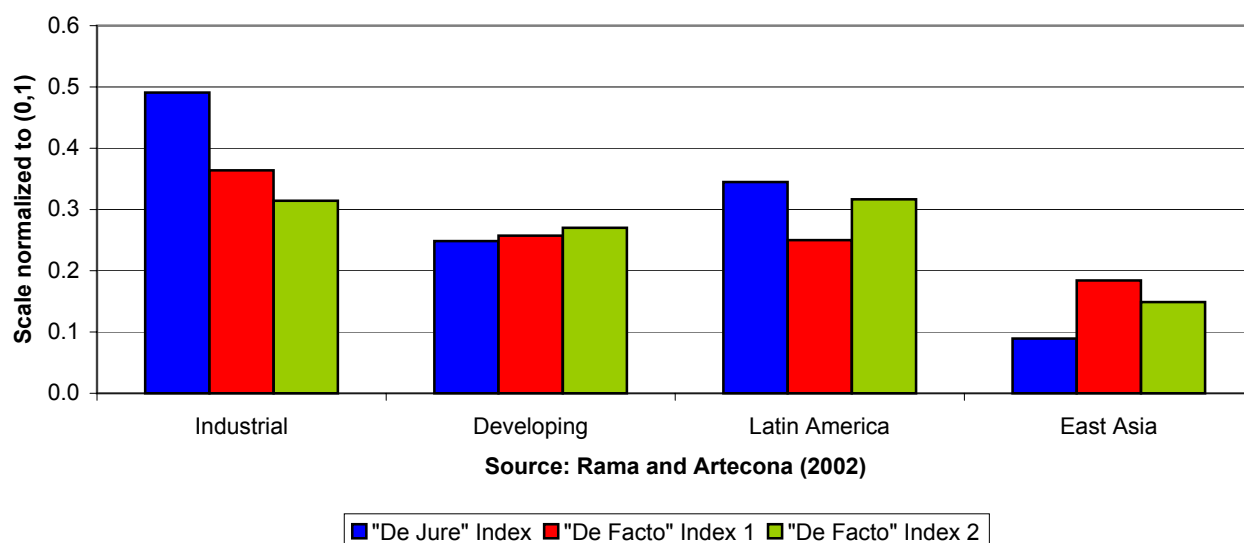
Table 10
Labor Market Regulations and Long-Term Growth: Sensitivity Analysis for GMM-IV Estimates
Impact of Different Labor Rigidity Indicators on Long Term Growth

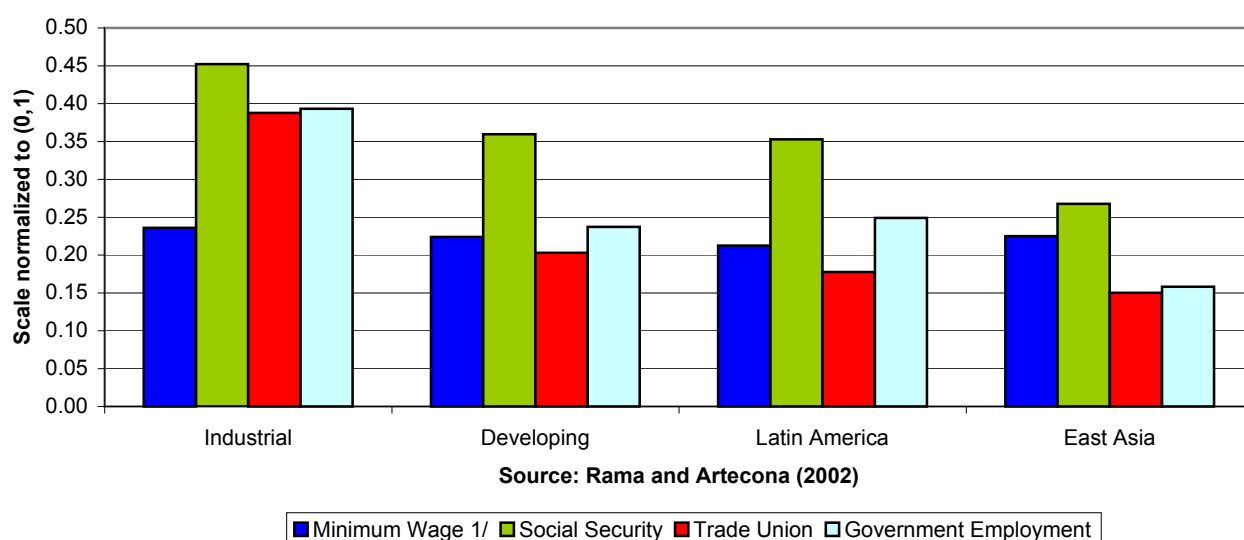*Panel Data of Countries, non-overlapping 5-year observations over 1970-2000*

Labor Indicator	All Countries				Industrial Countries				Developing Countries			
	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.	Coeff.	Std. Dev.	R**2	Nobs.
(0) "De Jure" Index	-0.035	(0.01) **	0.18	220	-0.026	(0.03)	0.47	64	-0.043	(0.02) *	0.14	156
(1) "De Facto" Index 1	0.003	(0.02)	0.20	238	-0.154	(0.09) *	0.36	72	0.009	(0.04)	0.23	165
Minimum Wage	0.031	(0.01) **	0.19	210	-0.013	(0.01) *	0.50	73	0.018	(0.04)	0.22	137
Social Security Contribution	-0.007	(0.01)	0.19	212	-0.077	(0.03) **	0.50	65	-0.007	(0.02)	0.25	147
Trade Union Membership	-0.010	(0.02)	0.25	218	-0.116	(0.07) *	0.45	73	-0.049	(0.04)	0.27	145
General Govt. Employment	0.022	(0.01) *	0.20	193	-0.086	(0.09)	0.47	73	0.026	(0.03)	0.22	120
(2) "De Facto" Index 2	-0.029	(0.01) **	0.28	235	-0.133	(0.08) *	0.51	73	-0.040	(0.02) *	0.29	162
Minimum Wage	-0.013	(0.01) *	0.31	217	-0.028	(0.02) *	0.53	73	-0.031	(0.02) *	0.32	144
Maternity Leave (# days)	0.008	(0.02)	0.24	215	0.021	(0.05)	0.48	70	0.023	(0.05)	0.26	145
Ratification of ILO Conv. 87	-0.028	(0.00) **	0.28	232	-0.080	(0.08)	0.53	73	-0.043	(0.02) *	0.13	159
Central Govt. Employment	-0.043	(0.02) **	0.28	195	-0.025	(0.01) *	0.55	73	-0.025	(0.07)	0.25	122
(3) De Jure vs. De Facto												
L1 relative to L0	0.038	(0.01) **	0.16	217	0.013	(0.01)	0.45	64	0.073	(0.02) **	0.12	153
L2 relative to L0	0.008	(0.01)	0.20	214	0.028	(0.03)	0.48	64	0.021	(0.01) *	0.16	150

*Note: Regression specification follows Table 9. Complete regression results available from the authors upon request. *(**) indicates statistical significance at the 10 (5) percent level.*

Figure 1. Labor Market Regulations across the World
Averages, 1970-2000

Scale normalized to (0,1)

0.6
0.5
0.4
0.3
0.2
0.1
0.0

Industrial   Developing   Latin America   East Asia

Source: Rama and Artecona (2002)

■ "De Jure" Index ■ "De Facto" Index 1 ■ "De Facto" Index 2

Figure 2. Index 1 of "De Facto" Labor Market Regulations
Averages, 1970-2000

Scale normalized to (0,1)

0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00

Industrial   Developing   Latin America   East Asia

Source: Rama and Artecona (2002)

■ Minimum Wage 1/ ■ Social Security ■ Trade Union □ Government Employment

Figure 3. Index 2 of "De Facto" Labor Market Regulations
Averages, 1970-2000

Scale normalized to (0,1)

0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00

Industrial   Developing   Latin America   East Asia

Source: Rama and Artecona (2002)

■ Minimum Wage 1/ ■ Maternity Leave ■ ILO Conv. 87 □ Government Employment
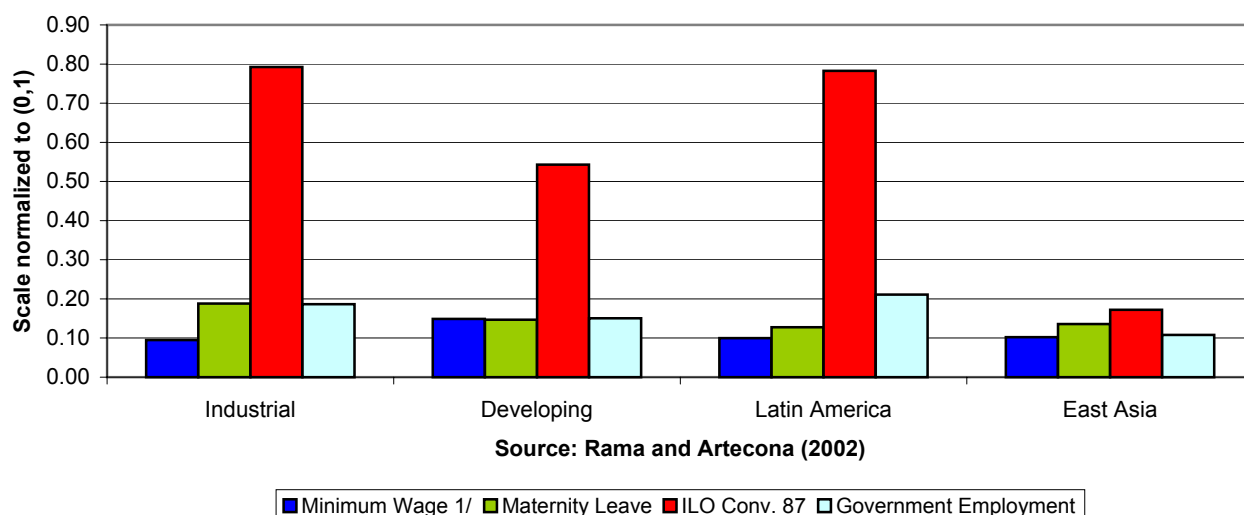
**Figure 4. Index of "De Jure" Labor Market Regulations
Averages over decades, 1970-2000**

Source: Rama and Artecona (2002)
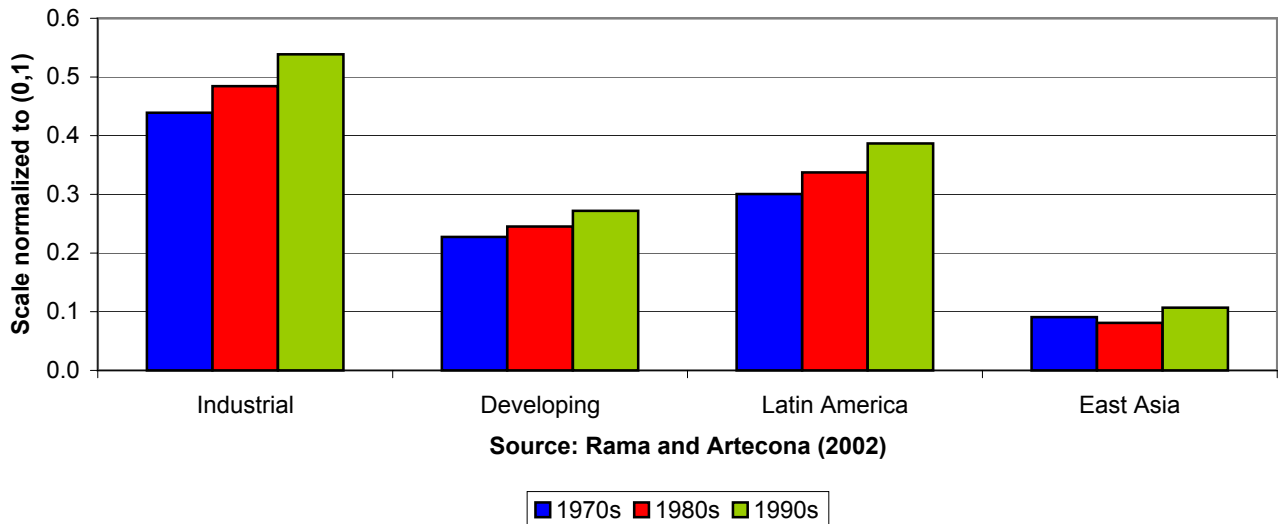
**Figure 5. Index 1 of "De Facto" Labor Market Regulations
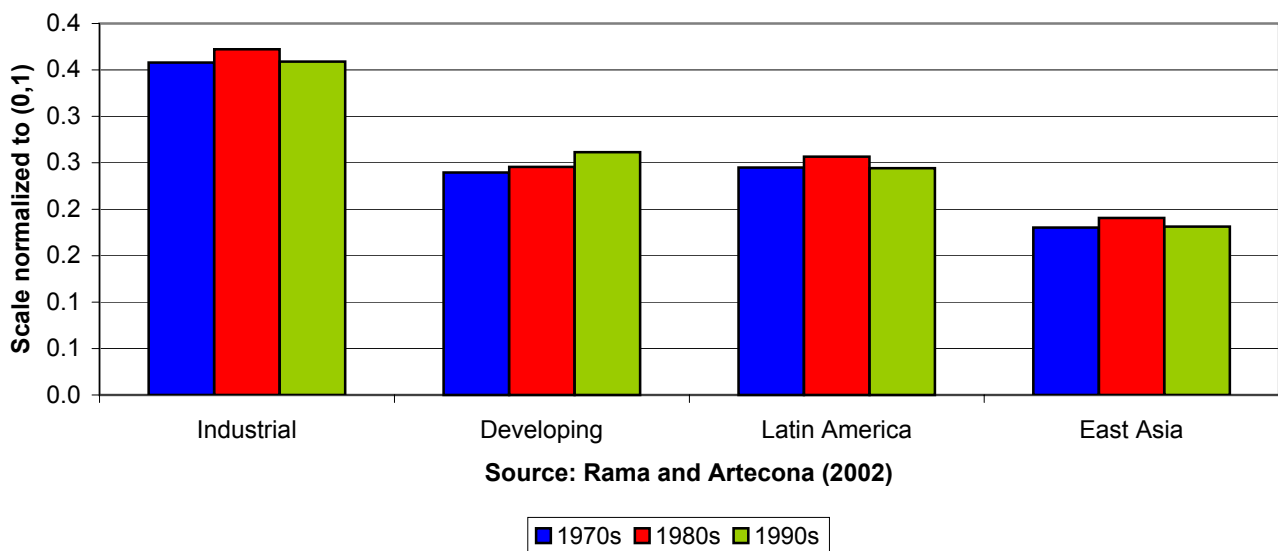Averages over decades, 1970-2000**

Source: Rama and Artecona (2002)

**Figure 6. Index 2 of "De Facto" Labor Market Regulations
Averages over decades, 1970-2000**
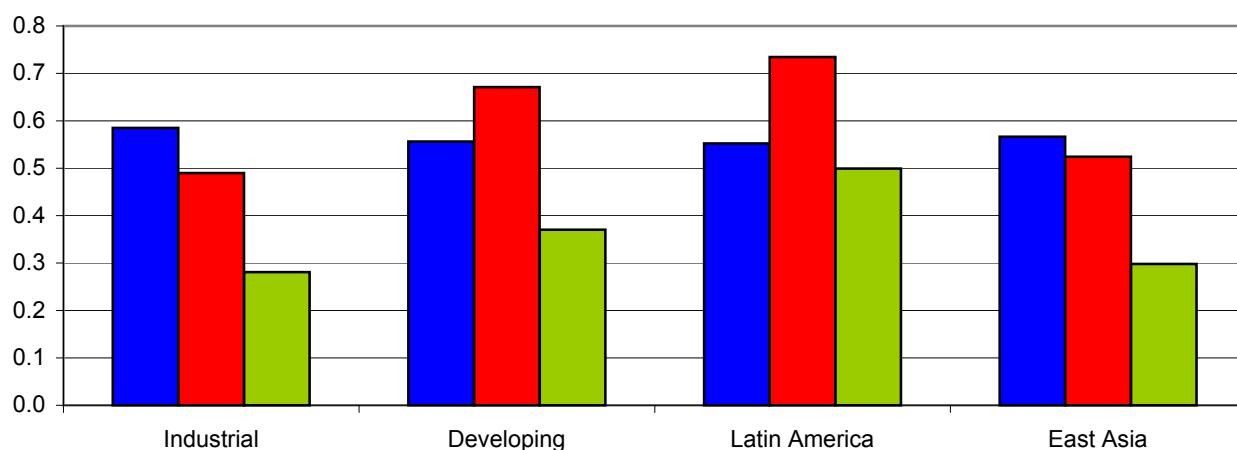

Source: Rama and Artecona (2002)
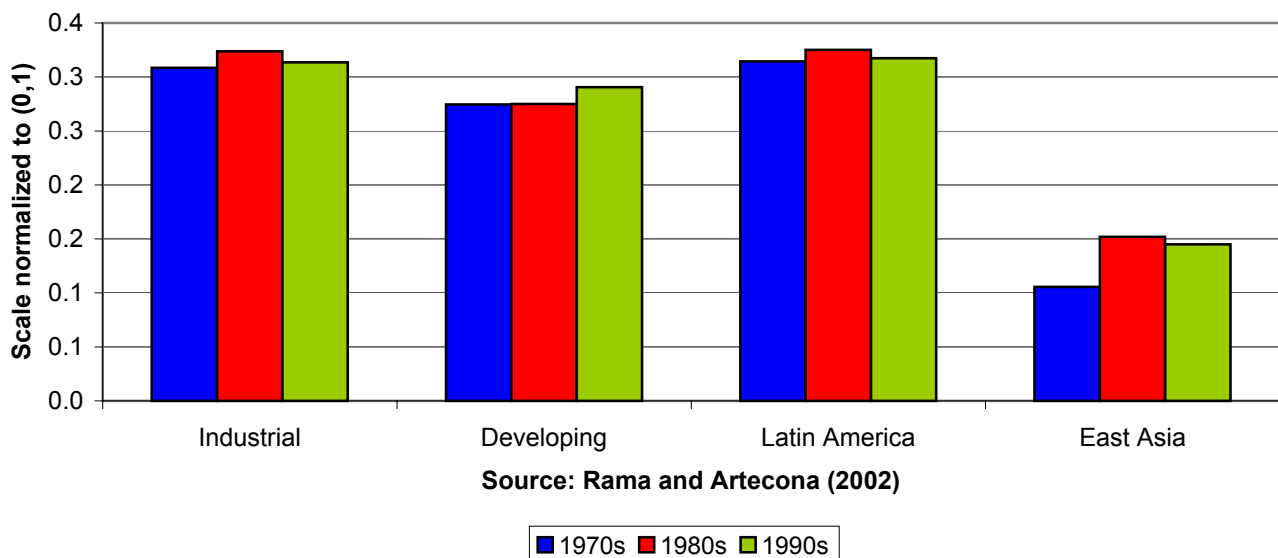
Figure 7. BDLLS Indices of Regulations across the World
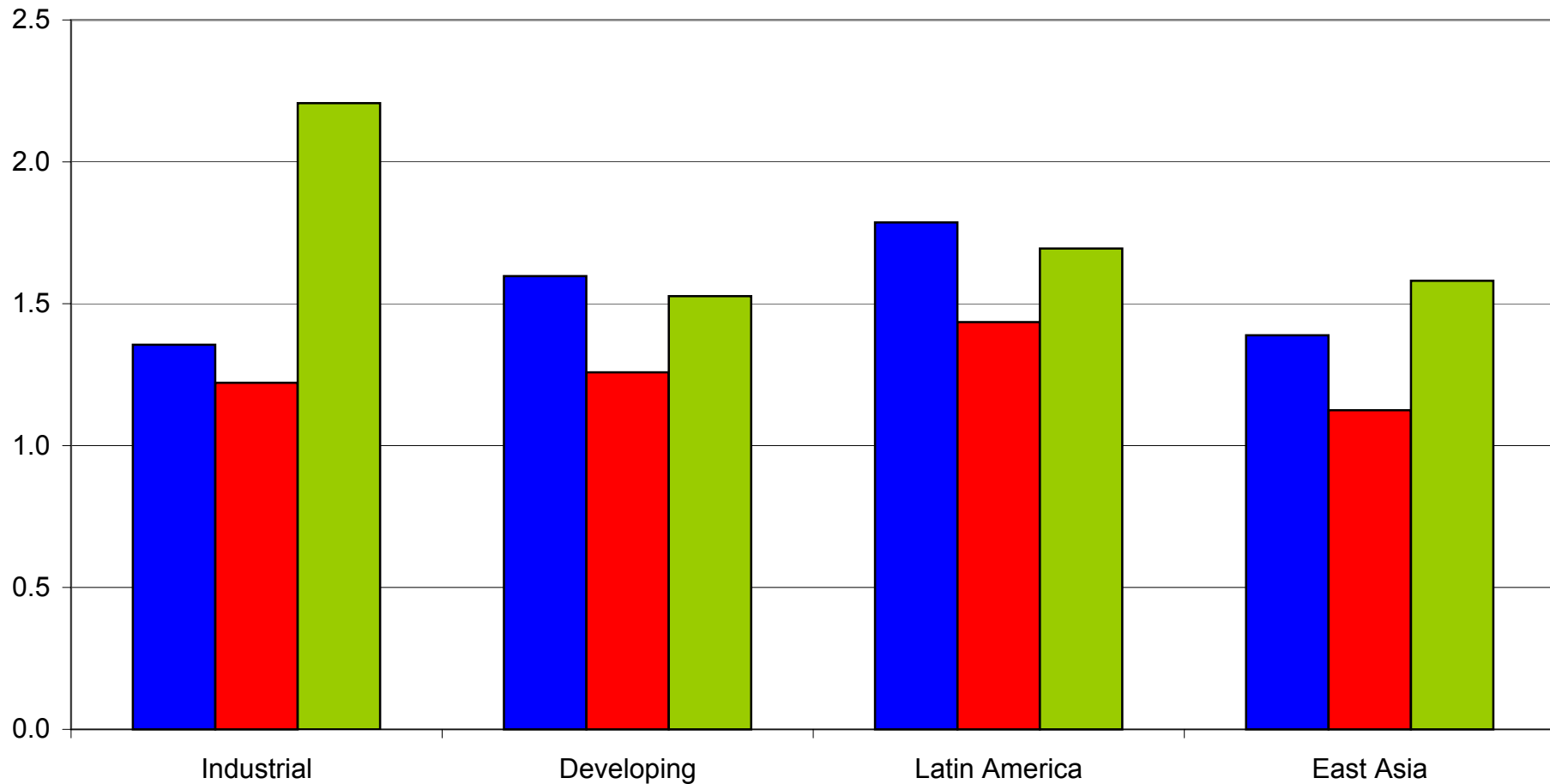
Source: Botero et al. (2003)

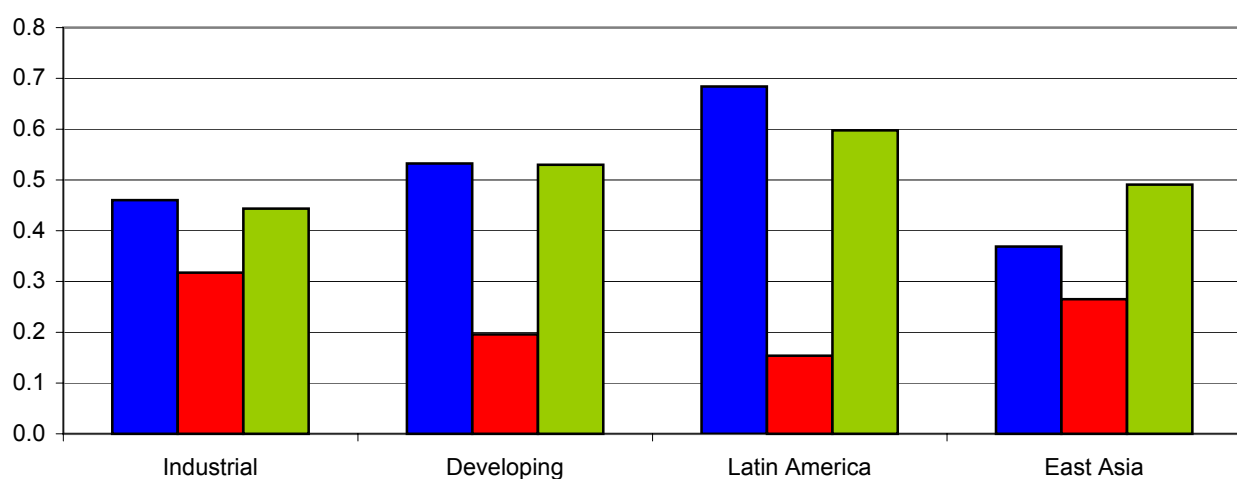■ Employment Laws ■ Industrial (Collective) Relations Law ■ Social Security Laws

Figure 8. Index of Employment Laws across the World

Source: Botero et al. (2003)

Legend: ■ Alternative Employment Contracts ■ Conditions of Employment ■ Job Security
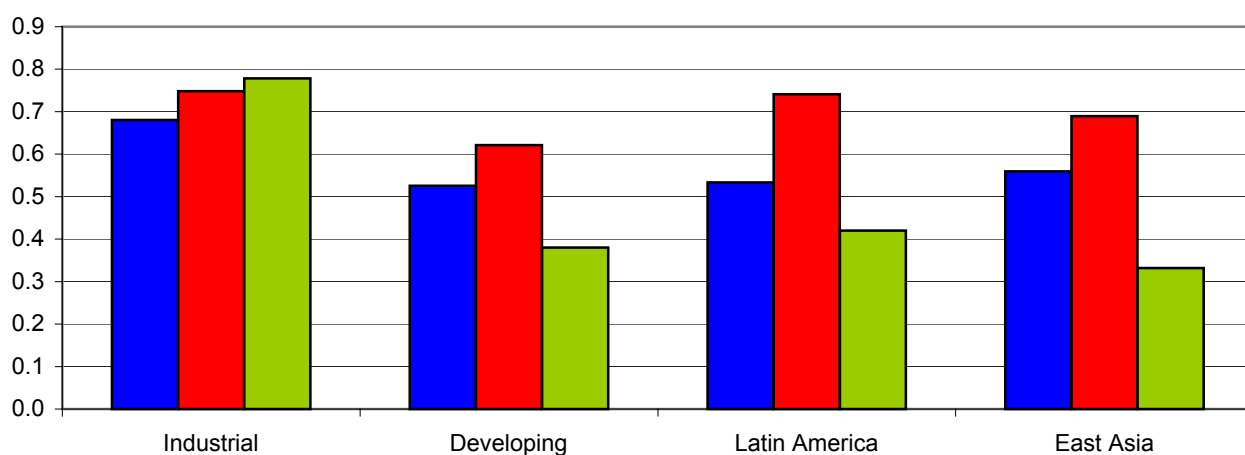
Figure 9. Index of Industrial Relations Laws across the World

Source: Botero et al. (2003)

Legend: ■ Collective Bargaining ■ Worker Participation in Management ■ Collective Disputes

Figure 10. Index of Social Security Laws across the World

Source: Botero et al. (2003)

Legend: ■ Old Age, Disability and Death Benefits ■ Sickness and Health Benefits ■ Unemployment Benefits

Figure 11
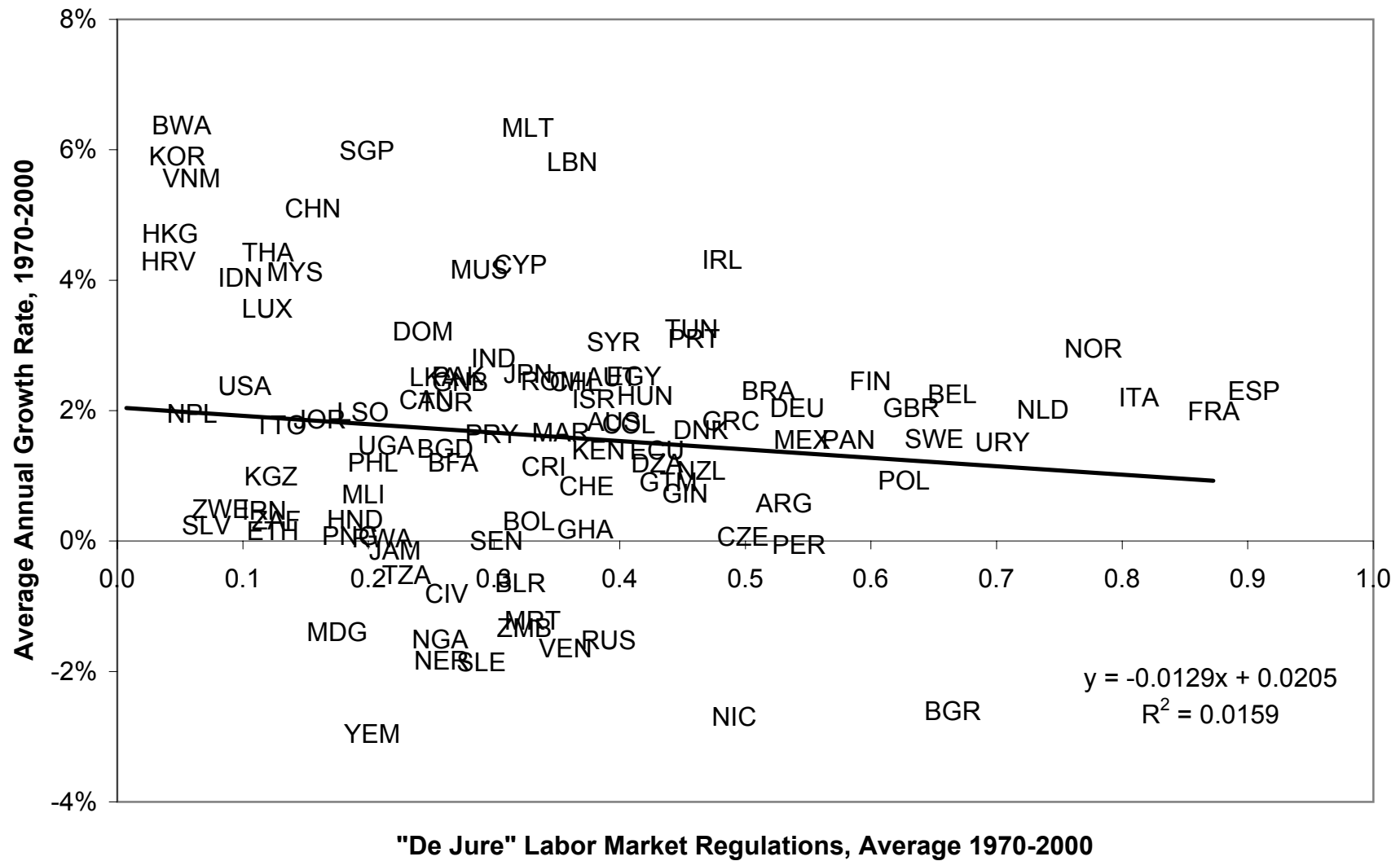**Index of "De Jure" Labor Regulations vs. Economic Growth**

$y = -0.0129x + 0.0205$
$R^2 = 0.0159$

"De Jure" Labor Market Regulations, Average 1970-2000

Figure 12
"De Facto" Labor Regulations vs. Economic Growth, I

$y = -0.0003x + 0.0162$
$R^2 = 7E\text{-}06$

Average Annual Growth Rate, 1970-2000

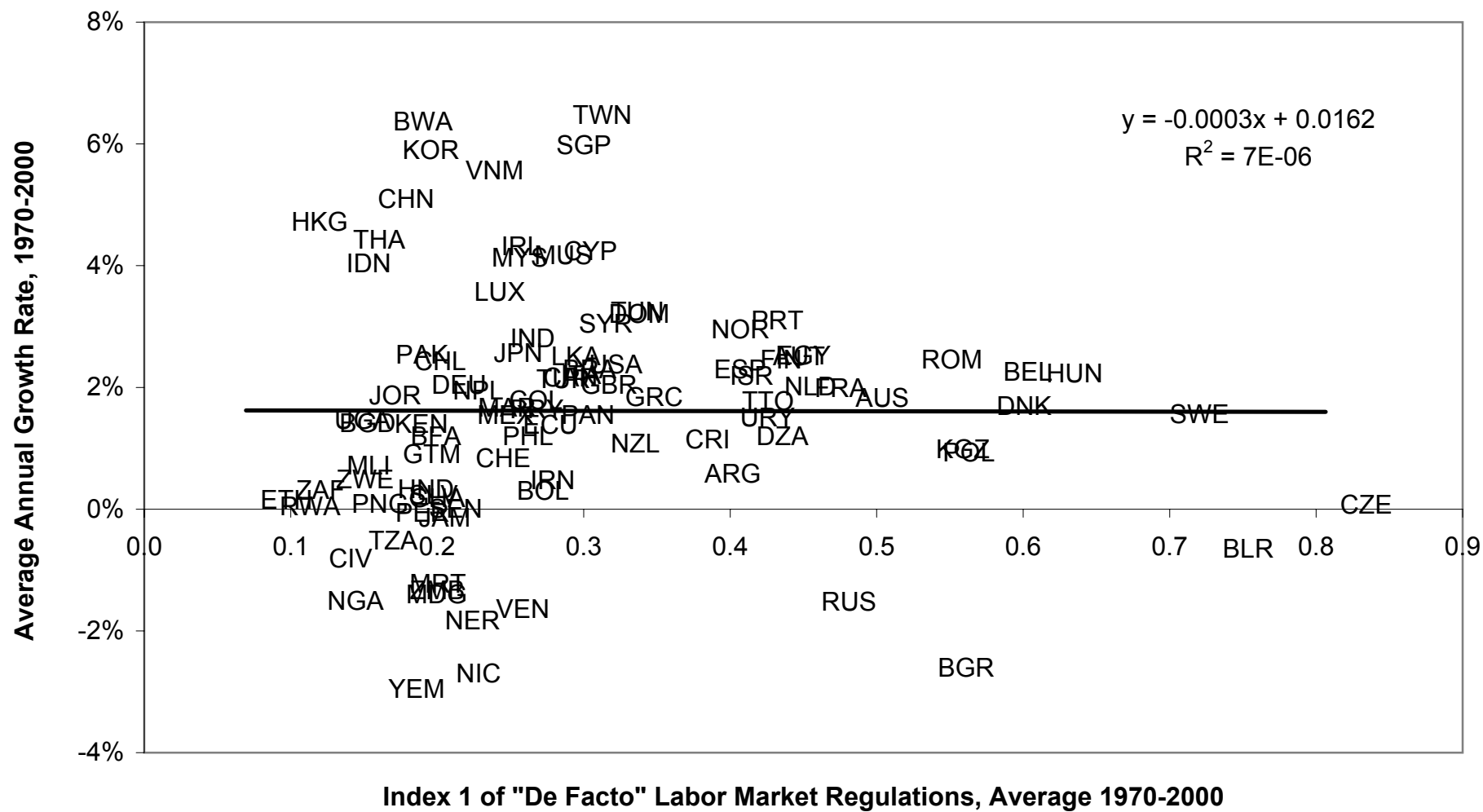Index 1 of "De Facto" Labor Market Regulations, Average 1970-2000

Figure 13
"De Facto" Labor Regulations vs. Economic Growth, II

$y = -0.0414x + 0.0287$
$R^2 = 0.1144$