

ADB Economics Working Paper Series



Impact of Labor Market Institutions on Unemployment: Results from a Global Panel

Paul Vandenberg

No. 219 | September 2010



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Paul Vandenberg is Economist in the Economics and Research Department, Asian Development Bank. The views expressed herein are those of the author and do not necessarily represent the views of the Asian Development Bank, its staff, or its shareholders. The author would like to thank Lilibeth Poot for research assistance.

Asian Development Bank

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics

©2010 by Asian Development Bank
September 2010
ISSN 1655-5252
Publication Stock No. WPS102422

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Abstract

Policies and programs designed to protect workers may, paradoxically, have a negative impact on labor as a whole by increasing unemployment. A key question is which policies have this effect. Using a 3-year panel of 90 countries, the study finds that the unemployment rate is affected by the existence, duration, and replacement rate of unemployment insurance. Hiring and retrenchment regulations and the nature of collective bargaining, however, are not significantly correlated with unemployment. These results are broadly in line with the extensive literature on countries of the Organisation for Economic Co-operation and Development but are at odds with the few cross-country studies that have considered a wider sample. These findings question again whether the deregulation of labor markets in developing countries will improve labor market outcomes.

I. Introduction

Labor regulations and programs vary widely around the world. In India, for example, a manufacturer employing 100 workers or more needs government permission to retrench even one worker. Sri Lanka has a similar requirement but the size threshold is set much lower, at 15 workers or more. In Bangladesh, as in most countries, permission is not needed. Even regulations as basic as the length of the legal workweek can differ considerably. A Mexican worker works 20% more than her Croatian counterpart to earn a week's pay—48 hours versus 40. Not only do regulations vary for those who are employed, but there are also large differences in the benefits received by those who face the unfortunate circumstance of being unemployed. A Danish worker can collect unemployment insurance, while being retrained, for 4 years. For a Canadian worker, the duration of benefits is much shorter, at between 14 and 50 weeks, depending on employment history and the unemployment rate in her region. A worker in Singapore gets no unemployment benefit.¹

This variety in regulations and benefits gives rise to important public policy questions regarding the impact of more protective (or, conversely, more flexible) regulations and programs on economic outcomes. The costs of more protective measures may have to be borne, in one way or another, by one of several players in society. If the burden falls on employers, they may be prompted to reduce the demand for workers. For example, an Indian manufacturer may hesitate to hire workers to fill peak-season orders because of the anticipated difficulty of reducing the workforce once those orders have been filled. Thus, protective measures may have the somewhat paradoxical effect of supporting the welfare of the employed at the expense of the unemployed. This insider-outsider problem is at the heart of key questions about labor policy. It also underlines the question asked in this paper, and in others, as to whether labor market regulations and programs have an impact on the level of unemployment.

In any country, relations between employer and employee are affected by a variety of regulations and institutions. As such, the first part of the paper attempts to map these different areas and suggest their possible impact on the labor market. This will help us make sense of both the existing literature and the estimates conducted for this study. A review of the empirical literature is then provided. The focus is on cross-national studies, and a distinction is made between studies covering countries of the Organisation for Economic Co-operation and Development (OECD), of which there are many, and

¹ On work hours, see Lee and McCann (2008); on unemployment benefits in Canada, see Service Canada (2010); on Denmark, see Auer and Cazes (2003); for others, see Vandenberg (2010).

wider samples, of which there are few. The subsequent sections explain the data and methodology of the present study and present the results of estimates of the determinants of unemployment across a sample of 90 countries over the period 2003–2005. The results suggest that the existence, duration, and replacement rate of unemployment insurance programs are significantly correlated with the unemployment rate. This result tends to confirm the results for most studies of the OECD. Hiring and firing rigidities are not found, however, to impact unemployment, which is also in line with much of the OECD evidence but differs from the few studies that consider broader country samples. Overall, the results suggest that the push to make developing country labor markets more flexible may not have an impact on unemployment.

II. Key Areas of Labor Regulation and Protection

Workers are protected and supported by a range of regulations, programs, and arrangements collectively referred to as labor market institutions. They can be divided into five main areas: hiring, deployment, termination, post-termination, and collective bargaining. The first three areas are commonly considered part of employment protection. Post-termination programs, namely income support, retraining, and job search, do not protect jobs but instead protect workers who are in transition between jobs. While employment protection tends to affect the decisions of employers, post-termination programs affect the decisions of workers, notably in their eagerness to return to work. Collective bargaining is a process that defends and amends the protection of workers and, critically, is used to set wages. The strictness of regulation, the generosity of support programs, and the extent of collective bargaining impact on employment levels but not unambiguously, as suggested below.

A. Hiring

Those aspects of hiring regulations that are of particular concern to employment decisions relate to nonpermanent or nonregular employment, notably fixed-term contracts and employment through a third-party contractor or agency. Flexible arrangements provide the employer with greater opportunity in managing the size of the workforce. Fixed-term and agency workers can be terminated more easily and at lower cost than permanent workers. As well, wage and nonwage costs are often lower as full social security participation may not be required or enforced, and severance pay may be lower. A prime focus of labor market reform in Europe over the past 15 years has been the loosening of restrictions on the use of fixed-term contracts and workers contracted through third-party agencies (IMF 2010, Box. 3.1). Employers have responded to the greater flexibility by increasing the number of workers hired under these arrangements. Between 1985 and 2005, for example, the proportion of workers in the EU-15 that was on fixed-term

contracts increased from 8.4% to 14.4% (Ochel 2008, 24). Other countries have also high rates of nonregular workers. In the Republic of Korea, for example, a full 30% of workers were employed under fixed or temporary contracts in 2004, prompting the government to enact new legislation limiting such contracts to 2 years (Vandenberg 2010).

The impact of such hiring regulations on labor demand is ambiguous. On one hand, easier fixed-term and third-party contracting might encourage firms to supplement the permanent workforce with nonpermanent workers, notably if product and/or service demand is cyclical or seasonal. On the other hand, looser regulations may encourage firms to substitute nonregular workers for regular workers. A recent study by Kahn (2010) found that the reforms in Europe did not generate an employment boost over the period 1996–2001 but instead resulted in greater substitution.

B. Deployment

A key aspect of deployment is the regulation of working hours for the workday or workweek, and rules on weekend and overtime work. In nearly all countries that set a legal workweek, the length is between 40 and 48 hours. The effect of a shorter workweek is ambiguous. Reducing the week was earlier thought to spread the work among a greater number of people, thus reducing unemployment. This was the purpose of the International Labor Convention on the Forty-Hour Week Convention, passed by the International Labour Conference in the midst of the Depression of the 1930s. It was also the thinking behind France's introduction of a 35-hour week. At the same time, however, a shorter week increases the cost of the labor input that can reduce labor demand and contribute to unemployment.

C. Termination

Terminations include the procedures for retrenchment and the costs of severance or retrenchment pay. Easier and less costly regulations provide flexibility to the employer to adjust the workforce to production requirements.² A dwindling number of countries require government approval for retrenchment. There is considerable debate about reforming the law in India.³ Many countries, however, require the employer to notify the government and/or trade union of large-scale layoffs and design a plan to retrain or redeploy workers. This is practiced in the People's Republic of China. Severance pay is based on the number of years of service and can come at a high cost to employers laying off a significant number of long-tenured workers. Theoretically, a high cost or procedural difficulty in terminating workers can constrain initial hiring as employers anticipate and

² Not included here are terminations based on worker indiscipline or misconduct which, despite being an important aspect of labor regulation and industrial relations, is likely to have little impact on overall unemployment.

³ In a flexicurity type trade-off, there is considerable discussion about eliminating the permission requirement on retrenchment in exchange for increased severance pay from the current 15 days per year of service to 45 days. See Vandenberg (2010).

seek to avoid these high costs or difficulties of the future.⁴ Instead, employers may resort to greater capital intensity, outsourcing to firms under less stringent regulations, and/or expanded use of nonregular workers. Of these three options, only the first, the resort to increasing capital, will reduce labor demand.

D. Post-Termination (Unemployment Insurance)

Unemployment insurance does not protect employment but provides income support during periods of unemployment, thus easing the transition between jobs. The benefit level (also known as the replacement rate) and duration period have a direct link with the unemployment rate as unemployed workers are less compelled to return to work quickly when benefits are more generous and provided over a longer time frame. The intuition is borne out by empirical work (see below). In a more positive light, benefits allow time for a better match between the skills of the worker and the requirements demanded by employers. This benefits the worker, the employer, and productivity in the wider economy. Conversely, when unemployment benefits are not provided, workers do not have the luxury of being unemployed and will tend to seek a more immediate return to work. Unemployment may be reduced but poor job matching may be a negative spin-off.

E. Impact of Collective Bargaining

Collective bargaining would exert upward pressure on wages and thereby reduce employment, as depicted in the standard wage/price setting analysis. Thus, countries with higher levels of union density and higher rates of coverage by collective agreements would tend to have higher rates of unemployment. Calmfors and Drifill (1988) have argued, however, that both highly decentralized (firm-level) and highly centralized (economy-level) collective bargaining structures will result in more moderate wage demands than in intermediate (industry-level) structures. The reasoning is that workers and unions engaged in firm-level bargaining will consider the impact of their high wage demands on the competitiveness of their firm vis-à-vis other firms; and unions in highly centralized systems will consider economywide effects. Industry-level bargaining will take neither concern into account.⁵

⁴ Issues of cost and difficulty are related. In India, for example, large companies do not need permission to retrench if workers agree to leave voluntarily. Workers can be enticed to leave by providing severance pay above the legally mandated level. These schemes are known as voluntary retirement schemes and have been used widely over the last decade for both young and older workers in both the public and private sectors.

⁵ This insight has been incorporated into current thinking on labor markets and macroeconomics. See, for example, Carlin and Soskice (2006, 113–7).

III. A Review of Existing Research

Considerable research has been conducted over the past 15 years to determine the causes of unemployment. While unemployment varies with the level of output, researchers have sought also to gauge the impact of labor regulations and institutions. These investigations were given added importance in the 1990s by increases in unemployment in Europe and its differences with the United States (US) in terms of unemployment, output growth, and productivity. As the US is characterized by less protective labor legislation and lower social benefits, it seemed obvious to investigate these differences. Until recently, the empirical work has been confined to OECD countries due to the availability of data. This includes the development of an index of employment protection legislation (EPL) that has made these studies possible. It is thus useful to divide the existing studies between those based on OECD countries and those based on a broader country sample.

A. OECD Cross-Country Studies

A large number of the OECD studies have found that employment protection legislation does not, by itself, result in higher unemployment. It may do so but only when interacted with other institutional structures, notably the degree of centralized collective bargaining. In contrast, the level (replacement rate) of unemployment insurance benefits does affect the unemployment rate with higher benefits related to higher unemployment. These studies tend to include annual data for 20 or slightly fewer countries over 2–3 decades.

Nickell (1997 and 1998) finds that the strictness of EPL has no significant effect on unemployment but it does affect the level of employment, although not when women are excluded. Daveri and Tabellini (2000) find that EPL is significantly but negatively correlated with unemployment, suggesting that more restrictive legislation correlates with lower unemployment. Belot and Van Ours (2001) find that EPL is an insignificant determinant of unemployment in the majority of their regressions. Boone and Van Ours (2004) also find that EPL is not significant. Baker, Glyn, Howell, and Schmitt (2004) find that the EPL variable is not significant over the periods 1985–1994 and 1960–1999, and turns negative over the period 1980–1999, suggesting stricter regulation reduces unemployment.

Scarpetta (1996) finds that EPL is not significant when a centralization (of collective bargaining) variable is included; without that variable it is significant. Nicoletti and Scarpetta (2004) show a similar result in which the effect of EPL on the level of employment is entirely due to countries with an intermediate level of corporatism. IMF (2003) finds that stricter EPL is significantly correlated with the unemployment rate but that the interacted term EPL/union density is negative, suggesting that restrictive regulation combined with greater trade union coverage results in lower unemployment. Nunziata (2002) finds the EPL has no effect on the level of unemployment, although it

does affect its persistence. Nickell, Nunziata, and Ochel (2005); Bassanini and Duval (2006); and Baccaro and Rei (2007) find that EPL is not significantly correlated with unemployment. The study by Kahn (2010), cited previously, found that liberalizing reforms that make it easier to hire temporary workers did not affect the level of employment.

All but one of the studies cited above tested the impact of unemployment insurance benefits (the replacement rate) on the unemployment. Ten of the 13 studies find it to be significant and positively signed in all or most of their regressions. Adsera and Boix (2000) generate a similar result. Conversely, and counter-intuitively, the three other studies find it to be negatively related. Baccaro and Rei (2007) find that it is negative but often insignificant, while Baker et al. (2004) find that it is negative but under the condition that the benefit rate is not particularly high. Thus, the bulk of the evidence suggests that higher benefits result in higher unemployment. Fewer studies test the impact of the duration of unemployment benefits. Nickell (1998); Nunziata (2002); and Nickell, Nunziata, and Ochel (2005) find that longer duration periods correlate with higher unemployment in most of their estimates, as would be expected. Baker et al. (2004) generate the opposite result.

For collective bargaining, researchers have tended to specify models based on either a strict interpretation of Calmfors-Drifill (intermediate centralization affects unemployment) or a looser interpretation that high centralization is negatively correlated. IMF (2003) and Nicoletti and Scarpetta (2004) test for and find that an intermediate level does correlate with higher unemployment. Others such as Scarpetta (1996) and Bassanini and Duval (2006) find that high corporatism is significantly and negatively related.

B. Broader Cross-Country Results

Broader cross-country studies of unemployment that include non-OECD countries are few in number. Until the early years of the new millennium this may have been accounted for by the lack of cross-country data on labor market institutions. Since then, however, Botero et al. (2004) developed a new set of indicators of labor market regulation in 85 countries. The data is predominately based on a review of laws and regulations. The dataset has since been expanded to include more countries and is updated annually as part of the Doing Business program. As well, the Executive Opinion surveys of the World Economic Forum provide data in the Global Competitiveness Report that gives perception-based indicators of labor market institutions, also on an annual basis. These two datasets present a dilemma for researchers on whether to use the Doing Business data on the legal requirements (*de jure*) or the World Economic Forum surveys of business managers' perception (a proxy for *de facto*) regulation. There is a case to be made for either; because actual laws remove the element of human perception but suffer from the fact that laws and regulations in developing countries may be only partially enforced. Despite the development of these datasets, there are only three studies to date that have

attempted a cross-country analysis of unemployment, and only one of which uses more than two explanatory variables.

Botero et al. (2004) did find a positive correlation between the average unemployment rate for 1991–2000 and an employment laws index for 1997, with a single control variable of average years of schooling. Some 65 countries were included. Estimates using the collective relations laws index and the social security laws index were not significant. In a similar manner, Djankov and Ramalho (2009) find a positive partial correlation between the unemployment rate for 2003 and the Doing Business labor rigidity index while controlling solely for 2006 per capita income. The data includes 83 countries.

Feldmann (2009) provides the only test of the impact of labor market institutions on unemployment, which uses more than two explanatory variables. The data cover 73 countries over the period 2000–2003 and uses the perception-based variables from the Global Competitiveness Report. Feldmann finds greater labor market flexibility is correlated with lower unemployment, thus echoing the results of the two above studies. Breaking down the composite labor flexibility indicator, the results suggest that the impact can be attributed, more specifically, to flexible hiring and firing and differences in military conscription. The minimum wage, decentralized collective bargaining, and unemployment benefits, all measured through the executive opinion surveys, are not significant.

It might be useful to also note two unpublished studies. Commander and Tinn (2007) attempted to correlate four measures of employment rigidity from Doing Business (hiring, firing, hours, and a combination of the three) for four country-income groups. Only four of the 12 correlations were significant at or above 0.4 level of association, three for low-income countries, and one for high-income ones. The number of countries for each correlation and the nature of controls are not well indicated in their paper. No result for the entire country sample is provided.⁶ Eifert (2007), using 4 years of data from Doing Business, found that reforms in labor regulation that weakened worker protection (reduced rigidity) did not affect the unemployment rate.

C. Single (Developing) Country Studies

Prominent in studies on developing countries is research focused on India and Latin America. For India, Besley and Burgess (2004) exploit differences in state-level regulations regarding the federal Industrial Disputes Act, which regulates dismissal, to classify states as pro-worker or pro-employer. These designations are then used as dummies in regression estimates. Bhattacharjea (2006) has noted that the classification is based on minor procedural variations. Thus, the dummies may be picking up state-level differences not related to labor regulation. Nonetheless, Besley and Burgess (2004) find

⁶ It was prepared as a background paper for the review of Doing Business conducted by World Bank's Independent Evaluation Group. That evaluation led the World Bank to suspend the use of the Employing Workers Index in policy advice provided to its member countries. Eifert's paper was also cited in the Independent Evaluation Group's evaluation.

employment is higher in states classified as pro-employer. Using the same approach to state classification, a number of other studies on India have confirmed the results (Hasan et al. 2007, Dutta Roy 2004, Topalova 2004, Sanyal and Menon 2005, Ahsan and Pages 2009). A collection of country-specific papers on Latin America includes five studies that find a negative employment effect of regulation as against two studies that find no such link (Heckman and Pages 2004).

IV. Theory, Methodology, and Specification

The paper suggests the main determinants of unemployment as the demand for workers arising from economic activity, the supply of potential workers into the labor market, and various labor market institutions. The basic formulation can be represented as follows:

$$U_t = c + \beta_1 G_t + \beta_2 P_t + \beta_3 R_t + \beta_4 UI_t + \beta_5 B_t + \varepsilon \quad (1)$$

where U is the unemployment rate and the subscript t denotes the year. G denotes labor demand (output gap and competitiveness of the business environment). P represents labor supply variables, notably the relative size of the labor force, which is positively correlated, and conscription, which is inversely related. R denotes the strictness of labor regulations with stricter or more inflexible regulations correlated positively with the unemployment rate. UI denotes unemployment insurance with the existence, level of benefits, and the duration of benefits all positively related to unemployment. B denotes the strength of the bargaining power of workers, with greater power pushing up wages and thus increasing unemployment. Finally, c denotes the constant term and ε is the error term.

The various specifications were estimated using ordinary least squares. A procedure of panel corrected standard errors was employed to avoid the misspecification that can arise in estimating the covariance matrix (Beck and Katz 1995; Greene 2003, 232). The estimates include country fixed effects, instead of random effects, based on the plausible assumption that the unobserved country characteristics are not likely to be uncorrelated with other explanatory variables.⁷ To test the appropriateness of the fixed-effects model, a fixed effects likelihood ratio (FE LR) F-test (shown in the results tables) and chi² test (not shown) were conducted for all the estimates. These tests confirmed that the fixed-effects model is not redundant.

⁷ Ordinary least squares fixed effects and feasible generalized least squares random effects models have both been used to estimate unemployment in OECD countries. See the review of studies by Bassanini and Duval (2006, Annex 1).

The main variables of interest—output gap, labor rigidity, and unemployment insurance—generate similar coefficients and t-ratios across the 12 specifications. The population indicator varies somewhat more but is hardly a cause for concern. Taken together, the results confirm the robustness of the estimates. The variable correlation matrix, presented in Appendix 1, shows few correlations above 0.5. In two sets of cases, high correlations are to be expected: unemployment insurance program with duration and benefits; and labor rigidity with its components hiring and redundancy difficulty. In both cases, the correlated variables are not simultaneously included in any of the regressions. GDP per capita does correlate with some variables at above the 0.5 level but it is not used independently and instead is interacted with OECD membership. There is a moderate to high correlation between the population variable and unemployment insurance, but when the former is dropped in specification 4, the results differ very little from other estimations. It can be concluded, therefore, that multicollinearity is not a concern. Durbin-Watson d statistics suggest the absence of serial correlation.

V. Data

This study uses data for 91 countries for the 3-year period 2003–2005. The two criteria used to select the sample were the availability of data and an unemployment rate not exceeding 25%. The latter criterion, which excluded four countries, was imposed to eliminate outliers. Descriptive statistics, broken down by region, are provided in Table 1. All regions are well represented, except Africa because unemployment data for most of that region are not compiled by the International Labour Organization (ILO) or other organizations. The sample includes 29 OECD countries and 61 others, and therefore low- and middle-income countries dominate the sample by a factor of about 2:1. The regression estimates include between 71 and 90 countries, based on data availability for specific variables. This represents the largest country sample of any known study of the determinants of unemployment.

A description of the variables and their sources are provided in Appendix 2. The unemployment rate, which is the dependent variable, is taken from ILO statistics and is thus standardized across countries. To gauge the labor demand effects of economic activity, the output gap is calculated as the difference between actual and potential GDP. Data for potential output is not available in standardized format for non-OECD countries, so it is estimated using the Hodrik-Prescot filter from actual output for 2001–2007. The results are then used to calculate the gap for the 3 years covered by the sample. Also included are variables to account for the bureaucratic costs faced by business in dealing with government and the level of product market regulation. Blanchard and Giavazzi (2003) suggest that the latter will increase unemployment. The bureaucratic costs variable is based on opinion surveys of business executives, whereas product market regulation is gauged by the more objective measure of the extent of price controls.

Table 1: Base Data—Mean of Variable

	Africa	Asia and the Pacific	Europe	Latin America and the Caribbean	North America and Oceania
Economic Variables					
Percentage of population aged 15–64	61.5	65.7	67.9	61.6	66.5
GDP per capita (US dollars)	4,562.1	10,536.3	22,576.0	7,396.3	28,589.5
Average GDP growth (%)	1.8	4.2	1.3	1.2	1.6
Output gap	-1.4	-1.5	-0.9	-1.2	-0.2
Price controls	4.6	4.8	5.3	5.1	6.4
Bureaucratic costs	4.8	5.2	6.3	5.2	5.7
Labor Market Variables					
Unemployment rate (%)	11.5	6.6	8.6	9.8	5.1
Labor rigidity	37.4	22.0	33.4	33.4	13.5
Hiring difficulty	37.0	21.4	35.2	46.3	12.5
Redundancy difficulty	48.0	27.4	28.1	21.9	16.0
Redundancy costs	48.1	61.3	24.8	71.2	16.8
UI program (number of countries, with)	4.0	14.0	32.0	7.0	4.0
UI duration (number of weeks)	23.5	21.5	68.2	11.1	81.3
UI replacement rate	15.0	22.8	64.4	23.6	36.0
Conscription	3.3	5.5	5.2	6.2	9.0
Centralized collective bargaining	5.8	7.1	5.8	6.4	7.3
Number of countries in the sample	7	27	32	19	5
Number of OECD countries in the sample	0	3	21	0	5

GDP = gross domestic product; UI = unemployment insurance.

Note: See Appendix 2 for a description of the variables and their sources.

Source: Calculated from the sample data.

Labor supply is captured through two variables: the proportion of the working age population aged 15–64, out of total population and conscription (mandatory military service). A higher working-age population would increase labor supply and thus increase unemployment. In contrast, conscription decreases labor supply, especially from the younger segments of the population, for whom the unemployment rate tends to be higher than the general rate in most countries.

Data for the labor regulation variables were taken from the Doing Business database, discussed above. Both the composite labor rigidity variable and in separate estimates, two of its three subcomponents, namely, hiring regulations and the difficulty of making workers redundant, are included. The cost of redundancy is also used. These data are based on the laws and regulations on the books and are then cross-checked with experts in each country.

Information on unemployment insurance is taken from the Social Security Throughout the World (SSA, various years), which does not provide data in standardized tables because the duration and level of benefits vary by employment history and other factors. The information was gleaned from the country reports and verified through checks with other sources for OECD countries (OECD 2005 and 2010).

To gauge the influence of collective worker representation on the labor market, data from executive opinion surveys conducted for the Global Competitiveness Report on the extent to which employers feel that wages are set by centralized collective bargaining versus by the individual employer are used. While factual data on the proportion of workers covered under centralized collective bargaining agreements might be a better indicator, it does not exist for the countries in the sample. Data on the simpler measure of union density also does not exist for the sample.⁸

VI. Results

Three sets of regressions are estimated. Specifications 1–6 employ the composite indicator for labor rigidity with slightly different variations of the basic model, mostly by adding or substituting nonlabor-related variables (Table 2). Specifications 7–10 replace the composite labor rigidity variable with two of its subcomponents (difficulty of hiring and procedures for redundancy), as well as redundancy costs. These specifications test the significance of individual aspects of labor rigidity. This is especially important because the composite variable is not significant, as will be seen. Finally, specifications 11–12 substitute for the unemployment insurance variable (whether the country provides insurance) with indicators for the duration and for the level of unemployment benefits (replacement rate), respectively. This is done to test the significance of the key aspects of unemployment insurance, aside from the existence of such a program. The results of specifications 7–12 are presented in Table 3.

The results from all 12 specifications indicate, as expected, that the level of economic activity affects the unemployment rate. The more that output is below its trend rate, the higher is the unemployment rate as would be expected, since higher output increases the demand for labor. This is congruent with OECD studies, such as Bassanini and Duval (2006). This result is tested in specification 2 by replacing the output gap with the average GDP growth rate over the preceding 3 years and find that it is also significant, although at a reduced level. Specification 3 adds an interactive term of logged per capita income and OECD membership to capture the income-level effects. The results indicate that higher-income OECD countries have higher unemployment rates that cannot be fully accounted for by other variables in the model. Taken individually, the two variables, logged GDP per capita and OECD membership, are not significant, which suggests that there is no indication that unemployment is characteristically higher or lower in either more or less developed countries, controlling for the other variables in the model.

⁸ The most accurate data on trade union density are compiled by the ILO (ILO 2010b). However, the data are not recent for many countries, are not comparable between countries, and do not cover the countries in the sample. The data are available upon request from the ILO's Bureau of Statistics.

Table 2: Estimation Results—Determinants of the Unemployment Rate, 2003–2005

	1	2	3	4	4	6
Output Gap	-0.38*** (-2.70)		-0.39*** (-2.82)	-0.33** (-2.35)	-0.37** (-2.08)	-0.38** (-2.47)
Population 15–64	1.02** (-2.10)	-0.69 (-1.43)	-0.79 (-1.58)		-1.06* (-1.71)	-1.16** (-2.21)
Labor Rigidity	-0.00 (-0.00)	0.00 (0.12)	-0.00 (-0.15)	-0.02 (-0.46)	0.03 (0.38)	0.02 (0.31)
Unemployment Insurance	0.98*** (4.05)	0.81* (1.86)	1.17*** (3.99)	0.95*** (4.02)	1.13*** (2.98)	1.20*** (4.25)
Average GDP Growth		-0.25* (-1.86)				
Log (GDPpc)*OECD			12.18*** (2.82)			
Conscription				0.05 (0.89)		
Bureaucratic Costs					0.11 (1.63)	
Price Controls					-0.06 (-0.80)	
Centralized Collective Bargaining						0.14 (0.51)
Countries	87	87	87	82	78	77
Observations	227	227	227	217	192	209
Adjusted R ²	.93	.93	.94	.93	.94	.94
S.E. of regression	1.04	1.07	1.03	1.01	0.98	0.98
F-statistic	35.5	33.5	36.2	37.5	36.3	39.1
Durbin-Watson <i>d</i>	2.14	2.26	2.19	2.19	2.29	2.18
Redundant Fixed Effect LR F-test	34.2	32.3	31.8	35.7	33.2	37.0

*** denotes 1% level of significance; ** denotes 5%; * denotes 10%.

Note: Dependent variable: unemployment rate. Estimated with country fixed effects, with cross-section weights and panel corrected standard errors. Robust *t*-statistics in parentheses; all estimates include year dummies and a constant term. All D-W *d* values are above the upper limit; all fixed effects likelihood ratio F-tests significant at 1% level.

Source: Author's calculations.

The existence of an unemployment insurance scheme is positively correlated with the unemployment rate, as expected. This is a unique result in that most studies are based on a sample (OECD countries) in which all countries provide such benefits, and therefore the influence of the existence of the system itself cannot be tested.⁹ The result does suggest that the pressure on the unemployed to find new employment is eased by the presence of income support. This can justify the stance of some countries, such as Malaysia and Singapore, which to date have resisted calls for establishing an unemployment insurance program due to the moral hazard it may create. This must be traded off against equity considerations and the efficiency of job matching that was raised above. While countries do understand that unemployment insurance may raise unemployment, the global trend is for the establishment of such insurance where it has

⁹ What are tested in these other studies are the characteristics of the system, notably the level and duration of benefits, not the presence or absence of the system.

not existed and, concomitantly, to a reassessment of the duration and level of benefits where such insurance does exist.

In specifications 11 and 12, the unemployment insurance program variable is replaced with indicators of the duration of benefits and the benefits level. Both variables are also significant.

Table 3: Estimation Results—Disaggregating Composite Labor Variables, 2003–2005

	7	8	9	10	11	12
Output Gap	-0.39** (-2.81)	-0.39** (-2.78)	-0.38** (-2.76)	-0.37** (-2.63)	-0.29** (-2.11)	-0.38** (-2.41)
Population 15–64	-0.79 (-1.61)	-0.80* (-1.71)	-0.80* (-1.72)	-0.54 (-1.20)	-0.95** (-2.13)	-0.63* (-1.80)
Log (GDPpc)*OECD	12.15** (2.80)	12.14** (2.83)	12.03** (2.82)	12.01** (2.73)	11.41** (2.75)	16.01*** (3.34)
Unemployment Insurance	1.18*** (4.01)	1.18*** (4.02)	1.16*** (3.88)			
Hiring	-0.00 (-0.06)			-0.00 (-0.14)		
Redundancy Difficulty		0.01 (0.21)		0.00 (0.03)		
Redundancy Costs			0.00 (0.33)			
UI Duration					0.04*** (3.10)	
UI Replacement Rate						0.02*** (3.43)
Countries	87	87	86	90	81	71
Observations	227	227	225	232	214	187
Adjusted R ²	.94	.94	.93	.94	.94	.93
S.E. of regression	1.03	1.03	1.03	1.03	1.02	0.98
F-statistic	36.2	36.2	35.2	35.9	37.8	33.3
Durbin-Watson <i>d</i>	2.19	2.19	2.18	2.19	2.22	2.20
(Redundant) Fixed Effects LR F-test	32.0	32.8	33.0	34.3	37.5	30.4

*** denotes 1% level of significance; ** denotes 5%; * denotes 10%.

Note: Dependent variable: unemployment rate. Estimated with country fixed effects, cross-section weights based on panel corrected standard errors. Robust *t*-statistics in parentheses; all estimates include year dummies and a constant term. All *D-W d* values are above the upper limit; all fixed effects likelihood ratio F-tests significant at 1% level.

Source: Author's calculations.

The composite labor rigidity variable is not significant in any of the estimates. Indeed, the coefficients and *t*-statistics are at or near zero and the sign oscillates ambiguously between positive and negative. This result is in line with the evidence from most studies on OECD countries, as were reviewed above. Earlier it was noted that certain aspects of labor regulation, which are included in this indicator, may reduce flexibility for employers without reducing the extent of their hiring. For example, more flexible provisions for hiring on nonpermanent contracts may change the nature of the employment relationship, but

not the number of hires. In specifications 7–10, the composite labor rigidity variable is replaced, respectively, by two of its subcomponents and one related measure. These three variables of hiring difficulty, redundancy difficulty, and redundancy costs are not found to affect the unemployment rate, thus confirming the result for the composite variable.

Labor supply effects are captured through the working age population and conscription variables. The first is significant (weakly) in three of the five initial models but consistently carries a negative sign. The sign is unexpected as a proportionately greater working age population would result in higher supply and thus might contribute to higher unemployment. However, the variable is not precise in attempting to capture the supply aspect and, in addition, may be capturing some other aspect, such as the higher spending of people in that age bracket, thus fueling employment creation through higher product demand. The other supply variable, conscription, is not significant. It was included because Feldmann (2009) found it to be consistently relevant in his estimates. In those estimates, it carries a negative sign, meaning that little or no conscription (a higher value) correlated with lower unemployment. This treats conscription as a constraint on employment, like other labor regulations. It is not clear, however, why conscription should be viewed in this manner. Instead, conscription may also be considered to affect supply, in that young people who are conscripted are not looking for work and are thus excluded from the labor force. As youth unemployment is normally high, this would put downward pressure on the unemployment rate. In the regression it is positively signed and thus would fit the latter interpretation of having a labor supply effect. However, it is not significant. More work is needed to clarify the expected impact of conscription.

The nature of collective bargaining does not appear to affect the level of unemployment. This variable has been included in two ways. It was introduced in specification 6 as a scaled 1–10 variable with a lower value representing more centralization. This implies that the relationship with unemployment is linear. It was also introduced in a modified manner to reflect the view of Calmfors and Drifill (1988) that wage moderation occurs when collective bargaining is either highly centralized or decentralized. The middle situation, industry-level bargaining, would generate the highest wage demands and have the greatest impact on unemployment. Thus, specification 6 was also estimated with a dummy variable based on the 1–10 scale. The variable took the value 1 for scores >4 or ≤ 7 and 0 otherwise. In this way, centralized and decentralized systems were combined. The variable was not significant in either specification.

The two institutional variables for competitiveness are also not significantly correlated with unemployment. The bureaucratic costs variable exhibits a fair degree of correlation although not at the 10% level or better. It is, however, incorrectly signed. The price control variable shows a much weaker degree of association, although it does carry the expected sign.

The differences between these results and those of the only other study of this kind (Feldmann 2009) are remarkable. In fact, they differ in nearly all major respects. In Feldmann's study, the output gap and unemployment insurance benefits are not significant. In this study they are. In the former, labor rigidity and conscription are significant. In the latter they are not. Thus, Feldmann suggests that deregulation of labor markets will reduce unemployment, while this study suggests that it will not. His study is in line with the two other studies that used a broad global sample. This study is in line with the studies of OECD countries. What might explain these differences, especially given that the country samples are broadly similar and the dependent variable is from the same source? The two chief differences are the data sources and the estimation methodology. The Feldmann study is based on random country effects while this study is based on fixed effects. Each has been tested and found suitable.¹⁰ In the Feldmann study, the key labor-related variables are based on executive opinion surveys (hiring and firing, collective bargaining, unemployment benefits, minimum wage, and a composite variable). In this study, the key variables are based on the laws, regulations, and programs in place, with verification by in-country experts. While the latter may appear more objective, the opinion-based approach has its merits given the uneven implementation and enforcement record of many developing countries.¹¹ In addition, Feldmann (2009, 80) conducted a number of checks for perception bias by comparing the opinion-based data against hard data for 19 OECD countries. The results suggest that the opinion-based data "appear to be well suited" for use in the estimates of unemployment.¹²

VII. Conclusion

The results of this study suggest that protective labor legislation, which includes restrictions on hiring and retrenching workers, does not have a significant impact on the rate of unemployment. At the same time, the existence of an unemployment insurance system, along with higher benefit levels and longer benefit entitlements, can increase unemployment. These results, generated from a broad global sample of countries, are consistent with the results found in studies of OECD countries over the past 15 years.

The results presented here are certainly not definitive. They do, however, make a contribution to the literature on labor regulation around the globe that, unfortunately, is still very much in its infancy. What this study does do is to advise caution in light of a general perception that regulations can only have negative economic consequences and that those governments that want to improve labor market outcomes need to liberalize.

¹⁰ This study used a country random effects model but in applying the Hausman test the specification was not validated.

¹¹ Feldmann (2009, 80) states that "our survey-based indicators are much better suited to capture the de facto strictness of labor regulation."

¹² Pairwise correlation coefficients range from 0.21 to 0.78.

Certainly some countries may have hiring and retrenchment laws that are onerous for employers and that translate into negative economywide effects. As well, unemployment insurance benefits may be too generous. At the same time, however, policymakers may be disappointed with the meager results obtained from engaging in liberalizing reforms. They would do well to study and pick their reforms carefully.

Comparing this study's results with those of the only other study of this nature, it is found that estimates are highly sensitive to the choice of variable indicators and estimation methodology. The two studies generate opposing results and lead to divergent policy prescriptions. More work on understanding the economics and the econometrics should be considered.

Finally, one of the major shortcomings of studies of this nature is that they focus on the downside of regulation. Regulations are put in place to protect the interests of workers. If those regulations do not increase unemployment it should not be concluded that they have no effect on economic welfare. In such a case, they would have a positive effect.

Appendix 1: Variable Correlation Matrix

	Percent of Population Aged 15–64	GDP per Capita	Average GDP Growth	Output Gap	Price Controls	Bureaucratic Costs	OECD	Unemploy- ment Rate
Macroeconomic Variables								
GDP per capita	0.51							
Average GDP growth	0.33	-0.23						
Output gap	0.09	0.15	-0.14					
Price controls	0.01	0.28	0.02	-0.03				
Bureaucratic costs	0.14	0.38	-0.09	-0.04	0.26			
OECD	0.30	0.69	-0.23	0.17	0.18	0.32		
Labor Market Variables								
Unemployment rate	0.04	-0.29	0.00	-0.04	-0.23	0.01	-0.18	
Labor rigidity	-0.15	-0.25	-0.02	0.00	-0.17	-0.17	-0.09	0.25
Hiring difficulty	-0.24	-0.27	-0.10	-0.04	-0.17	-0.12	-0.19	0.22
Redundancy difficulty	-0.07	-0.25	0.07	0.04	-0.21	-0.22	-0.07	0.17
Redundancy costs	-0.31	-0.36	-0.19	-0.05	-0.21	-0.26	-0.30	0.04
UI program	0.59	0.44	0.13	0.02	0.04	0.15	0.41	0.16
UI duration	0.35	0.52	-0.03	0.06	0.14	0.18	0.41	-0.11
UI replacement rate	0.51	0.48	0.08	0.01	0.03	0.16	0.44	0.17
Conscription	-0.04	0.19	-0.27	0.10	0.08	0.15	0.12	-0.22
Centralized collective bargaining	0.10	-0.19	0.28	-0.06	0.01	-0.12	-0.27	-0.03

	Labor Rigidity	Hiring Difficulty	Redundancy Difficulty	Redundancy Costs	UI Program	UI Duration	UI Replacement Rate	Cons- cription Rate
Macroeconomic Variables								
GDP per capita								
Average GDP growth								
Output gap								
Price controls								
Bureaucratic costs								
OECD								
Labor Market Variables								
Unemployment rate								
Labor rigidity								
Hiring difficulty	0.78							
Redundancy difficulty	0.70	0.26						
Redundancy costs	0.14	0.13	0.23					
UI program	-0.03	-0.20	-0.05	-0.37				
UI duration	-0.04	-0.13	-0.12	-0.31	0.56			
UI replacement rate	0.06	-0.10	-0.05	-0.31	0.93	0.71		
Conscription	-0.26	-0.04	-0.23	0.00	-0.23	0.00	-0.29	
Centralized collective bargaining	-0.32	-0.25	-0.25	-0.04	-0.09	-0.22	-0.18	-0.01

GDP = gross domestic product; UI = unemployment insurance.

Note: Variables are described in Appendix 2.

Source: Computed from the sample data.

Appendix 2: Description of the Variables

Variable	Description and Source
Unemployment Rate	Unemployed persons as a percentage of the total labor force. Source: ILO (2010a).
Unemployment Insurance Program	Dummy variable for whether a country provides unemployment insurance benefits, 1 = if it does; 0 = if it does not. Source: SSA (various years).
Unemployment Insurance Duration	Number of weeks that a qualified worker can receive unemployment insurance benefits. Sources: SSA (various years), OECD (2005 and 2010).
Unemployment Insurance Replace	Replacement rate defined as unemployment insurance benefit as a percentage of a worker's previous wage. Sources: SSA (various years), OECD (2005 and 2010).
Labor Rigidity	Average of three subindices: difficulty of hiring index, rigidity of hours index, and a difficulty of redundancy index. Scored from 0 to 100 with higher scores indicating higher rigidity. Hours index has five components: restrictions on night work; restrictions on weekly holiday work; whether workweek can be 5.5 days; whether workweek can extend to 50 hours, including overtime, for 2 months of seasonal work; and whether annual leave is 21 days or less. Other subindices explained below. Source: World Bank (2010, Employing Workers section).
Hiring	Difficulty of hiring index comprises three components: whether fixed-term contracts are prohibited for permanent tasks, with values yes = 1, no = 0; the maximum cumulative duration of fixed-term contracts, with value of 1 for < 3 years, 0.5 for ≥ 3 years but < 5 years, and 0 for ≥ 5 years; and the ratio of the minimum wage for a trainee or first-time employee to the average valued added per worker, with values of 1 for ≥ 0.75, 0.67 for ≥ 0.50 but < 0.75, 0.33 for ≥ 0.25 but < 0.50, and 0 for < 0.25. Source: World Bank (2010, Employing Workers section).
Redundancy Difficulty	Difficulty of releasing redundant workers index has eight components: whether redundancy is disallowed as a basis for terminating workers; whether the employer needs to notify a third party to terminate one worker; whether the employer needs to notify a third party to terminate nine workers; whether the employer needs approval from a third party to terminate one worker; whether the employer needs approval to terminate nine workers; whether the law requires the employer to reassign or retrain workers before making the worker redundant; whether priority rules apply for redundancies; and whether priority rules apply for reemployment. If "yes" to first question, score is 10 and other questions do not apply; if "yes" to the fourth question, score is 2; all others "yes" = 1. Source: World Bank (2010, Employing Workers section).
Redundancy Costs	The redundancy cost indicator measures the cost of advance notice requirements, severance payments, and penalties due when terminating a redundant worker, expressed in weeks of salary. Source: World Bank (2010, Employing Workers section).
Population 15–64	Percentage of the total population aged 15–64 years. Source: World Bank (2009).

continued.

Appendix 2: continued.

Conscription	Index of military conscription with five possible values: 10 = no conscription; 5 = six months or less; 3 = >6–12 months; 1 = 12–18 months; 0 = >18 months (0). Source: Gwartney and Lawson (2007, 192).
Centralized Collective Bargaining	Views of employers as to whether wages are set by centralized collective bargaining or by the individual employer, scaled from 1 (centralized bargaining) to 10 (individual employer). Source: Gwartney and Lawson (2007, 191).
GDP per Capita	Gross domestic product, per capita. Source: World Bank (2009).
GDP Growth	Average annual GDP growth rate for the 3 years prior to each of the 3 years, 2003–2005. Source: World Bank (2009).
Output Gap	Percentage difference between actual and potential GDP; Hodrick-Prescott filter used to calculate potential GDP from 2001–2007 data, $\lambda = 100$. Source: Calculated using GDP data from World Development Indicators (World Bank 2009).
Price Controls	Extent of price controls based on a six-point scale (0, 2, 4, 6, 8, 10) with more controls receiving a lower rating. Source: Gwartney and Lawson (2007, 192).
Bureaucratic Costs	Perception of employers regarding the percentage of work time that senior management spend dealing and/or negotiating with government officials, scaled from 0 to 10, with more time spent receiving a lower rating. Source: Gwartney and Lawson (2007, 192).

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About the Paper

Paul Vandenberg examines policies and programs designed to protect workers, but which may have a negative effect on labor as a whole by increasing the unemployment rate. Using a 3-year panel of 90 countries, this study finds that the unemployment rate is affected by unemployment insurance. Hiring and retrenchment regulations are not, however, significantly correlated with unemployment.

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Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics
ISSN: 1655-5252
Publication Stock No. WPS102422



Printed in the Philippines