

Labor Market Dynamics in Korea — Looking Back and Ahead*

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The recent global financial crisis or “Great Recession” led to the deepest downturn in the global economy since World War II, hitting in particular economies open to trade and integrated with the global financial system, including Korea. During the recession and the ongoing recovery, labor market dynamics have differed widely across countries. This paper analyzes the determinants of labor market dynamics in Korea and other advanced economies during the recent crisis, focusing in particular on the role played by institutions, the nature of the shock hitting countries, and policy measures. It is found that institutional factors such high employment protection and low unemployment benefits tend to mute the responsiveness of unemployment to changes in output. Policy responses, including short-term employment programs, also matter. The paper also finds that if a recession is associated with financial sector strains and/or the bursting of a housing market bubble, this tends to be associated with higher levels of unemployment during recessions and recoveries.

JEL Classification: C1, C2, E2, E3, J0, J2, J3, J6, J8

Keywords: labor markets, unemployment, employment, wages,
hours worked, labor market policies, labor market
institutions, business cycles

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1. INTRODUCTION

The recent global financial crisis or “Great Recession” led to the deepest downturn in the global economy since World War II. It particularly hit economies open to trade and integrated with the global financial system, including Korea. However, the global economy is now recovering and Korea is at the forefront of the rebound, having benefited from a strong policy response, the normalization of international trade, and the return of investor risk-appetite.

During the “Great Recession” and the ongoing recovery, labor market dynamics have differed widely across countries. Some countries, such as the United States and Spain, have seen significant job losses and steeply rising unemployment rates, while others, including Korea, Japan, and Germany, have experienced more muted dynamics for employment and unemployment. What explains this divergence in labor market dynamics?

This paper analyzes the determinants of labor market dynamics across a diverse set of advanced economies, including Korea, during recessions and recoveries over the past 50 years. In particular, the paper focuses on the importance of institutional factors such as the degree of employment protection, the generosity of unemployment benefits, and the share of temporary workers. It also focuses on the role played by the “nature” of recessions in determining labor market dynamics. For example, what are the implications if a recession was caused by a financial crisis and/or the bursting of a housing-market bubble? Also, do pre-conditions such as soundness of corporate balance sheets matter? Further to this, the paper analyzes the role played by policies in Korea and other countries, focusing in particular on government employment programs during the “Great Recession.”

Based on this analysis, the outlook for employment during Korea’s ongoing recovery is assessed and some preliminary policy implications are drawn. On the latter, the paper discusses the exit strategy from the employment support programs implemented by the Korean government during the crisis. Furthermore, it briefly discusses policy options to support

employment growth and enhance labor market flexibility over the medium term, including the scope to reduce employment protection legislation, adjust the focus of training and education to be more in line with future needs, and other steps to reduce the duality in the Korean labor market.

2. LABOR MARKET DYNAMICS DURING THE “GREAT RECESSION”

Korean labor markets did not escape the adverse spillovers from the recent global economic downturn, but the impact was cushioned by policy measures (figure 1):

Labor force. Between June 2008 and December 2009, the labor force participation rate declined from 61.5% (seasonally adjusted) to 60.5% (seasonally adjusted), but then increased as workers re-entered the labor market to take up jobs offered under government work programs. The initial drop in the participation rate was most pronounced for women and workers with lower levels of education. They typically take up a larger share of temporary jobs and, in the latter case, lower skilled jobs and, therefore, are more likely to face layoffs and lack of job opportunities when a downturn hits. Among age-cohorts, the younger workers also left the labor market at a faster pace during the initial stages of the crisis. However, many of these more “vulnerable” groups have since returned to the labor market in conjunction with the introduction of the government work programs. However, the overall participation rate remains below pre-crisis levels, currently standing at 61% (seasonally adjusted).

Employment. Employment losses from the downturn were particularly concentrated in financial services, manufacturing and other cyclically sensitive sectors exposed to the adverse spillovers from the global crisis. However, the government’s job creation program and other measures introduced in response to the crisis saw employment in public administration, education, and social services rise by close to 500,000 between June 2008

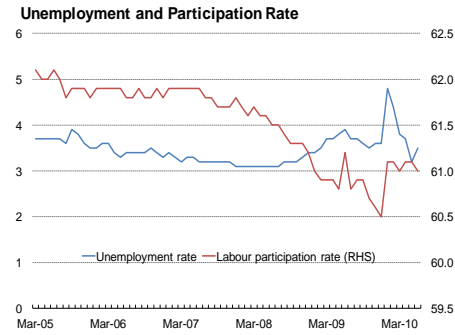
and August 2009, almost matching the decline in private employment during the same period. These measures, together with the high level of employment protection, helped support employment for regular workers throughout the crisis. The job-creation programs also helped support the employment of temporary workers, which declined significantly during the early stages of the crisis. On the other hand, the employment of daily workers and self-employed declined throughout the crisis. However, with the economic recovery gaining pace, job gains in the private sector have picked up in 2010 and are becoming more broad-based.

Unemployment. Notwithstanding the decline in labor force participation, registered unemployment also took a hit during the first year of the crisis, impacting in particular the younger cohorts during the early stages of the crisis. While the government job-creation programs helped cushion the fall in employment, a delayed implementation of the latter stage of the program led to a temporary spike in the unemployment rate to almost 5% in early 2010 because labor force participation rose as workers signed up for the program. However, the corresponding increase in public sector employment did not take place until a few months later, which then led the unemployment rate to fall back again.

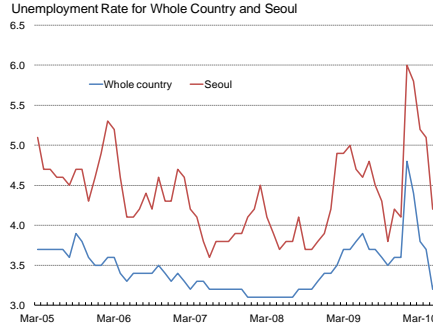
Hours and wages. During the course of the crisis, the average work-week declined by around 3 hours to 44 hours and it has continued to decline in recent quarters. Monthly wages also fell as hours worked and hourly wages were cut, declining on an annual basis between December 2008 and September 2009 for all industries. However, the wage growth rate has returned to positive territory over the past few quarters. The initial drop in average wages was most pronounced for cyclically sensitive sectors such as manufacturing, construction, and financial services. By employment status, non-regular workers saw the largest declines in pay.

Figure 1 Korea-Labor Market Dynamics During “Great Recession”

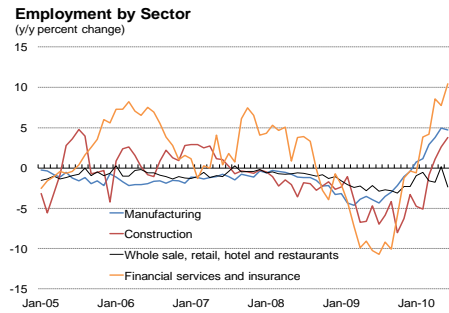
Unemployment rose and labor force participation declined as the crisis unfolded....



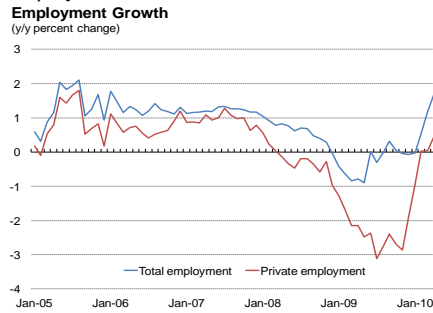
...and had a disproportionate impact on the Seoul area....



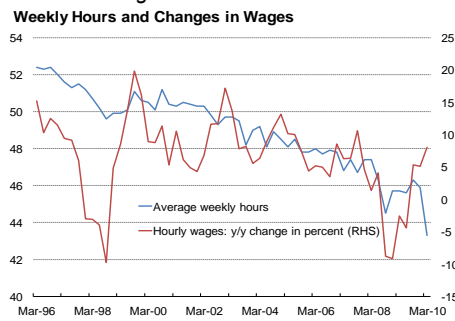
....and the more cyclically sensitive sectors.



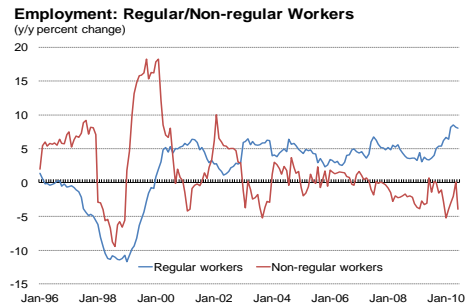
However, the government's work program helped cushion the decline in overall employment....



..., and high employment protection forced the adjustment to take place more through lower hours and wages....



....and to be carried in particular by the non-regular workers given their relatively lower firing costs.

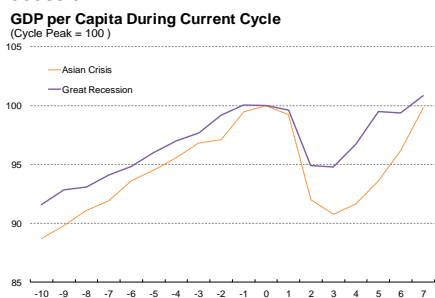


Compared to the Asian Crisis, the labor market suffered less this time around (figure 2). During the Asian crisis in 1997-1998, the employment rate bottomed out close to 10% below the cycle peak, while it during the current crisis only declined by 1.5% relative to the peak level. Correspondingly, the unemployment rate rose significantly more during the Asian Crisis, up by almost 6 percentage points compared to around 1 percentage point this time around. The divergence between the dynamics during the Asian and the current crisis to a large extent reflects that the economic downturn was much deeper in the late 1990s, with GDP per capita dropping by close to 10% from peak to trough. During the Great Recession, on the other hand, GDP per capita only fell by around 5% from peak to trough, supported by the proactive policy response and the much sounder fundamentals of the Korean economy this time around (i.e., stronger balance sheet positions of the government, financial institutions, and large corporates), making it more resilient to the adverse global spillovers. Moreover, wages and hours worked also adjusted more during the current crisis, cushioning the impact on employment.

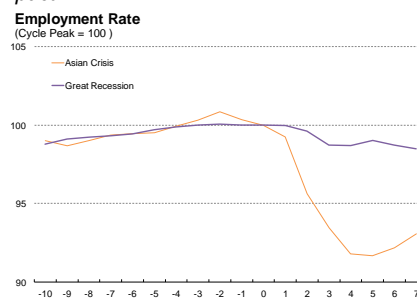
Korean labor market dynamics diverged from those seen in other advanced economies during the current crisis (figure 3). For example, the employment rate fell by 4% less than in the United States and the unemployment rate rose by around than 3.5 percentage points less. This partly reflects that Korea's economy has rebounded faster than the U.S. economy, employment protection is higher in Korea, and hours, wages, and participation rates fell more, cushioning the impact on employment and (registered) unemployment. These were also broadly the reasons why Korean labor markets were less adverse impacted than in countries such as Ireland, Spain, and the United Kingdom. However, employment conditions weakened relatively more in Korea than in Germany. This likely owes much to Germany's higher level of employment protection and the German government's massive expansion of a short-term work program. At the same time, the decline in the employment rate and increase in unemployment since the business cycle peak was broadly in line with the trend seen in Japan.

Figure 2 Korea-Comparing the Asian Crisis and the “Great Recession”

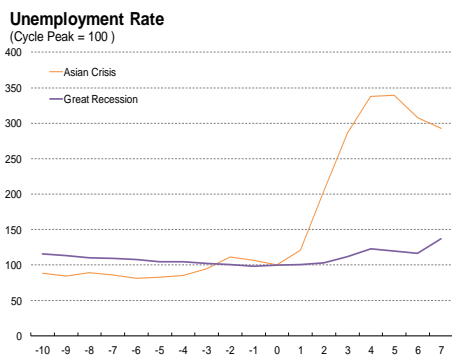
GDP declined by less during the “Great Recession”....



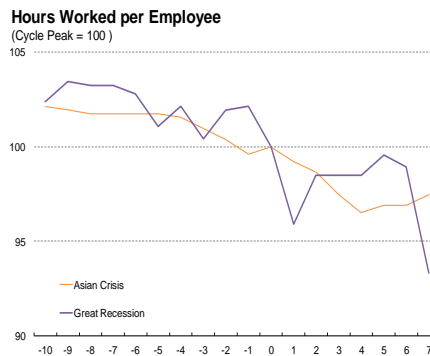
...and this was reflected in a softer employment impact...



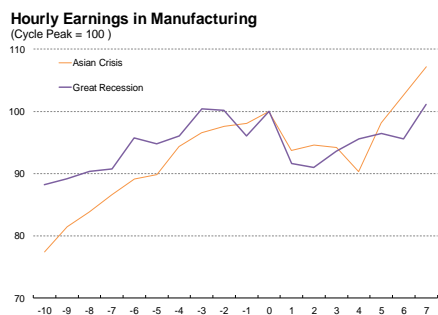
...and a smaller increase in unemployment.



However, the job losses may also have been cushioned by an initial larger decline in hours worked....



...and hourly earnings....



..., which declined by close to 10 percent y/y during the first two quarters of the recession.

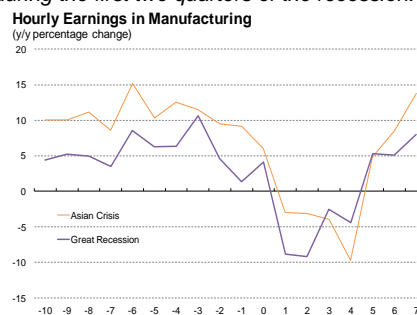
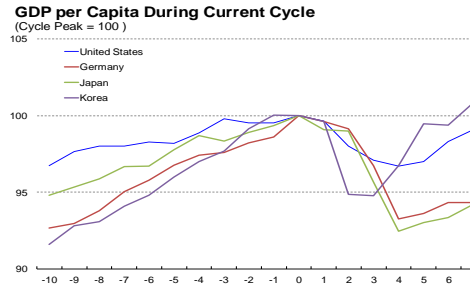
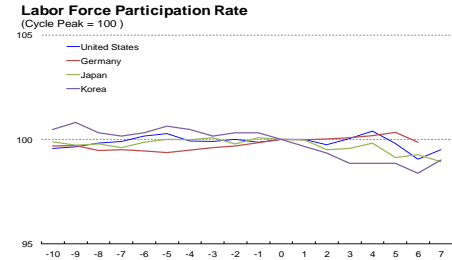


Figure 3 Korea-Comparing Korea to Other Countries

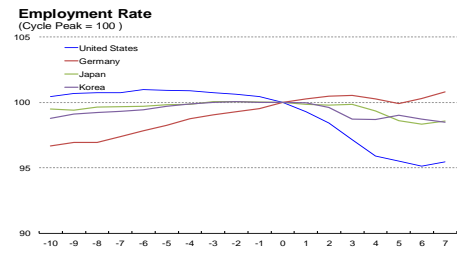
Output in Korea declined much faster than in the comparator countries during the “Great Recession”, but also recovered sooner.



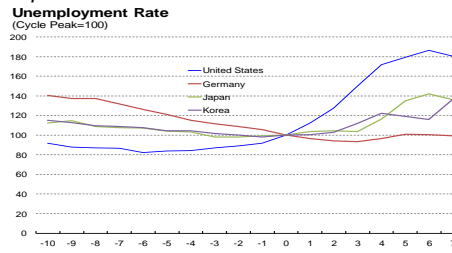
The decline in the labor force participation rate would appear to have been larger in Korea...



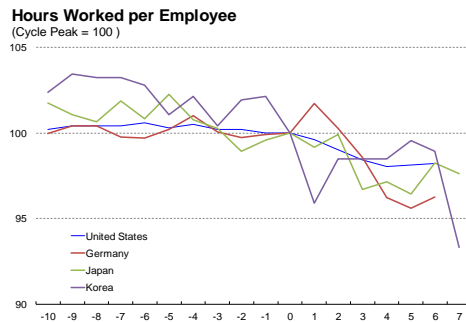
...while the decline in employment ...



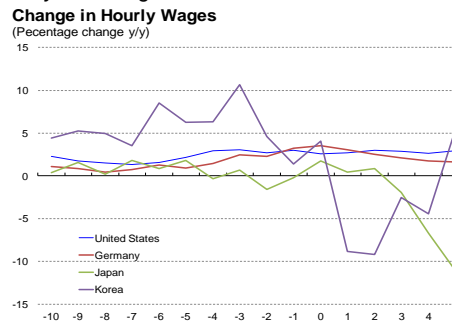
....and the rise in the unemployment rate was less dramatic and in line with trends seen for Japan.



However, the adjustment in hours worked...



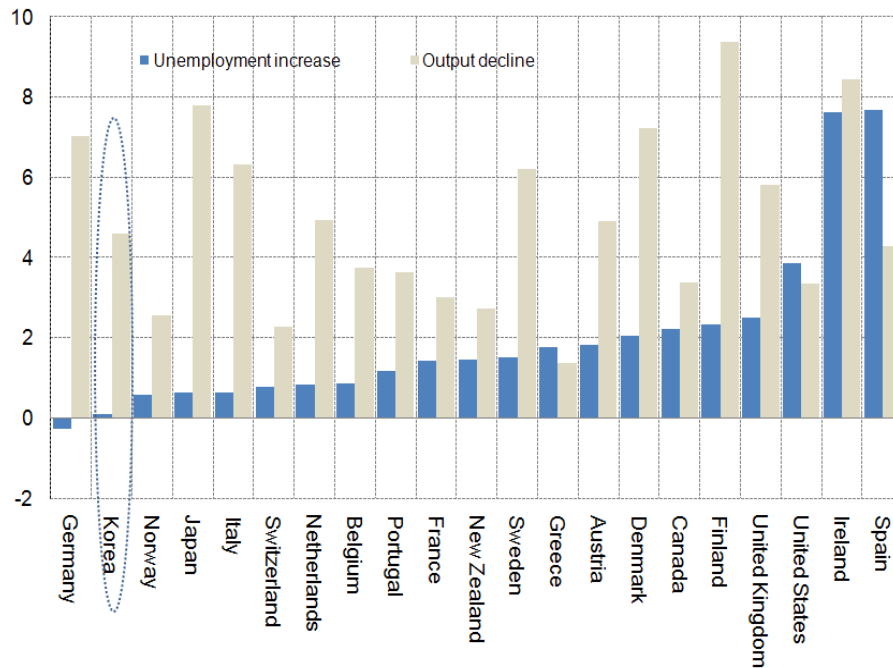
....and wages was larger in Korea, especially early on during the “Great Recession”.



3. WHAT EXPLAINS THE LABOR MARKET DYNAMICS ACROSS COUNTRIES?

As the previous section highlighted, the labor market dynamics during the “Great Recession” differed across advanced economies. While this partly reflected differences in output losses, it would appear that institutional factors were also at play. Moreover, the nature of the shock differed across countries, with some countries hit by a multitude of shocks (financial crisis, the bursting of asset bubbles, and trade shocks) and others, including Korea, primarily hit through the trade channel. In addition, policy responses varied in terms of both magnitude and type of measures.

Figure 4 Change in Unemployment Rate and Output During Crisis (Change in Percentage Points and Percent, Respectly, Peak to Trough)



To analyze the respective roles of institutions and the nature of shocks, the paper applies Okun's law as an organizing framework.¹⁾ Okun's law captures the relationship between unemployment and output and can be expressed as follows:

$$\Delta u = \alpha - \beta \Delta y,$$

where Δu is the change in the unemployment rate, α is the intercept coefficient, and β is the elasticity of the unemployment rate with respect to changes in output. Based on the estimation of this simple equation for a diverse set of advanced economies and using a panel regression setting, the paper will assess (i) which institutional factors can help explain the difference across countries in unemployment responsiveness to output changes and (ii) to what extent the "nature" of shocks has a bearing on labor market dynamics during recessions and recoveries (proxied by the forecast errors of the estimated Okun's law). Finally, we will assess the impact of some of the employment programs implemented in a number of countries.

3.1. The Role Played by Institutional Factors

To determine the responsiveness of unemployment to output changes, a dynamic version of Okun's law is estimated for 22 advanced economies, including Korea.²⁾³⁾ For each country, the dynamic version is estimated for the 20 years prior to each recession that the country has gone through based on quarterly data. Given that all countries have experienced at least one

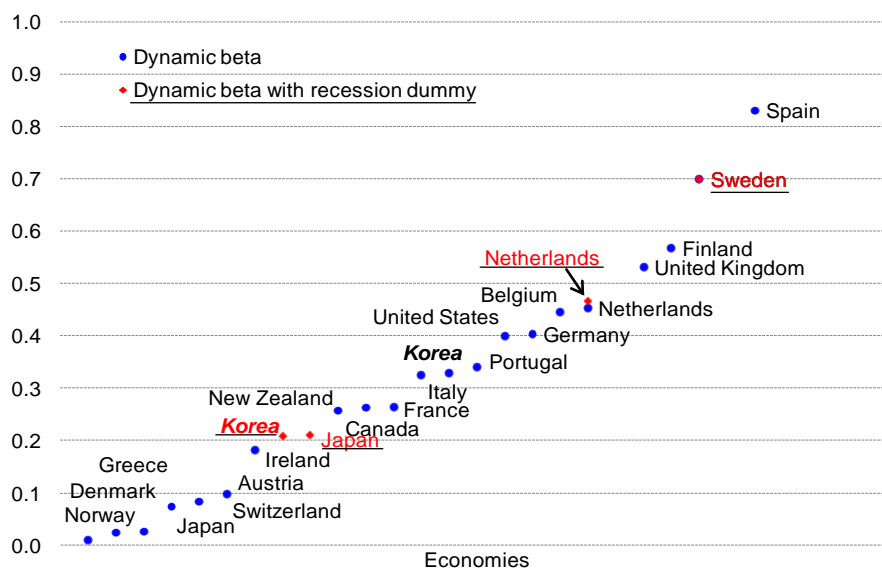
¹⁾ The paper follows the methodology used in chapter 3 of the April 2010 IMF World Economic Outlook, which was authored by Ravi Balakrishnan, Mitali Das, and Prakash Kannan.

²⁾ The dynamic β captures the long-term impact of changes in output on changes in the unemployment rate.

³⁾ The countries included are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.

recession over the past 50 years, the estimated equations gives us a set of dynamic β s across countries and over time. The results show that the responsiveness of unemployment to changes in output has been higher in the years preceding the current crisis than it was in the 1990s. Moreover, the estimated coefficients for the dynamic β s reveal large cross country differences, with responsiveness very high in countries like Canada and Spain, while it is low for countries like Norway and Japan. For Korea, the dynamic β is estimated to be at the low end, especially when controlling for crisis periods.

Figure 5 Dynamic Betas for 20 Years Prior to Great Recession (Responsiveness of Unemployment w.r.t. Output)

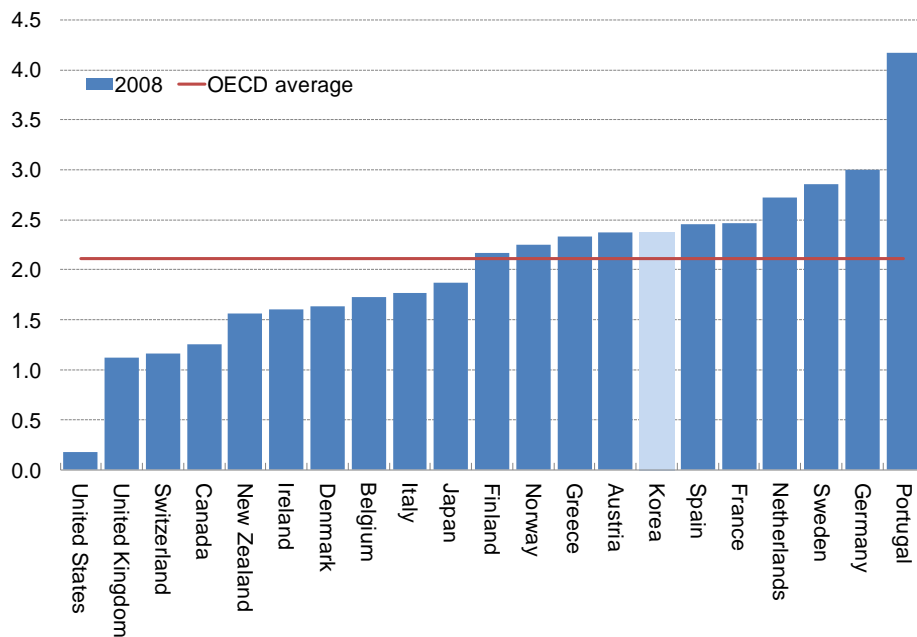


To gauge the role played by institutional factors, over time and across countries, a panel regression is estimated. In the panel regression, the

dynamic β s are regressed on a set of institutional factors⁴⁾ (see table 1, equation 1 to 5):

Employment protection. As expected, the panel regression shows that stricter employment protection makes unemployment less elastic to changes in output. This is because the higher costs of firing and hiring makes the employer more reluctant to both lay off workers during downturns and hire them during upturns. In Korea's case, employment protection is relatively high by OECD standards despite a decline over the past few decades, which helps explain the relatively low dynamic β for Korea. Moreover, effective

Figure 6 OECD Measures of Strictness of Employment Protection

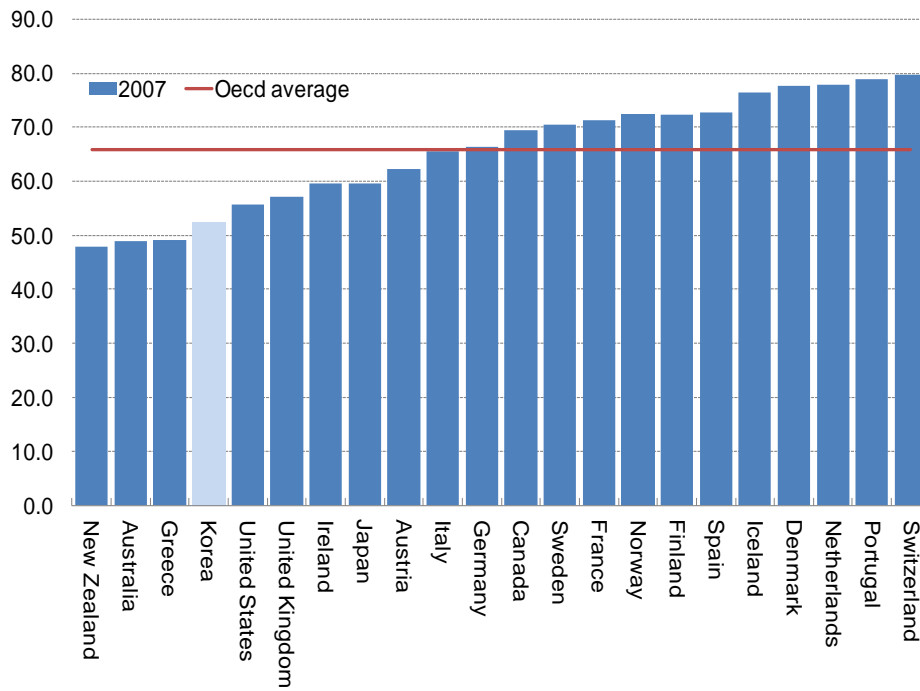


⁴⁾ As a measure of employment protection, OECD's employment protection legislation (EPL) index is used and the generosity of unemployment benefits measure the income replacement rates.

employment protection is typically higher in Korea at the work place than the minimum levels prescribed by the law, partly due to strong unions.

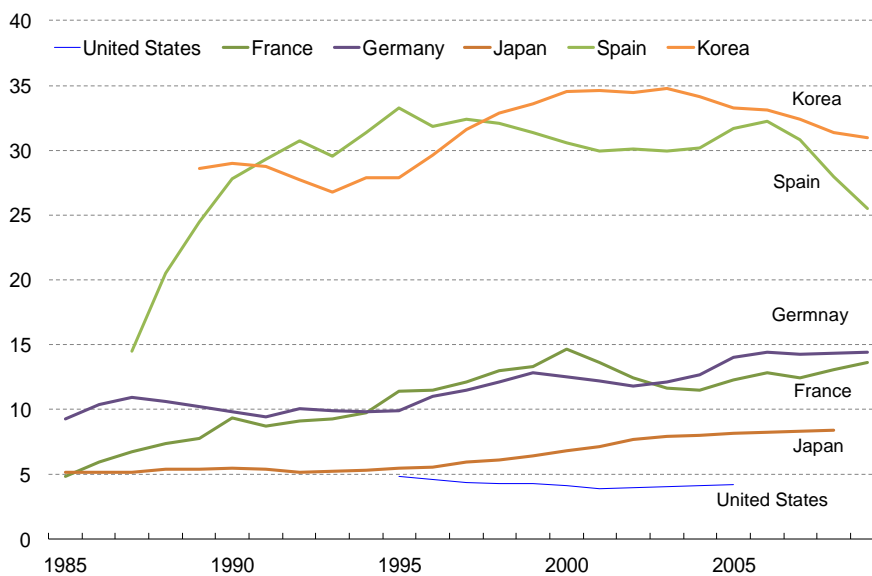
Generosity of unemployment benefits. Theoretically the impact of more generous benefits is ambiguous. During downturns generous benefits can limit downward wage flexibility and cause more job losses, while they may constrain employment growth during upturns by keeping reservation wages relatively high. The panel regression shows that the former would appear to dominate the latter. Given the relatively low income replacement rates in Korea, unemployment benefits would tend to mute unemployment dynamics compared to other countries.

Figure 7 Net Replacement Rate of Unemployment Benefits



Share of temporary workers. A priori, a larger share of temporary workers should be associated with larger swings in unemployment during economic cycles due to the lower degree of employment protection for workers with temporary contracts and because employers have sunk less investment in them. Moreover, the increased prevalence of this over time should ceteris paribus have augmented this for Korea, which has a very high share by OECD standards. However, while the coefficient has the expected sign, it is not significant in any of the panel regressions.

Figure 8 Share of Temporary Workers (in Percent)



A panel regression looking at the determinants of the responsiveness of employment produces broadly the same results (table 1).

Simulations show that institutional reform in Korea could have a significant impact on the responsiveness of unemployment and employment

Table 1 Determinants of Unemployment and Employment Responsiveness to Changes in Output

	Unemployment Equation					Employment Equation
	(1)	(2)	(3)	(4)	(5)	
Strictness of Employment Protection	-0.05 [0.050]			-0.08 [0.007]	-0.07 [0.007]	-0.13 [0.03]
Generosity of Unemployment Benefit		0.14 [0.193]		0.37 [0.001]	0.40 [0.000]	0.44 [0.003]
Share of Temporary Workers			0.005 [0.148]		0.005 [0.334]	0.01 [0.134]
Constant	0.41 [0.000]	0.36 [0.000]	0.23 [0.000]	0.64 [0.000]	0.59 [0.000]	0.72 [0.00]
Number of Observations	70	66	59	48	39	34
R^2	0.06	0.02	0.04	0.27	0.49	0.33

Note: IMF staff estimates.

Source: p -value are presented in square brackets.

to changes in economic activity. Reducing the strictness of employment protection legislation (equivalent to half the current level of Korea's current EPL index) would increase the elasticity of unemployment and employment (with respect to output) from -0.21 to -0.29 and 0.41 to 0.56 , respectively, an increase of close to 40%. Aligning Korea's unemployment benefits and share of part-time workers with the OECD average would also raise elasticity noticeably. A combination of lowering employment protection (cut in half), while raising unemployment insurance (to OECD levels), would increase elasticities of unemployment and employment by more than 50%.

Figure 9 Policy Simulations: Impact on Dynamic Beta's, Unemployment

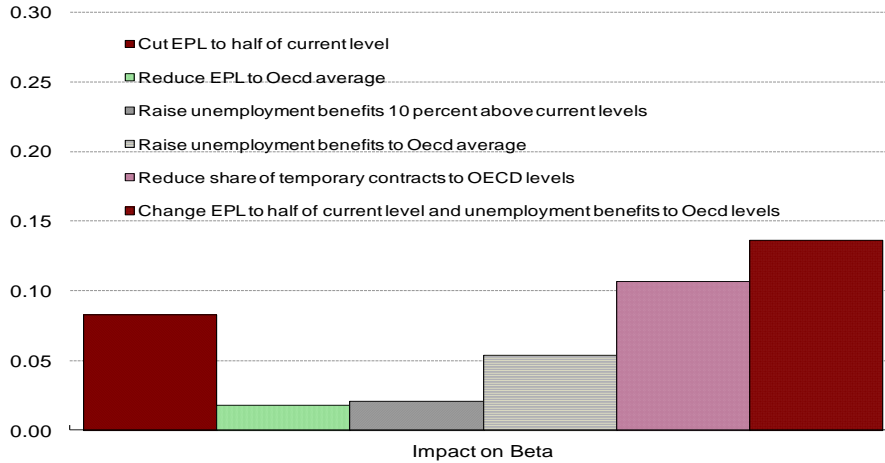
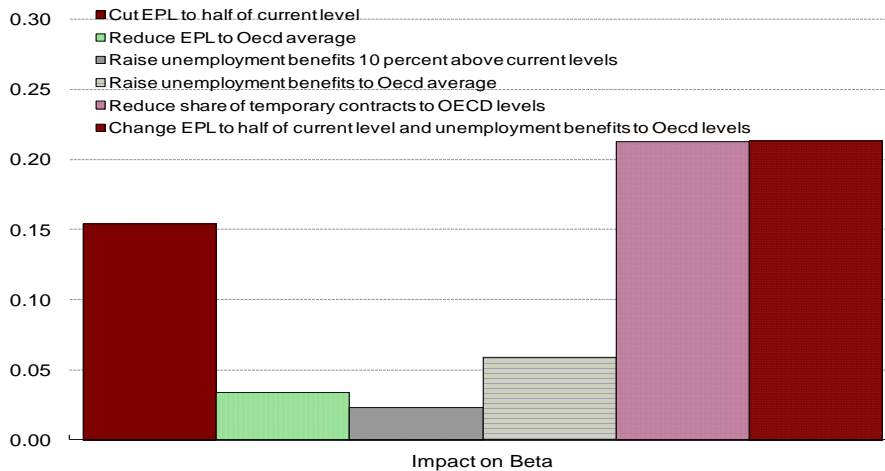


Figure 10 Policy Simulations: Impact on Dynamic Beta's, Employment



3.2. The Role Played by the Nature of the Recession

Each recession is different and has different implications for the depth of the labor market shock and the speed of recovery in employment. While this

Table 2 Unemployment Dynamics During Recession not Explained by Changes in Output

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial Crisis	0.73 [0.000]						
Financial Stress		0.21 [0.045]	-0.59 [0.019]			0.26 [0.019]	0.20 [0.085]
Financial Stress X Corporate Leverage			0.03 [0.003]				
Bursting of Housing Bubble				0.09 [0.000]		0.08 [0.000]	0.07 [0.002]
Stock Return Dispersion					0.52 [0.078]		1.09 [0.007]
Constant	0.21 [0.032]	0.12 [0.346]	0.04 [0.735]	0.06 [0.658]	0.29 [0.007]	-0.17 [0.241]	-0.28 [0.059]
Number of Observations	352	259	156	314	334	235	234
R^2	0.04	0.02	0.06	0.05	0.01	0.09	0.11

Note: IMF staff estimates.

Source: p -values are presented in square brackets.

clearly depends on the size of the economic downturn, the nature of the shock hitting the economy can also have an impact on the labor market dynamics during the recession and recovery phases.

To analyze the role played by the nature of recessions, a two-stage approach is applied. First, we compare the actual change in unemployment during previous recessions and recoveries for each country to the changes predicted by the estimated Okun law relationships. Second, these forecast errors, controlled for output changes, are then regressed on different shock types associated with previous recessions using a panel data setting (table 2 and table 3):⁵⁾

⁵⁾ This again follows the approach used in chapter 3 of the April 2010 IMF World Economic Outlook.

Table 3 Unemployment Dynamics During Recoveries not Explained by Changes in Output

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Financial Crisis	0.20 [0.097]						
Financial Stress		0.11 [0.047]	0.29 [0.102]			0.11 [0.056]	0.11 [0.097]
Financial Stress and Corporate Leverage			0.00 [0.188]				
Bursting of Housing Bubble				-0.01 [0.384]		-0.02 [0.144]	-0.02 [0.173]
Stock Return Dispersion					0.03 [0.822]		0.04 [0.842]
Constant	-0.18 [0.032]	-0.10 [0.041]	-0.07 [0.268]	-0.12 [0.077]	-0.15 [0.005]	-0.05 [0.531]	-0.06 [0.474]
Number of Observations	520	389	279	462	467	373	365
R^2	0.01	0.01	0.01	0.00	0.00	0.01	0.01

Note: IMF staff estimates.

Source: p -values are presented in square brackets.

Financial shocks. Historical evidence points to the protracted nature of recessions and recoveries following financial shocks. Using a financial crisis dummy with a value of 1 during recessions and recoveries accompanied by financial crisis, shows that financial shocks have implications for labor market dynamics. According to the panel regression results, the unemployment rate would be around 0.7 percentage points higher during recessions associated with financial shocks and about 0.2 percentage points higher during recoveries. Other measures of financial shocks, including a financial stress index, also suggest that unemployment will be higher during down-cycles associated with high financial distress, especially if there are

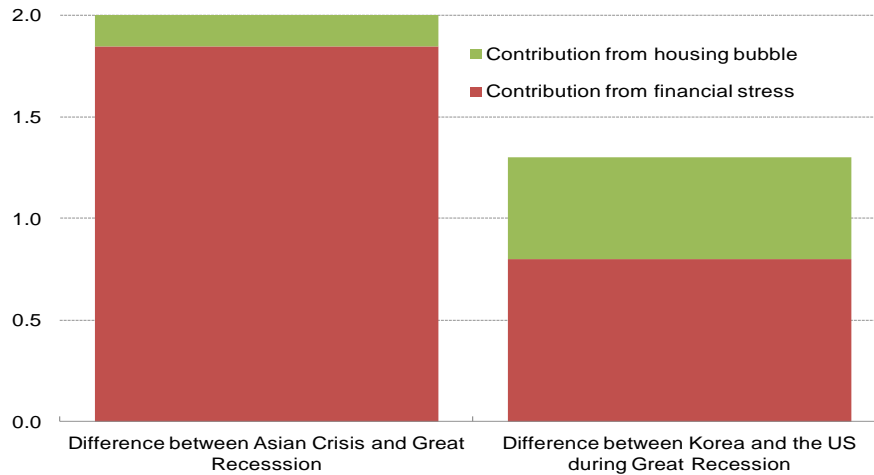
also balance sheet vulnerabilities such as high corporate leverage.⁶⁾

Sectoral shocks. A sectoral shock could be the bursting of a housing market bubble, which would primarily have a direct impact on the construction sector. However, it is also likely to have broader implications for households through wealth effects and the financial sector through solvency effects. A panel regression shows that a dummy variable with the value 1 during crisis accompanied by the initial bursting of a housing bubble can help explain a higher level of unemployment during the recession phase but not during the recovery phase. Another measure of sectoral shocks could be the dispersion in stock market returns across economic sectors, with a high level of dispersion indicating prevalence of sector-specific shocks. Including this measure in the regression confirms that sectoral shocks do tend to amplify the unemployment shock during recessions, but during recoveries the coefficient on dispersion is not significant.

These results also help explain why Korea was less hit this time around than during the Asian crisis and why Korea fared relatively better compared with other countries. During the Asian crisis, unlike this time around, the economy was hit by a dual financial and housing market shock. Moreover, the corporate sector was highly leveraged while, at least the large corporates, entered the recent crisis with strong balance sheets. Factoring in the relatively higher level of financial stress during the Asian crisis and the bursting of the housing market bubble can alone explain 2 percentage points (or most) of the difference in the change in the unemployment rate during the recession phases of the two crisis. During the current crisis, Korea, unlike the United States, did not face a banking crisis and a housing market collapse. In addition to the relatively lower responsiveness of unemployment to changes in output in Korea's case, this can explain around 0.75 percentage points of the difference between the change in the U.S. and Korean unemployment rates during the "Great Recession".

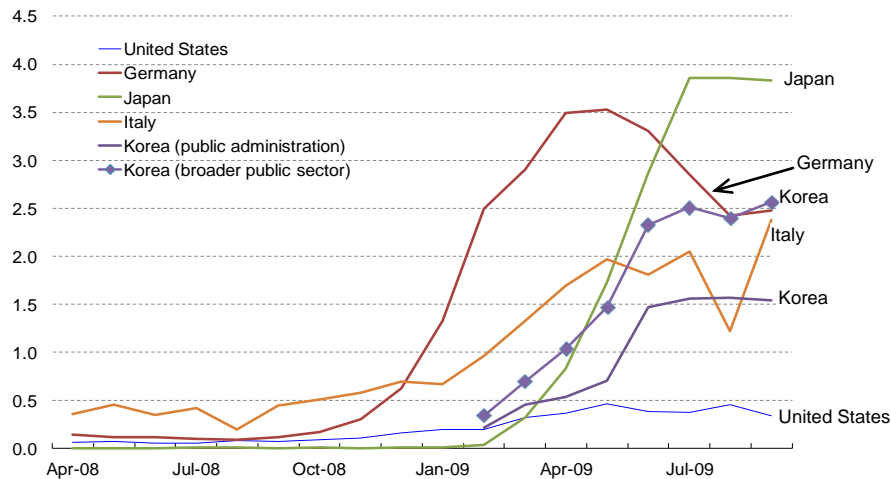
⁶⁾ The financial stress index used here was developed by Cardarelli, Elekdag, and Lall. See for example, *Journal of Financial Stability*, 2010, forthcoming.

Figure 11 Explaining Different Unemployment Outcomes (Percentage Point Contribution to Change in Unemployment Rate)



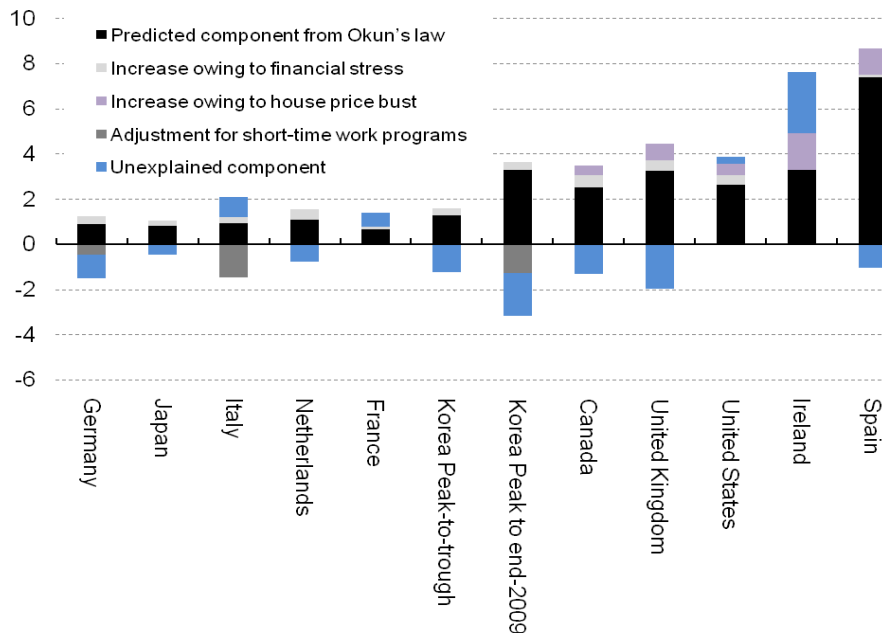
3.3. The Role Played by Government Employment Programs

During the recent downturn, a number of advanced economies introduced short-term work programs to cushion the impact from the economic slowdown on employment. Countries making use of these programs included France, Germany, Italy, Japan, Korea, and the United States. There was a significant expansion in these programs early on during the crisis in both Germany and Japan, which saw the intake soar to 3.5% and close to 4% of the labor force, respectively. In the United States and Italy the increase was less pronounced, which partly reflected design features making it less attractive for employers to use the programs and for workers to participate. In Korea's case, the government in the 2009 original and supplementary budget introduced various measures to support employment, both through subsidies and temporary public work programs. Aggregating employment in public administration, education, health, and social services, the increase in public employment in Korea during the first three quarters of 2009 accounted for close to 2.5% of the labor force.

Figure 12 Employment Work Program (in Percent of the Labor Force)

These programs can, therefore, also help explain the “unpredicted” change in unemployment during the crisis. While the economic slowdown, rising financial stress, and the housing markets busts (in some of the countries) can help explain a significant portion of the increase in actual unemployment from peak to trough during the recent downturn, there is still an unexplained portion. Indeed, in some countries, including Korea, Germany, and Italy, the predicted change in the unemployment rate by Okun’s law exceeds the actual change and the expansion in the job programs in the latter two countries can explain some of this. In Korea’s case, however, the public job expansion did not start until after the trough of the crisis in end-2008 and, therefore, only help explain the forecast errors during 2009.

Figure 13 Explaining Change in the Unemployment Rate (Peak-to-trough and Peak to end-2009 Change in Percentage Point)

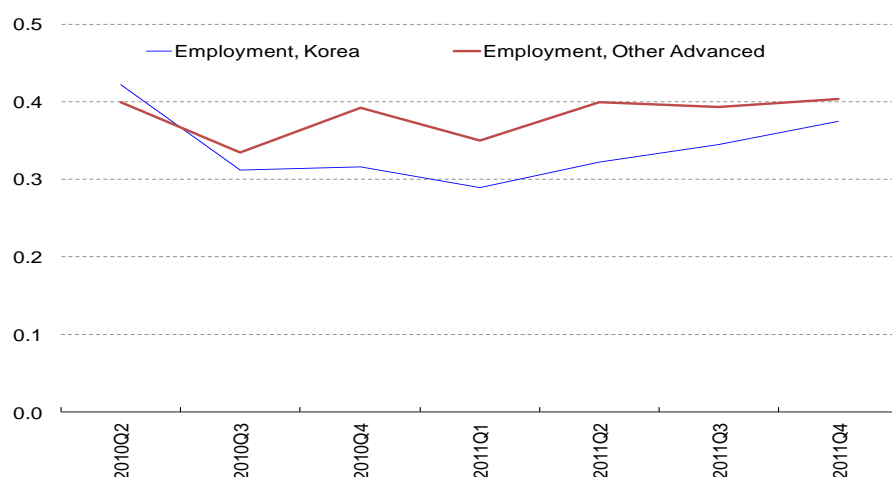


4. WHAT DO THE EMPIRICAL RESULTS SUGGEST FOR THE EMPLOYMENT OUTLOOK?

Employment is likely to pick up with the rebound in the Korean and global economy, although the recovery may prove protracted. Korea's economy has rebounded impressively since the recession in the second half of 2008 and is at the front-line of the global recovery. This has already been reflected in an improvement in labor market conditions, including a pick-up in employment across sectors and professions. However, the economic growth momentum is expected to slow in coming quarters, partly as a "technical payback" for the fast recovery and as macroeconomic stimulus is scaled back.

Even so, employment in Korea is predicted to grow faster than in most other

**Figure 14 Model Predicted Employment Recoveries
(Employment q/q SAAR divided by GDP q/q SAAR)**

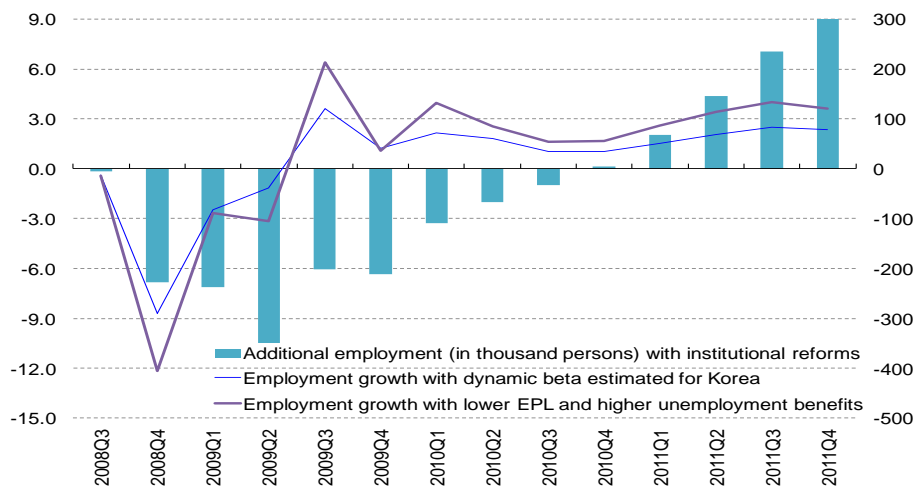


advanced economies, but this also reflects faster growth. Scaling the employment growth predicted by the estimated Okun laws with expected GDP growth, shows that the employment gains are less buoyant in Korea. This is in line with the estimated lower dynamic beta in Korea's employment equation. However, these predictions do not factor in that employers may be somewhat cautious about hiring due to lingering uncertainty about the economic outlook. Also, they do not factor in the potential impact from a gradual scale-back in public employment programs in Korea and other advanced economies.

Absent some of the labor market rigidities caused by institutional factors, employment could have recovered faster. If Korea's employment protection level had been lower and unemployment benefits had been higher, employment would have declined more during the crisis, but would also have picked up much faster during the recovery. Comparing the through-cycle prediction of employment growth using the dynamic beta estimated for Korea with the employment growth predicted if employment protection had

been half its current level and unemployment benefits in line with OECD levels (resulting in a higher beta), suggests that the overall employment level would end up much higher in the latter case. In addition, panel regressions show that annual employment growth in Korea (and other countries), controlling for output growth, could have been 0.15 percentage points higher in the past for each 1 point decline in OECD's employment protection index and 0.36 percentage point higher for each percentage point increase in the income replacement rate of unemployment benefits. For Korea, this corresponds to additional employment of 350,000 and 850,000, respectively, over a 10 year period. However, the positive coefficient on the income replacement ratio should be interpreted with caution. It may simply pick up the fact that some countries with high income replacement ratios have institutional features supporting labor market flexibility, including a low level of employment protection, decentralized wage-setting, etc. Indeed, if both employment protection and unemployment benefits are included as explanatory variables for employment growth, they turn out to be insignificant.

Figure 15 Model Predicted Employment (Growth q/q SAAR (LHS) and Cumulative Change in Persons (RHS))



5. CONCLUDING REMARKS

Korea's economy and labor markets were hit by the "Great Recession", but the job losses were lower than in the past and elsewhere. When the adverse spillovers from the global economic and financial crisis hit the economy during the second half of 2008, employment declined, especially in the more cyclically sensitive sectors and for non-regular workers. However, the job losses were smaller than during the Asian crisis, which partly reflected the smaller output loss but also a larger adjustment this time around in wages and hours worked. The latter also partly explains why job losses were less severe in Korea than in many other countries during the "Great Recession".

Institutional factors also explain the small increase in Korean unemployment during the recent crisis compared to trends in other countries. Korea's unemployment rate rose by a mere 0.1 percentage point between the pre-crisis cyclical peak in June 2008 and the trough of the crisis in December 2008. In fact, regression analysis reveals that the responsiveness of unemployment to output changes is relatively low in Korea compared to elsewhere, especially when controlling for crisis episodes. Based on a cross-country panel regression using advanced economies, it is found that the low responsiveness in Korea can partly be explained by the high level of employment protection, which is particularly high for regular workers. It also partly relates to the relatively low level of unemployment benefits in Korea. Further to these institutional factors, Korea's labor markets fared relatively well because the economy entered the crisis with sound fundamentals and was not, unlike other countries hit, by both banking crisis and the bursting of housing market bubbles. Moreover, the Korea government took decisive steps to counter the adverse fallout from the crisis through macroeconomic stimulus and an expansion of employment programs.

To avoid a "job-light" recovery, the authorities should manage the unwinding of policy support measures carefully and take further steps to increase labor market flexibility. While the rebound in economic activity in

Korea has been impressive so far, macroeconomic and labor market policies have played an important part. These will, therefore, have to be scaled back carefully to safeguard the recovery in the labor market, although it will be important to ensure that the work programs do not become permanent features and restrain private-led employment growth. In this context, it will also be important to step up efforts to reduce the high level of employment protection for regular workers. While it reduces the decline in employment during a crisis, panel regressions suggest that it also slows the subsequent recovery and, more generally, has a negative impact on employment growth. Furthermore, the high level of employment protection has served to amplify dualism in the labor market, which leaves the non-regular workers more exposed during downturns, raising precautionary savings given the limited access to unemployment benefits. It also gives employers less incentives to invest in on-the-job training for the large share of non-regular workers (more than 1/3), with likely negative implications for potential growth. Reducing employment protection, especially for regular workers, should go hand in hand with an enhancement in social protection programs to help lessen the income losses during unemployment and smooth consumption. Moreover, to help raise employment and give non-regular workers a foothold, further efforts are likely needed to strengthen training and education efforts, including by targeting these efforts more on what is demanded by employers.

APPENDIX

The description of data sources methodology in this Appendix borrows from chapter 3 of the IMF World Economic Outlook, April 2010.

A1. Data Sources

Table A1 Data Sources

Descriptor	Source
Employment	OECD, ¹⁾ Labor Force Statistics
Labor Force	OECD, Labor Force Statistics
Unemployment Rate	OECD, Labor Force Statistics; Haver Analytics
Real GDP	GDS (Raw Data from Haver Analytics) and CEIC for Korea
Employment Protection Legislation	OECD
Unemployment Benefits (Average Replacement Ratio for First Two Years)	IMF Structural Reform Database
Share of Temporary Workers	Eurostat, OECD
Hours per Employee	Haver Analytics, National Sources
Sectoral Stock Market Returns	Datastream and CEIC for Korea

Note: 1) OECD=Organization for Economic Cooperation and Development.

A2. Business Cycles

This paper employs a “classical” approach to dating business cycles by focusing on turning points in the level of output rather than deviations from a trend. The procedure — based on Harding and Pagan (2002) — uses a set of statistical criteria to determine the window over which an observation is classified as a local peak or trough and to determine the minimum duration of a complete cycle and the minimum duration of a phase of a business cycle. In this paper, the observation window is set at two quarters, the minimum duration at five quarters, and the minimum phase at two quarters. Although the criteria for the minimum duration of a cycle and a phase are occasionally binding, the procedure generally dates the start of a recession as the quarter during which output is higher than the two quarters preceding and following it. This implies that a period of two quarters of negative growth is a

sufficient, but not necessary, condition for a recession. Likewise, the end of a recession is generally marked as the quarter during which output is lower than the two quarters before and after it. With these criteria in place, local peaks and troughs are identified, which define recessionary and expansionary phases of the business cycle.

A3. Stock Market Dispersion

Measure of Stock Market Dispersion The measure of dispersion in stock market returns follows Loungani, Rush, and Tave (1990). Stock market returns at the sectoral level for each country are obtained from Datastream. The data generally begin in the early to mid-1970s. For each country i , the time series of the stock market dispersion measure (SD_i) is computed as follows:

$$SD_{it} = \left[\sum_{n=1}^N w_{nt} (R_{nt} - \bar{R}_t)^2 \right]^{1/2},$$

where w_{nt} is the share of total market capitalization of sector n in quarter t , R_{nt} is the quarterly return on the sector n index, and \bar{R}_t is the total market quarterly return. To minimize large fluctuations in sectoral weights, the average share of market capitalization over the previous 10 years was used.

A4. Okun's Law and Dynamic Beta

For each recession episode in a particular country, a dynamic version of Okun's law is estimated using quarterly data for the 20-year period leading up to the peak in output just before the start of the recession. The general form of the equation that is estimated is as follows:

$$\Delta u_t = \alpha + \sum_{i=0}^{p_1} \beta_i \Delta y_{t-i} + \sum_{i=1}^q \gamma_i \Delta u_{t-i} + \sum_{i=0}^{p_2} \delta_i \times D^R \Delta y_{t-i} + \varepsilon_t,$$

where Δu and Δy refer, respectively, to the change in the unemployment rate and the level of output growth. D^R is a dummy variable that takes on a value of 1 if the economy is in a state of recession. The use of the dummy variable allows the coefficients related to the responsiveness of changes in the unemployment rate to output growth to take on different magnitudes depending on the state of the business cycle. To allow for different dynamics across countries, the lag lengths (p_1 , p_2 , and q in the specification above) are chosen using a Bayesian information criterion for each country and each episode. For most countries and episodes, the criterion suggests the use of fewer than two lags. The procedure used to estimate the Okun's law equation for changes in employment is carried out in a similar manner, with the change in log employment as the dependent variable.

To demonstrate how the dynamic beta (β) is derived, we use the example of one lag on output and unemployment. This gives the following expression for Okun's law:

$$\Delta u_t = \alpha + \beta_0 \Delta y_t + \beta_1 \Delta y_{t-1} + \gamma_1 \Delta u_{t-1} + \varepsilon_t,$$

The dynamic beta (DB) measures the long-term impact of a one-unit change in output growth on the change in unemployment. Based on the specification above, the dynamic beta can be written as follows:

$$\begin{aligned} DB &= \sum_{s=0}^{\infty} \Delta u_{t+s} \\ &= \sum_{s=0}^{\infty} [\beta_0 \Delta y_{t+s} + \beta_1 \Delta y_{t+s-1} + \gamma_1 \Delta u_{t+s-1}]. \end{aligned}$$

When there is a one-unit change to output growth during period t and no change during other times, the equation reduces to:

$$DB = \beta_0 + \beta_1 + \gamma_1 \sum_{s=0}^{\infty} \Delta u_{t+s-1}.$$

The summation in the last term can be written as:

$$\sum_{s=0}^{\infty} \Delta u_{t+s-1} = \Delta u_{t-1} + \sum_{s=0}^{\infty} \Delta u_{t+s}.$$

Assuming that there is initially no change in unemployment (i.e., $\Delta u_{t-1} = 0$), we get:

$$DB = \beta_0 + \beta_1 + \gamma_1 DB.$$

Rearranging then gives the expression for the dynamic beta:

$$DB = \frac{\beta_0 + \beta_1}{1 - \gamma_1}.$$

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