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Different Types of Liberalization and Jobs in South Korean Firms[*]

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This study examines the effects of several factors indicating economic openness-imported intermediate goods, total imports, IFDI (inward foreign direct investment), and foreign ownership-on regular, irregular jobs and the ratio of irregular employment to regular employment. Findings revealed that imported intermediate inputs and IFDI affected neither regular nor irregular job figures. However, an increase in total imports led to a decrease in the number of irregular jobs without affecting regular full time jobs, leading to a decrease in the ratio of irregular jobs to regular jobs. On the other hand, changes in foreign ownership structure had a contrary effect, that is, a decrease in the number of regular jobs and an increase in irregular ones, and, thus, an increase in the ratio of irregular jobs to regular jobs. Overall results showed that a rise in imports results in depressed overall employment, irregular employment in particular, while more IFDI results in more irregular jobs replacing regular ones, effectively exacerbating job insecurity. The implication of this analysis is that greater economic openness may have a negative impact on the South Korean labor market overall.

Keywords: Economic Openness, Imports, Inward FDI, Employment Type, Regular Jobs, Irregular Jobs
JEL Classification: F14, F16, F21

I. INTRODUCTION

In an effort to overcome the Asian foreign exchange crisis that erupted at the end of 1997, South Korea undertook various reform measures: currency and fiscal

austerity, the structural reform of financial institutions and corporations, trade and capital liberalization, and reforms in labor-management relations and the sovereign sectors. As the global trade landscape shifted toward regionalism through the expansion of Free Trade Agreements, South Korea also adopted FTA-friendly strategies in early 2000. Wanting to escape trade disadvantages as a non-signatory and to liberalize its market in order to become an advanced trading country, South Korea developed an FTA roadmap in 2003 to achieve simultaneous FTA ratifications with influential economic blocs.

Reflecting these goals, South Korea's trade volume consistently increased from $225.6 billion (exports $132.3 billion, imports $93.3 billion) to $1 trillion for the first time in 2011 (exports $555.2 billion, imports $524.4 billion) since the financial crisis in 1998.[1] In 2013, total trade stood at $1.08 trillion (exports $559.6 billion, imports $515.6 billion).[2] South Korea's IFDI (inward foreign direct investment), which was a little over $1 billion in the early 1990s, increased significantly to $14.5 billion by 2013.[3]

The Korean financial crisis brought massive changes to the South Korean labor market. Until the mid-1990s, full-time regular jobs were the universal norm in South Korea. This work arrangement, which was made possible by strong economic growth, kept the unemployment rate low and guaranteed lifetime employment. However, the financial crisis led to unavoidable corporate restructuring, which brought about huge, unprecedented changes in the labor market. New policies rendered the market more flexible to facilitate this restructuring process, and allowed many companies to order massive layoffs and hire temporary, irregular workers to cut costs. As a result, the number of wage earners dropped from 13.2 million in 1996 (regular 7.5 million, irregular 5.7 million)[4] to 12.3 million in 1998 (regular 6.5 million, irregular 5.8 million), a loss

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[1] Notable exceptions were the years 2001 and 2009, when trade volume decreased following recessions in advanced economies and a global financial crisis.

[2] KITA, Korea Trade Statistics. <http://stat.kita.net/top/state/main.jsp?lang_gbn=null&statid=kts> (accessed May 20, 2014).

[3] MOTIE, Inward FDI Statistics. <http://www.mke.go.kr/motie/in/it/investstats/investstats.jsp> (accessed May 20, 2014).

[4] In this study, the definition of "irregular" workers has been adopted for the Korean Economic and Social Development Commission based on the agreement in 2002. Irregular indicates the meanings of 'temporary', 'part-time' and/or 'atypical' workers. For data obtained before 2003, "permanent" workers are understood to mean regular workers and "temporary/day" workers to mean irregular workers. For data dating after 2003, jobs have been categorized according to work

of nearly 0.9 million regular jobs. After overcoming the financial crisis, the number of wage earners, including the pre-crisis surge of irregular workers, increased until it reached pre-crisis levels of 13.4 million workers by 2000 (regular 6.4 million, irregular 7.0 million). From then, the number of wage earners grew to 18.2 million (regular 12.3 million, irregular 6.0 million) by August 2013, with a pronounced increase in regular workers. In contrast to such gain in job figures, however, the average incomes of irregular workers fell from 65.0% of that of regular workers in 2004 to 56.1% in 2013. Irregular workers also have the disadvantage of being much less protected by the social insurance umbrella. Such poor working conditions of irregular employees remain a severe problem in the South Korean labor market.

Table 1. Income & Social Security Coverage by Employment Status

(Unit: 10,000 KRW, %)

Category	Status	2004	2006	2008	2009	2010	2011	2012	2013
Monthly Earnings	Regular	177.1	190.8	212.7	220.1	229.4	238.8	246.0	254.6
	Irregular	115.2	119.8	129.6	120.2	125.8	134.8	139.3	142.8
	Ratio	65.0	62.8	60.9	54.6	54.8	56.4	56.6	56.1
National Pension	Regular	72.5	76.1	77.3	78.9	78.4	79.1	80.3	81.2
	Irregular	37.5	38.2	39.0	38.2	38.1	38.2	39.0	39.2
Health Insurance	Regular	73.8	76.1	78.0	79.8	79.5	80.9	82.2	83.5
	Irregular	40.1	40.0	41.5	43.4	42.1	44.1	45.4	46.2
Employment Insurance	Regular	61.5	64.7	65.8	67.6	75.7	77.4	78.9	80.6
	Irregular	36.1	36.3	39.2	42.7	41.0	42.3	43.3	43.6

Note 1) Ratio refers to ratio of the irregular workers' average salary to the regular workers' one, expressed as a percentage.
2) National pension, health insurance, and employment insurance covered the employed workers only.
Source: KOSIS. <http://kosis.kr/> (accessed May 21, 2014).

Studies focusing on the changes in South Korea's labor market after the sweeping changes of economic liberalization have been limited to examinations of the impacts on skilled and unskilled labor as a factor of production. Numerous domestic studies explored the effect that trade and investment liberalization have had on employment and wages, but these focused primarily on overall employment,

arrangement. More detailed definition of "irregular" workers is referred to a glossary of Economically Active Population Survey and a collected data from KOSIS <http://kosis.kr/> (accessed May 21, 2014).

overall income, or skilled and unskilled labor (Kim, Park and Lee, 2005; Ok, Jeong and Oh, 2007; Suh et al., 2008; Jeong and Kim, 2009; Chun, 2011). Two recent studies, Lee and Lee (2013) and Lee, Kim and Sim (2014) did classify labor into regular and irregular job-types but only analyzed the impacts on wages.

Therefore, this study classifies economy openness into imports of intermediate goods, total imports, IFDI, and foreign ownership that represent trade and investment liberalization and employee in the context of regular and irregular jobs. Also this study analyzes how economy openness affects Korean labor market in both quantitative and qualitative employment perspectives. The study's aim is to relate the controversial problem for the South Korean labor market, which consists of regular and irregular jobs, to economic openness.

This paper is presented in the following order. Chapter 2 reviews past literature on the effect of economic openness on employment and differentiates this study from others. Chapter 3 provides an explanation of the models and data used, and Chapter 4 presents the results of an empirical analysis incorporating the data and models. The final chapter evaluates the effect of economic openness on South Korea's labor market as it pertains to employment security.

II. LITERATURE REVIEW

Prior studies have mainly categorized employment into skilled or unskilled labor. This classification defines labor as another factor of production, i.e., it construes skilled labor as human capital. In international economics, the issue of skilled and unskilled employment is typically explained by one of two strands of thought: either employment is influenced by economic openness, following the Heckscher-Ohlin theorem, or by skill-biased technological change.

Leading proponents of the former approach include Borjas, Freeman and Katz (1991) who explained that the decline in unskilled relative wage and employment in America in 1980s was due to the influx of unskilled immigrants and a trade deficit aggravated by increased imports. Sachs and Shatz (1994) also argued that the depression of the U.S. manufacturing jobs from 1978 to 1990 stemmed from increased imports from low-wage countries. Levinsohn (1999) focused outside the U.S. and looked instead at Chile. In particular, he used panel data to analyze how the country's economic liberalization policies impacted 6,665 Chilean firms from 1979 to 1986. According to his findings, economic openness resulted in increased

demand for unskilled workers; however, job reallocation occurred faster for skilled workers. Harrison and Hanson (1999) analyzed the effect of Mexico's trade liberalization on the relative wage and employment of skilled laborers. After analyzing data from 2,354 manufacturing plants between 1984 and 1990, they concluded that exports and IFDI led to a significant increase in the relative wages and employment of Mexico's skilled workers.

Meanwhile, leading studies conducted on skill-biased technological change, the latter approach, include the work of Berman, Bound and Griliches (1994), who analyzed 450 industries in the U.S. in the 1980s to discover the causes behind the relative increase in skilled employment. They found that the relative employment prospects for skilled workers increased due to industry-wide technological advancements. These developments were led by investments in computers and R&D. Blanchard and Katz (1997) examined key factors affecting the natural rate of unemployment, and found that technological progress led to lower unemployment for skilled workers but higher unemployment for unskilled ones.

Later studies on skilled and unskilled labor from the perspective of international economics have focused on the role of economic liberalization. Economic openness was seen to mean not just an expansion of trade but rather as a sum of different parts including IFDI, global offshoring, etc., able to affect employment. Driffield and Taylor (2000) studied the effect that IFDI had on the British labor market and saw that IFDI not only directly led to an increased demand for skilled labor from the foreign companies themselves but also indirectly led to increased demand from other domestic companies in the U.K. that benefited from technological ripple effects. A combination of these direct and indirect effects led to the increased overall demand for skilled workers.

Studies observing the effects of global offshoring on employment include Feenstra, Hanson and Swenson (2000) and Hijzen, Görg and Hine (2005). Feenstra, Hanson and Swenson (2000) used four-digit SIC panel data on the U.S. from 1981 to 1993 to determine the effect of offshoring on unskilled employment. They concluded that unskilled employment decreased as offshoring increased. Hijzen, Görg and Hine (2005), who distinguished three skill groups, namely skilled, semi-skilled, and unskilled, in their analysis of 50 manufacturing firms in the U.K. between 1982 and 1996, also determined that international offshoring drove down the relative demand for unskilled labor. According to their research, R&D investment led to a higher demand for skilled labor.

In Germany, studies on employment and the issue of regular and irregular jobs are forthcoming. Becker and Muendler (2008) used the PSM (propensity score matching) approach to extract data on German employees, and they ran an ATT (average treatment effect on the treated) analysis. According to their findings, OFDI (outward foreign direct investment) from a multinational company lowered employee turnover and contributed to improved employment security. Görg and Görlich (2012) also studied how offshoring affects wages and unemployment for both regular and irregular workers in Germany. After analyzing full-time workers employed from 1999 to 2009, they concluded that full-time unemployment in manufacturing decreased drastically when the offshoring of raw materials by non-OECD countries increased. Unemployment for temporary workers also aggravated as a result of increased offshoring by OECD countries. Service sector unemployment for regular and irregular workers was found to decrease only with service offshoring by an OECD country.

Early South Korean studies include research by Jung (2003), Kim, Park and Lee (2005), and Cheon et al. (2005), but their analyses on the impact of economic liberalization on overall employment were based only on pre-2000 data. Consequently, their findings do not reflect the changes that occurred in South Korea's economy after 2000 and, furthermore, these studies did not distinguish among different employment types.

Ok, Jeong and Oh (2007) published a later study that considered the sharp uptick in South Korea's trade with China from 1993 to 2003. They announced that increases in horizontal and vertical within-industry trade led to lower employment in Korea. According to Suh et al. (2008), who drew on the theory that global offshoring could impact wages and employment, the opening of South Korea's market after the Korean financial crisis did not affect employment, although international offshoring, on the other hand, did expand overall employment.

Jeong and Kim's (2009) recent study analyzed the effect of IFDI on employment. They showed that foreign-owned companies are less aggressive when hiring workers. Furthermore, IFDI in downstream industries was found to have a negative impact on employment. Choe, Hong and Seo (2009) examined the effects that domestic and foreign services offshoring had on the demand for skilled and unskilled labor in South Korea's manufacturing industry. They found that offshoring decreases both skilled and unskilled employment, foreign offshoring having a much more negative influence on employment.

While more recent studies have attempted to distinguish between regular and irregular jobs, they have been limited to analyzing the effect on wages. Lee and Lee (2013) looked at the impact of global offshoring on the wages of regular and irregular workers; Lee, Kim and Sim (2014) discussed how OFDI affected the wages of skilled regular, unskilled regular, skilled irregular, and unskilled irregular workers. These two studies are alike in that they both draw from South Korea's labor panel data and are therefore both subject to the panel's limitation that workers are asked to provide their own employment status, thus making the responses unreliable. Consequently, studies on stability on employment which is an arising issue over Korean labor market from international economics perspective are not active.

As evidenced above, while some studies looking at the impact of economic liberalization on employment status have recently begun in Germany, there are no similar South Korean studies. Therefore, this paper will explore the effects that economic openness has had on employment in South Korea by examining its impact on different types of employment, which influence varying degrees of employee bargaining power. Specifically, this study will focus on regular and irregular jobs. In addition, this paper will use firm level data instead of industry level data to analyze the effects on employment. Existing literature has looked at tariff rates, trade volume, and import penetration rate with economic openness as the variable. However, as Suh et al. (2008) revealed, South Korea's economic liberalization was much faster than other countries following the Korean financial crisis, and more deregulation occurred through expanded IFDI than through lower tariffs. Therefore, this paper will include IFDI volume and foreign ownership as other indicators of economic openness in addition to imports and intermediate input.

III. EMPIRICAL SPECIFICATION AND DATA

1. Empirical Specification

Existing literature used industry data to examine the impact that economic openness has on employment, but as Levinsohn (1999) pointed out, this overlooks the reallocation of employment that occurs within industries due to trade liberalization. Furthermore, since the number of new hires by a firm is determined during the process of profit maximization, this study will turn to the widely-used Cobb-Douglas production function equation (1) to derive labor demand.

$$Q = Af(L, K) = AL^{\tilde{\alpha}}K^{\tilde{\gamma}} \tag{1}$$

where Q is total production, A is level of technology, L is labor input, and K is capital.

Labor input can be either regular or irregular jobs as determined by the firm. Firms cannot immediately hire the kind of workers they seek without committing to certain costs. Therefore, it stands to reason that firms do not want to lose competent employees whether via transfer or retirement. To prevent turnover, firms are motivated to offer regular, full-time positions with favorable work conditions to their employees. Additionally, firms would also want to hire irregular workers, whose statuses are more flexible, to better respond to fluctuations in the economy (Blanchard and Katz, 1997). All things considered, equation (1) is modified to equation (2).

$$Q = AE^{\alpha}T^{\beta}K^{\gamma} \tag{2}$$

where E and T represent regular and irregular labor input, respectively.

Assuming the product market is imperfectly competitive (Bhalotra, 1998; Kim, Park and Lee, 2005; Suh et al., 2008), the profit maximization condition is also derived to formulate equation (3).[5] The η in equation (3), representing price elasticity of product demand, will increase as the economy opens and the product market theoretically becomes more perfectly competitive. Therefore, η here would represent the degree of an economy's openness.

$$\alpha A(irr)^{\beta}k^{\gamma}\left(\frac{1}{\eta} + 1\right) = \frac{w_E}{P} \tag{3}$$

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[5] A firm's profit function is $\Pi = P(Q)Q - w_E E - w_T T - rK$. The profit maximization conditions are MPE(marginal product of E) $= \left(\frac{1}{\eta} + 1\right)^{-1}\frac{w_E}{P} = \alpha A(irr)^{\beta}k^{\gamma}$ and MPT(marginal product of T)$=$ $(\frac{1}{\eta} + 1)^{-1}\frac{w_T}{P} = \alpha A(irr)^{\beta}k^{\gamma}$.

where η is the price elasticity of product demand, $irr = \frac{T}{E}$, $k = \frac{K}{E}$, w_E is the nominal wage of a regular employee, and P is the product price.

Once equation (3) is log-transformed with irr representing ratio of irregular employee to regular employee, the labor demand function would look like equation (4) with a variable for economic openness. According to equation (4), the expanding economy openness increases the ratio of irregular employee to regular employee.

$$ln(irr) = -\frac{1}{\beta}ln\alpha - \frac{\gamma}{\beta}lnk + \frac{1}{\beta}ln\widetilde{w}_E - \frac{1}{\beta}lnA - \frac{1}{\beta}ln(\frac{1}{\eta} + 1) \qquad (4)$$

where $\widetilde{w}_E = \frac{w_E}{P}$ is the real wage of regular workers.

Equation (4) will be used to analyze the panel data, but if the argument that a firm's labor demand can be influenced by the size of the firm itself (Levinsohn, 1999; Görgand and Görlich, 2012) is taken into consideration, the model can be modified to look like equation (5).

$$ln(irr)_{it} = \delta_0 + \delta_1 lnk_{it} + \delta_2 ln\widetilde{w}_{E_{it}} + \delta_3 lnSize_{it} +$$
$$\delta_4 lnRnD_{jt} + \delta_5 lnIMP_{jt} + \delta_6 lnIFDI_{jt} + \epsilon_{ijt}^1 \qquad (5)$$

where RnD is a proxy variable for A representing investment in research and development, IMP and $IFDI$ are proxy variables for economic openness representing imports and foreign direct investment respectively, $Size$ is the firm's size, and the subscripts i, j, t represent the firm, industry to which the firm i belongs, and the time respectively. And the error term is organized as follows, $\epsilon_{ijt}^1 = \mu_i^1 + \lambda_t^1 + u_{ijt}^1$. μ_i^1 is the firm-specific residual, λ_t^1 is the time-specific residual, and u_{ijt}^1 is a random variable with $u_{ijt}^1 \sim i.i.d.(0, \sigma_{u1}^2)$ that is independent and identically distributed.

The rationale for analyzing the effect of economic openness on employment using a labor demand function lies in the high likelihood that the demand side, as opposed to the supply side, heavily influenced the South Korean labor market after the Korean financial crisis (Kim, 2008; Kim, 2012). Therefore, labor demand is deemed sufficient for analyzing the effect on regular and irregular jobs.

However, when there is no existing data on a firm's regular employees, equation (5) has the problem of lacking a definition for irr (the ratio of irregular hires to regular hires). In addition, equation (4) does not exactly analyze how economy openness will affect each work-type that would be affected by the ratio of irregular employee to regular employee. To solve the issue, this paper proposes an alternative: inferring labor demand separately for regular and irregular workers. Therefore, the profit maximization condition equation (3) derived from production function equation (2) is modified to create equations (6) and (7).[6]

$$\alpha A E^{\alpha-1} T^\beta K^\gamma \left(\frac{1}{\eta} + 1\right) = \alpha Q E^{-1} \left(\frac{1}{\eta} + 1\right) = \frac{w_E}{P} \qquad (6)$$

$$\beta A E^\alpha T^{\beta-1} K^\gamma \left(\frac{1}{\eta} + 1\right) = \beta Q T^{-1} \left(\frac{1}{\eta} + 1\right) = \frac{w_T}{P} \qquad (7)$$

where w_T is the nominal wage of an irregular worker.

Once equations (6) and (7) have been log-transformed to indicate regular and irregular jobs, they are transformed into dynamic panel models taking into account the level of technology and size of the firm and ultimately transformed into equations (8) and (9).

$$lnE_{it} = \phi_0 + \phi_1 lnE_{it-1} + \phi_2 lnQ_{it} + \phi_3 ln\widetilde{w}_{E_{it}} + \phi_4 lnSize_{it} +$$
$$\phi_5 lnRnD_{jt} + \phi_6 lnIMP_{jt} + \phi_7 lnIFDI_{jt} + \epsilon_{ijt}^2 \qquad (8)$$

$$lnT_{it} = \psi_0 + \psi_1 lnT_{it-1} + \psi_2 lnQ_{it} + \psi_3 ln\widetilde{w}_{T_{it}} + \psi_4 lnSize_{it} +$$
$$\psi_5 lnRnD_{jt} + \psi_6 lnIMP_{jt} + \psi_7 lnIFDI_{jt} + \epsilon_{ijt}^3 \qquad (9)$$

where $\widetilde{w}_T = \frac{w_T}{P}$ indicates the real wage of an irregular worker and the error terms are organized as follows, $\epsilon_{ijt}^2 = \mu_i^2 + \lambda_t^2 + u_{ijt}^2$ and $\epsilon_{ijt}^3 = \mu_i^3 + \lambda_t^3 + u_{ijt}^3$ respectively. μ_i^2 and μ_i^3 are the firm-specific residuals in each equation, λ_t^2 and λ_t^3 are the time-specific residuals in each equation, and u_{ijt}^2 and u_{ijt}^3 are the random variables with $u_{ijt}^2 \sim i.i.d.(0, \sigma_{u2}^2)$ and $u_{ijt}^3 \sim i.i.d.(0, \sigma_{u3}^2)$.

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[6] The equation (6) and (7) are derived from MPE and MPT in footnote 5, respectively.

The need for a dynamic model for a labor demand function on regular and irregular jobs has been well documented, Bhalotra (1998), Greenaway, Hine and Wright (1999), Kim, Park and Lee (2005), Suh et al. (2008), Choe, Hong and Seo (2009), and, therefore, a lagged variable for labor demand has been included in the model.

2. Data

Existing research on the impact of economic liberalization on skilled and unskilled employment has drawn from various data sources including data on industries, firms, and workers. Similar South Korean studies usually looked at three sources of data because their data sets differentiate employment by type: Survey Report on Labor Conditions by Employment Type (Kim and Kim, 2011), Korean Labor and Income Panel Study (Lee, Kim and Sim, 2014), and the Census on Basic Characteristics of Establishments (Kim and Park, 2006).[7] However, the Survey Report on Labor Conditions by Employment Type and the Census on Basic Characteristics of Establishments do not reveal the identification codes of individuals and businesses, which makes it impossible to establish a panel based on this data. The Korean Labor and Income Panel Study does include codes identifying individuals, making it pertinent for use in establishing a panel; however, data on individuals cannot be used to infer equation (5) which considers firms.

Consequently, this study will draw its data from the Workplace Panel Survey (WPS)[8] which contains information on over 1,700 South Korean businesses including data on their business environment, human resource management systems, labor-management relations, and collective bargaining processes. This panel survey is conducted by the Korea Labor Institute and has been announced every two years since 2005. Currently, 2005, 2007, 2009, and 2011 data exist. Of the 1,905 businesses surveyed in 2005, 1,229 of them were followed up until 2009, indicating a high rate of continuous sample maintenance.[9]

The WPS, however, only surveys firms with at least 30 permanently employed workers. Because regular workers inherently outnumber irregular ones in such firms, this sample is unfortunately different from South Korea's current labor

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[7] Includes only recent research.
[8] KLI, WPS <http://www.kli.re.kr/wps/ko/main/main.jsp> (accessed May 21, 2014).
[9] Refer to KLI WPS User's Guide <http://www.kli.re.kr/wps/ko/userguide/lst.wps-0400> (accessed July 20, 2013), pp. 3-4.

situation. Nevertheless, the ratio of irregular workers to regular workers in both the WPS and South Korea case, as shown in Table 2, indicates a decreasing trend. Because economy openness is only expected to have similar effect on employment, the WPS data used in the paper was appropriate for analysis.

Table 2. Average Number of Workers by Employment Status (WPS)

(Unit: Person, %)

Year	Irregular (A)	Regular (B)	Ratio $(C = \frac{A}{B} \times 100)$	Ratio of Korea
2005	129.12	403.79	31.98	57.80
2007	110.96	370.90	29.92	56.02
2009	88.51	340.96	25.96	53.65
2011	95.24	343.91	27.69	52.06
All Years	106.45	365.70	29.11	54.73

Note: Ratio of Korea is calculated using number of employees by each work-type of KOSIS.
Source: Authors' calculations based on the WPS and KOSIS. <http://kosis.kr/> (accessed on May 21, 2014).

This study drew the following data from the WPS: total sales (production), number of regular and irregular workers (labor input), ending tangible assets (capital input), wage increase rate of regular and irregular workers,[10] ending capital stock (firm size), foreign ownership (IFDIR), existence of labor union, founding year, and the KSIC (Korean Standard Industrial Classification) 8 and 9 version 2 digit code.

The total imports in manufacturing industry, one of the variables for economy openness, was calculated at industry level from the UNcomtrade which was obtained by 6 digit in HS (Harmonized System) 2002 and concordant with ISIC Rev. 3 (=KSIC8)[11] by 4 digit and calculated with KSIC8 by 2 digit industry. The total imports in service industry was obtained from the Bank of Korea with KSIC8 by 2 digit. The imports of intermediate goods in manufacturing industry was calculated using HS2002 by 6 digit from the UNcomtrade in concordance with HS2002 6 digit - ISIC Rev. 3 (=KSIC8) 4 digit - BEC (Broad Economic Categorie)

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[10] According to the equations (5), (8), and (9), we have to use the real wage of regular and irregular workers. Since there are no real wage data in the WPS, however, we will use wage increase rate as proxy variables.

[11] The ISIC Rev. 3 2 digit code is almost equal to the KSIC8 2 digit code.

3 digit. It was calculated using only BEC's imports of intermediate goods.[12,13] However, we were not able to obtain data from imports of intermediate goods in service industry from the UNcomtrade since data for service industry were not available. Data on IFDI and R&D spending by industry (KSIC9 2 digit) was gleaned from the Survey of R&D published by the Science and Technology Statistics Service and the Ministry of Trade, Industry, and Energy's Foreign Investment Statistics.

These nominal data sets use different measurement units, with total sales, ending tangible assets, ending capital stock, and R&D costs taking the unit of 1 million KRW, intermediate goods imports being marked in dollars, IFDI taking the unit of $1,000, and service industry imports taking the unit of $1 million. Therefore, these figures were converted to KRW, based on the industrial (KSIC9 2 digit) producer price index and yearly average exchange rate.[14]

Basic statistics for variables revealed observations for dependent variables lnE (log-value for regular jobs) and lnT (log-value for irregular jobs) in equations (8) and (9) to be 7,140 and 4,939, respectively, lower than the total observation. This is due to the inclusion of firms that hired no regular or irregular workers whatsoever. For the sake of calculation, a value of 1 was added to the number of regular and irregular workers before log transformation.

More firms hired regular employees than irregular ones, because, as mentioned above, the WPS samples consist of only sizable workplaces. For this reason, the dependent variable $ln(irr)$ (log-value of ratio of irregular to regular jobs) found in equation (5) fell to 4,932, or 69.0% of the total observation of 7,147. This leads to the problem that firms with no irregular workers will be excluded from the sample when inferring equation (5), the primary method of analysis used in this paper. Therefore, the value of 0 will be applied to log-value $ln(irr)$ for firms with no irregular employees. As it stands, $ln(irr)$ has a negative value, as most firms hire more regular workers than irregular ones. Therefore, giving a value of 0 to $ln(irr)$ will elevate the ratio of irregular to regular workers for firms that have not hired any irregular ones. For example, if firm A has no irregular workers and

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thus has an $ln(irr)$ value of 0, while firm B which hired 100 regular and 10 irregular employees ends up with a negative $ln(irr)$ value, then firm A will have a higher value for the ratio of irregular to regular employees. Therefore, the ratio of irregular employees to regular employees will be multiplied by 10,000.[15] Since this change will result in more observations with an $ln(irr)$ of 0, the Tobit model will be employed for additional calculations of equation (5).

Furthermore, the total observations of the wage increase rate of irregular workers were significantly low at 600, and the average years (T-bar) were also short at just 1.31. That is, because the data are not sufficient, the estimation of dynamic panel equation (9) is expected to be difficult. The maximum value for the existence of labor unions is 3; other than existence (=1) and nonexistence (=2), the presence of inactive unions (=3) is also included in the survey. For the purposes of this study, however, inactive unions will be considered de facto nonexistent and only firms with active labor unions will be given a value of 1.

Table 3. Basic Statistics of Variables Used

	Variables Used		Mean	Std. Dev.	Min.	Max.	Observation	
	ln(irr) (ratio of irregular to regular jobs)	overall	-1.66	1.65	-8.81	6.09	N	4,932
		between		1.54	-9.19	4.59	n	2,147
		within		0.81	-6.53	3.27	T-bar	2.30
	lnk (per capita capital for regular jobs)	overall	18.34	2.46	7.53	27.92	N	5,459
		between		2.42	8.82	26.15	n	2,149
		within		0.70	10.67	23.24	T-bar	2.54
Eq.(5)	$\widetilde{w}_E$ (wage increase rate of regular workers)	overall	4.77	3.73	-25.00	50.00	N	6,661
		between		3.04	-8.33	50.00	n	2,588
		within		2.67	-17.23	33.37	T-bar	2.57
	lnSize (ending capital stock)	overall	24.04	2.58	13.79	31.63	N	5,336
		between		2.60	15.18	31.63	n	2,121
		within		0.47	18.28	28.67	T-bar	2.52
	lnRnD (R&D costs)	overall	24.62	5.62	0.00	30.54	N	7,147
		between		5.29	0.00	30.54	n	2,623
		within		3.18	5.52	36.74	T-bar	2.72

[15] Considering that the minimum value of $ln(irr)$ is -8.81, irr would be less than 0.001. Therefore, irr must be multiplied by 10,000 so that $ln(irr)$ can have a minimum value greater than zero.

Table 3. Basic Statistics of Variables Used

	Variables Used		Mean	Std. Dev.	Min.	Max.	Observation	
Eq.(5)	lnIMP (total imports)	overall	29.45	1.83	24.00	31.60	N	5,629
		between		1.81	24.07	31.60	n	2,115
		within		0.25	26.92	31.67	T-bar	2.66
	lnIFDI (IFDI)	overall	25.03	2.71	0.00	29.07	N	7,147
		between		2.45	0.00	29.07	n	2,623
		within		1.32	8.76	35.63	T-bar	2.72
Eq. (8) and (9)	lnE (regular workers)	overall	4.96	1.28	0.00	10.34	N	7,140
		between		1.24	0.96	10.34	n	2,622
		within		0.37	1.40	8.37	T-bar	2.72
	lnT (irregular workers)	overall	3.49	1.79	0.00	9.44	N	4,939
		between		1.71	0.00	9.31	n	2,149
		within		0.76	-1.62	7.86	T-bar	2.30
	lnQ (total sales)	overall	24.88	2.22	15.17	31.78	N	5,739
		between		2.18	17.22	31.78	n	2,232
		within		0.43	19.56	28.63	T-bar	2.57
	$\widetilde{w}_T$ (wage increase rate of irregular workers)	overall	4.82	3.26	0.00	26.00	N	600
		between		3.08	0.00	20.00	n	458
		within		1.49	-5.93	15.57	T-bar	1.31
Others	IFDIR (foreign ownership)	overall	6.01	19.70	0.00	100.00	N	7,147
		between		19.46	0.00	100.00	n	2,623
		within		7.61	-68.99	81.01	T-bar	2.72
	UNION (existence of labor unions)	overall	1.62	0.50	1.00	3.00	N	7,147
		between		0.48	1.00	3.00	n	2,623
		within		0.15	0.29	3.12	T-bar	2.72
	RTIME (age of firm)	overall	22.39	16.69	-1.00	126.00	N	7,147
		between		16.09	-1.00	123.00	n	2,623
		within		2.05	2.89	41.89	T-bar	2.72
	lnSRnD (ratio of R&D to sales)	overall	18.00	10.60	0.00	30.44	N	7,147
		between		9.22	0.00	30.42	n	2,623
		within		5.85	-1.20	37.41	T-bar	2.72
	lnINT (import of intermediate inputs)	overall	29.52	1.54	24.25	31.51	N	2,925
		between		1.56	24.25	31.46	n	1,077
		within		0.21	28.43	31.00	T-bar	2.72

Note 1) N, n and T-bar refer to the total observations, firms, and number of years included in the analysis.
   2) lnINT is calculated only for the manufacturing industry.
   3) Between describes between transformation ($\bar{x}_i = \sum_{t=1}^{T} x_{it}$) and within represents within transformation ($x_{it} - \bar{x}_i$).
Source: Authors' calculations.

IV. EMPIRICAL RESULTS

Inferring equation (5) using the fixed effects model resulted in the per capita capital stock for regular workers yielding a positive value in every model. Models 1, 2, 4, and 6 (only the manufacturing industry) were not significant. But models 3, 5, 7, and 8 (included both the manufacturing and the service industry), in which total imports replaced intermediate goods imports, also exhibited statistically significant values. This is because when the sample was expanded to include the service industry, the increase in per capita capital for regular workers led to irregular employees replacing regular ones. Findings regarding the wage increase rate of regular workers were not statistically significant in any of the models. This showed that, unlike past studies, wages did not affect employment in any significant way. This is due to the merging of the wage increase rate's effects, making it impossible to extract statistically significant results separately for regular and irregular workers. Therefore, the impact of wages on employment will have to be inferred again from equations (8) and (9).

Increases in capital stock have been found to decrease the ratio of irregular jobs to regular jobs. The bigger the firm, the more likely it was to prefer regular employees. R&D investment, R&D investment by size of firm, existence of labor unions, and the years the firm was active for were found to have no effect on the ratio of irregular workers to regular workers.

The core variables in this study-imports of intermediate inputs, total inputs, and IFDI-were found to be statistically irrelevant, showing that economic openness does not affect employment. However, foreign ownership, another economic openness variable, was found to have a statistically significant positive impact on overall employment. Thus, of the variables indicating degree of economic openness, IFDI has an influence on employment, unlike imports. IFDI was found to have a positive effect on irregular jobs, rather than regular ones. These findings may deviate slightly depending on the exact adjustments made to the value of the ratio of irregular jobs to regular jobs, as discussed earlier, which was the rationale behind the Tobit model approach.

Table 4. Fixed Effects Results on Ratio of Irregular to Regular Jobs

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
lnk	0.174 (0.134)	0.169 (0.133)	0.411*** (0.099)	0.173 (0.134)	0.408*** (0.100)	0.168 (0.134)	0.413*** (0.099)	0.411*** (0.099)
$\widetilde{w}_E$	0.007 (0.023)	0.007 (0.023)	0.023 (0.017)	0.007 (0.023)	0.023 (0.017)	0.006 (0.023)	0.023 (0.017)	0.023 (0.017)
lnSize	-0.319** (0.162)	-0.321** (0.162)	-0.399*** (0.116)	-0.298* (0.163)	-0.400*** (0.116)	-0.301* (0.164)	-0.396*** (0.116)	-0.397*** (0.116)
lnRnD	0.154 (0.108)	0.155 (0.108)	-0.006 (0.018)		-0.007 (0.018)			
lnSRnD				0.007 (0.013)		0.006 (0.013)	0.013 (0.009)	0.013 (0.009)
lnINT	0.151 (0.553)	0.169 (0.550)		0.298 (0.554)		0.318 (0.550)		
lnIMP			-0.214 (0.360)		-0.216 (0.360)		-0.126 (0.375)	-0.132 (0.375)
lnIFDI	0.041 (0.037)		0.002 (0.030)	0.045 (0.037)			0.007 (0.030)	
IFDIR		0.014*** (0.005)			0.010** (0.005)	0.014*** (0.005)		0.010** (0.005)
UNION	0.494 (0.501)	0.528 (0.494)	0.519 (0.434)	0.489 (0.499)	0.539 (0.432)	0.522 (0.493)	0.526 (0.434)	0.546 (0.432)
RTIME	0.114 (0.155)	0.120 (0.158)	-0.007 (0.068)	0.107 (0.156)	-0.005 (0.068)	0.114 (0.160)	-0.008 (0.068)	-0.006 (0.069)
Cons.	-2.401 (16.692)	-2.057 (16.592)	13.658 (10.783)	-3.165 (16.721)	13.766 (10.753)	-2.704 (16.631)	10.411 (11.354)	10.731 (11.303)
Obs.	2,437	2,437	4,186	2,437	4,186	2,437	4,186	4,186
Panels	980	980	1,754	980	1,754	980	1,754	1,754
R^2	0.039	0.042	0.035	0.038	0.037	0.041	0.036	0.037
Adj. R^2	0.035	0.038	0.033	0.034	0.034	0.036	0.034	0.035

Note 1) Robust standard errors are in parentheses.
    2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.
    3) Year dummies were included in all models.
    4) Model (1), (2), (4), and (6) contain only the manufacturing industry, but model (3), (4), (7), and (8) include both the manufacturing and the service industry.
Source: Authors' calculations.

Table 5. Tobit Results on Ratio of Irregular to Regular Jobs

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
lnk	0.305*** (0.093)	0.320*** (0.093)	0.241*** (0.057)	0.279*** (0.091)	0.244*** (0.057)	0.295*** (0.091)	0.240*** (0.057)	0.242*** (0.057)
$\widetilde{w}_E$	0.009 (0.028)	0.010 (0.027)	0.016 (0.020)	0.009 (0.028)	0.017 (0.020)	0.010 (0.027)	0.015 (0.020)	0.016 (0.020)
lnSize	0.191** (0.079)	0.158** (0.080)	0.273*** (0.057)	0.203** (0.079)	0.259*** (0.057)	0.169** (0.080)	0.274*** (0.057)	0.262*** (0.057)
lnRnD	0.138 (0.095)	0.128 (0.091)	-0.022 (0.023)		-0.026 (0.023)			
lnSRnD				0.004 (0.015)		0.004 (0.015)	0.006 (0.010)	0.004 (0.010)
lnINT	-0.091 (0.111)	-0.103 (0.111)		-0.004 (0.092)		-0.011 (0.089)		
lnIMP			-0.445*** (0.065)		-0.441*** (0.064)		-0.468*** (0.063)	-0.464*** (0.062)
lnIFDI	0.002 (0.047)		0.047 (0.032)	0.022 (0.045)			0.050 (0.032)	
IFDIR		0.012** (0.005)			0.011*** (0.004)	0.013** (0.005)		0.011** (0.004)
UNION	1.113*** (0.304)	1.039*** (0.305)	0.987*** (0.233)	1.111*** (0.305)	0.932*** (0.231)	1.032*** (0.306)	1.028*** (0.233)	0.970*** (0.231)
RTIME	0.002 (0.010)	0.004 (0.010)	-0.005 (0.008)	-0.000 (0.010)	-0.004 (0.008)	0.002 (0.010)	-0.004 (0.008)	-0.004 (0.008)
Cons.	-8.268*** (2.813)	-7.218** (2.833)	5.396*** (2.070)	-7.427*** (2.770)	6.778*** (2.052)	-6.252** (2.764)	5.244** (2.068)	6.629*** (2.050)
sigma_u	3.087*** (0.139)	3.088*** (0.139)	3.306*** (0.112)	3.086*** (0.139)	3.310*** (0.112)	3.086*** (0.139)	3.313*** (0.112)	3.318*** (0.112)
sigma_e	3.586*** (0.083)	3.579*** (0.082)	3.680*** (0.066)	3.588*** (0.083)	3.676*** (0.066)	3.582*** (0.083)	3.678*** (0.066)	3.674*** (0.066)
Obs.	2,437	2,437	4,186	2,437	4,186	2,437	4,186	4,186
#. Left	770	770	1,305	770	1,305	770	1,305	1,305
Panels	980	980	1,754	980	1,754	980	1,754	1,754

Note 1) Standard errors are in parentheses.
   2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.
   3) Year dummies were included in all models.
   4) Model (1), (2), (4), and (6) contain only the manufacturing industry, but model (3), (4), (7), and
    (8) include both the manufacturing and the service industry.
Source: Authors' calculations.

Results from the Tobit analysis showed that, of the controlled variables, the wage increase rate of regular workers, R&D costs, R&D costs by firm size, and the years the firm was active had no statistically significant impact on the ratio of irregular workers to regular workers, the same conclusion as drawn from the fixed effects model. However, the Tobit analysis differs from the fixed effects model in that per capita capital stock for regular workers, firm size, and the existence of labor union yielded a positive value across all models. That is, per capita capital for regular workers was found to have a significant impact, and the bigger the firm was, the more preference it had for regular workers rather than irregular workers. Also, the presence of an active labor union was found to have a positive effect on irregular jobs. Of the variables indicating economic openness, while imports of intermediate goods and IFDI were found to have no impact on the ratio of irregular to regular jobs, foreign ownership was found to have a direct one. On the other hand, increase in total exports led to a decrease in this ratio. To sum up, the Tobit approach estimated that, relatively speaking, imports have a positive impact on regular jobs while IFDI has a positive impact on irregular ones.

However, equation (5) cannot accurately estimate the overall impact of economic openness on type of employment. To overcome this limitation, equations (8) and (9) were calculated using the difference GMM (generalized method of moments) estimation. For the difference GMM results to have consistency, there should be no autocorrelation in the error term, and the appropriate instrument variables must be selected. These conditions will be verified using the AR and Hansen tests.

Results from equation (8) on whether economic openness has an impact on employment show AR (1) as having a statistically significant negative value on most models, but due to the inability to test AR (2), it was impossible to accurately determine autocorrelation in the error terms. This is because the panel data used in this study spans four years whereas the average year (T-bar) of the variables used in Table 3 was 3 years and below. The null hypothesis on the use of appropriate instrument variables was accepted in all models by the Hansen test, concluding that the variable used to infer equation (8) was indeed appropriate.

Results of the analysis show that almost all variables, including the lagged variable for regular jobs ($L.lnE$), total sales, wage increase rate, R&D costs, R&D costs by size of firm, import of intermediate inputs, total imports, IFDI, foreign ownership, labor unions, and years firm was active do not affect regular jobs.

Table 6. Difference GMM Results on Regular jobs

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
L. lnE	-0.057 (0.140)	-0.021 (0.169)	0.100 (0.175)	-0.022 (0.139)	0.199 (0.194)	0.061 (0.178)	0.111 (0.173)	0.174 (0.181)
lnQ	-0.288 (0.183)	-0.443* (0.254)	-0.021 (0.226)	-0.257 (0.186)	0.083 (0.313)	-0.380 (0.238)	-0.105 (0.205)	-0.304 (0.312)
$\widetilde{w}_E$	0.002 (0.021)	-0.024 (0.031)	0.036 (0.028)	0.010 (0.019)	0.030 (0.026)	-0.011 (0.028)	0.034 (0.027)	0.025 (0.027)
lnSize	0.464** (0.180)	0.589** (0.254)	0.160 (0.131)	0.460** (0.187)	0.220 (0.181)	0.566** (0.267)	0.244* (0.129)	0.096 (0.163)
lnRnD	-0.030 (0.054)	0.016 (0.095)	-0.079 (0.079)		-0.105 (0.131)			
lnSRnD				0.005 (0.008)		0.014 (0.009)	0.008 (0.011)	0.030 (0.036)
lnINT	0.063 (0.446)	0.094 (0.495)		0.216 (0.501)		0.590 (0.544)		
lnIMP			0.145 (0.400)		-0.171 (0.612)		0.190 (0.325)	0.675 (0.742)
lnIFDI	-0.023 (0.058)		0.106 (0.073)	-0.022 (0.061)			0.031 (0.051)	
IFDIR		-0.011 (0.007)			-0.010 (0.006)	-0.013* (0.008)		-0.009 (0.007)
UNION	-0.904 (0.664)	-1.498* (0.820)	-0.227 (0.816)	-0.862 (0.704)	-0.457 (0.745)	-1.425* (0.849)	-0.140 (0.738)	0.207 (0.898)
RTIME	-0.025 (0.033)	-0.033 (0.035)	-0.047 (0.049)	-0.013 (0.026)	-0.070 (0.085)	-0.021 (0.028)	-0.027 (0.046)	0.030 (0.082)
Obs.	767	767	1,278	767	1,278	767	1,278	1,278
Panels	474	474	789	474	789	474	789	789
#. Inst.	27	27	27	27	27	27	27	27
AR(1) z	-1.47	-1.88	-2.96	-1.39	-2.94	-1.94	-2.85	-2.69
AR(1) p	0.141	0.061	0.003	0.164	0.003	0.052	0.004	0.007
Hansen z	21.14	9.06	12.90	21.41	14.57	7.93	16.58	13.72
Hansen p	0.173	0.911	0.680	0.163	0.556	0.951	0.413	0.619

Note 1) Robust standard errors are in parentheses.
    2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.
    3) Year dummies were included in all models.
    4) Model (1), (2), (4), and (6) contain only the manufacturing industry, but model (3), (4), (7), and
       (8) include both the manufacturing and the service industry.
Source: Authors' calculations.

However, firm size yielded a significant positive relation in most models, suggesting that the bigger a firm, the more it will hire regular workers, as Levinsohn (1999) pointed out in his conclusion.

As described above, variables indicating economic openness were not found to be statistically significant. However, intermediate goods imports and total imports exhibited a positive value while a negative value was inferred from IFDI and foreign ownership,[16] showing that imports and IFDI can have contrary effects on regular jobs. An increase in IFDI could equal fewer regular jobs because IFDI can pressure firms to downsize and restructure, causing greater job loss, rather than creating new quality jobs. This finding is inconsistent with Driffield and Taylor's (2000) conclusion that IFDI leads to an increase in the demand for skilled labor. It is, however, in line with the Lipsey and Sjöholm's (2002), finding that IFDI creates more blue-collar jobs but at the expense of white-collar ones, and Jeong and Kim's (2009) conclusion that increased foreign ownership fails to create jobs.

According to the difference GMM analysis of equation (9) on irregular workers, the wage increase rate for irregular workers was lower than the observation, so this variable could not be analyzed and was excluded. Subsequent results showed the AR (1) to have a significant negative value, as with regular jobs. The Hansen test showed that the null hypothesis was accepted in all models.

The lagged variable ($L.lnT$) for irregular jobs, unlike regular ones, yielded a significant positive value in models (3), (5), (7), and (8), which used total imports. This means that while, in just manufacturing, the past employment of irregular employees does not affect current and future hires, it does affect them when the service industry is included in the calculation. Other variables, including total sales, firm size, R&D costs, R&D costs by firm size, intermediate goods imports, IFDI, labor union, and years firm was active did not exhibit significant values, the same result as for regular jobs.

However, the variables for total imports and foreign ownership were found to be statistically significant, and the impacts of imports and IFDI on irregular jobs were revealed to be different from those on regular ones. That is, values for imports of intermediate inputs and total inputs were negative, whereas for IFDI and foreign ownership, they were positive. This finding, that increases in imports corresponds to decreases in irregular jobs, is consistent with the observation by Sachs and Shatz (1994)

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[16] Foreign ownership in Model (6) was found to be significant.

that imports from low-wage countries decreases blue-collar jobs, and the finding by Revenga (1997) and Greenaway, Hine and Wright (1999) that imports further exacerbates competition among the firms and thus leads to decreased employment.

Table 7. Difference GMM Results on Irregular jobs

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
L. lnT	0.104 (0.090)	0.117 (0.088)	0.192*** (0.071)	0.122 (0.088)	0.234*** (0.080)	0.122 (0.087)	0.189*** (0.070)	0.193*** (0.069)
lnQ	-0.945 (0.628)	-0.025 (0.615)	-0.962 (0.643)	-0.194 (0.455)	0.709 (1.081)	-0.030 (0.418)	-0.917* (0.523)	-0.338 (0.582)
lnSize	0.154 (0.541)	-0.386 (0.497)	-0.122 (0.520)	-0.469 (0.680)	0.432 (0.820)	-0.458 (0.621)	-0.022 (0.472)	0.035 (0.474)
lnRnD	-0.026 (0.146)	-0.121 (0.236)	-0.093 (0.183)		-0.512 (0.393)			
lnSRnD				-0.002 (0.024)		-0.006 (0.024)	-0.017 (0.025)	-0.038 (0.038)
lnINT	-0.218 (0.917)	-0.254 (0.827)		-0.049 (0.783)		-0.455 (0.838)		
lnIMP			-1.064 (0.833)		-2.839* (1.590)		-0.765 (0.614)	-1.268* (0.734)
lnIFDI	0.051 (0.056)		-0.000 (0.061)	0.015 (0.051)			0.022 (0.059)	
IFDIR		0.011* (0.006)			0.015* (0.008)	0.011* (0.006)		0.016** (0.007)
UNION	1.002 (1.405)	1.511 (1.222)	2.409 (1.601)	1.442 (1.488)	2.898* (1.574)	1.223 (1.246)	2.010 (1.485)	1.977 (1.403)
RTIME	0.101 (0.093)	0.058 (0.108)	0.138 (0.148)	0.059 (0.122)	-0.070 (0.179)	0.057 (0.117)	0.139 (0.124)	0.078 (0.086)
Obs.	834	834	1,429	834	1,429	834	1,429	1,429
Panels	510	510	877	510	877	510	877	877
#. Inst.	30	30	30	30	30	30	30	30
AR(1) z	-4.04	-4.16	-6.05	-3.92	-4.61	-4.21	-6.25	-6.59
AR(1) p	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen z	250.7	26.65	15.59	25.76	17.28	23.49	15.98	21.58
Hansen p	0.199	0.145	0.741	0.174	0.635	0.265	0.718	0.364

Note 1) Robust standard errors are in parentheses.
     2) ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.
     3) Year dummies were included in all models.
     4) Model (1), (2), (4), and (6) contain only the manufacturing industry, but model (3), (4), (7), and (8) include both the manufacturing and the service industry.
Source: Authors' calculations.

V. CONCLUSION

After the Korean financial crisis, South Korea's economy became more open to outside inputs. This study examined the effects of this economic openness, as measured by imports and IFDI, on the volatile South Korean labor market, and specifically on employment by status. Data from the WPS (Workplace Panel Survey) were used to analyze the impact of intermediate goods imports, total imports, IFDI, and foreign ownership on regular jobs, irregular jobs, and the ratio of irregular workers to full-time workers.

Intermediate goods imports and IFDI were found to have no impact on regular and irregular jobs, but the total imports and foreign ownership were statistically significant. The total imports and imports of intermediate goods,[17] IFDI and foreign ownership[18] have similar signs in most of the models. In other words, increases in imports (of intermediate goods and total imports) corresponded to a decrease in irregular workers without affecting regular workers, and, therefore, a decrease in the ratio of irregular workers to regular workers. This phenomenon can be explained by imports having a negative impact on irregular workers, who have much less bargaining power, because more imports lead to intensified competition that motivates firms to cut back on their number of employees. These results approximate Sachs and Shatz's (1994) determination that imports from low-wage countries depress blue-collar jobs, as well as Revenga (1997) and Greenaway, Hine and Wright's (1999) observation that imports exacerbate competition and result in job loss.

However, increases in IFDI (IFDI and foreign ownership) lead to fewer regular jobs and more irregular ones, thereby increasing the ratio of irregular jobs to regular jobs. This change is due to the restructuring that takes place after the introduction of M&A investment (IFDI), replacing former wage workers with irregular temporary ones. This paper's findings on the effects of foreign ownership on employment are identical to Lipsey and Sjöholm's (2002) analysis that IFDI creates more blue-collar jobs while cutting white-collar ones, as well as Jeong and Kim's (2009) conclusion that increases in foreign ownership fail to

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[17] The level of significance is different except fixed effects but imports of intermediate goods and total imports have same signs, described by comprehensive results.

[18] The level of significance is different statistically, but except for the difference of GMM, IFDI and foreign ownership have same signs, described by a comprehensive analysis.

increase jobs.

   Finally, the above findings show that increases in imports (of intermediate goods and total imports) lead to a reduction in employment, particularly irregular jobs, whereas increases in inward foreign direct investment (IFDI and foreign ownership) replace wage workers with temporary workers, thereby worsening employment security. In conclusion, economic openness has had an overall negative impact on the South Korean labor market.

Table 8. Summary of Effects of Economic Openness on Employment by Status

Dep. Variable	Ratio of Irregular to Regular		Regular	Irregular
Method of Analysis	Fixed Effects	Tobit	Diff.GMM	Diff.GMM
Import of Intermediate Goods	⊕⊕⊕	⊖⊖⊖	⊕⊕⊕	⊖⊖⊖
Total Imports	⊖⊖⊖	⊖⊖⊖***	⊕⊕	⊖⊖⊖**
IFDI	⊕⊕⊕	⊕⊕⊕	⊕/⊖	⊕⊕
Foreign Ownership	⊕⊕⊕***	⊕⊕⊕***	⊖⊖⊖*	⊕⊕⊕***

Note 1) The number of symbols represents consistency of coefficient values of each model. ⊕⊕⊕ indicates a positive value in all models, ⊕⊕ in most models, and ⊕/⊖ indicates an equal number of models with the symbol.
    2) The number of asterisks refers to the level of significance in each model. *** indicates a significance value within 10% in all models, with ** indicating the same for most models, and * indicating the same for some models.

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