

Effort Years and Underperformance: The Intersection of Employment, Social Protection, and Gender in South Korea

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Abstract

This paper offers an unorthodox method to determine economic underperformance in relation to a state's desired social policy goals. The method measures what is referred to within as effort years in macroeconomic terms (EYm), and attempts to determine whether further studies on socio-structural factors that may be limiting labor force participation are warranted. It does this by comparing labor force participation across all available age groups between a state and corresponding benchmark state and then accounting for the efficiency of productivity. The results are expected to help policymakers generate a reasonable conclusion as to the increase in labor through higher employment rates and increased productivity, which are necessary to meet desired goals. In the case of South Korea, results show a considerable shortfall in effort years of productivity that could potentially contribute to economic growth and greater social protection outlays. Notably, more than 99% of South Korea's shortfall can be attributed to the state's gender gap in employment.

Key words

employment, gender, labor, social welfare, South Korea

Introduction

The Republic of Korea (hereafter South Korea or Korea) prides itself on being a top 15 economy by measurements of gross domestic product (GDP). As a status-seeking state (O'Malley, 2014) and member of the Organisation of Economic Co-operation and Development (OECD), it strives to be recognized in the upper tier of developed states and not simply one of 34 OECD member economies. However, Korea ranks fairly low on a number of important metrics measured by the OECD, making it difficult for the country to reach even the average measure in certain metrics,

let alone be above average. A recent editorial (Choi, 2016) lamented Korea's position in a number of OECD categories: second in low wage employment, fourth in irregular employment, and first in elderly poverty. The metrics show a mix of employment and social welfare issues that many find concerning.

Facing an economic dilemma, the administration of Park Geun Hye responded with a number of policy measures designed to spur consumption and employment. However, in terms of employment, the national debate has coalesced around the idea that youth unemployment among recent university graduates is too high. This has led to a push for greater employment opportunities for young people at the expense of older workers. One priority for the administration was implementing a peak wage system for older workers to curtail personnel expenses and spur the hiring of younger workers.

In general, the administration crafted three economic priorities that were either prominent election themes or prominent policy directions, namely higher youth employment, greater private consumption, and increased government social spending. These are not necessarily complementary, and like many developed states, Korea still faces a sluggish economy in the wake of the 2008 financial crisis. However, considering Korea's policy directions, the financial crisis may be a scapegoat for what some consider an underperforming economy under the best of circumstances. In fact, acknowledging that demand-side policies to boost consumption had little effect on increasing employment and productivity, the Park government shifted to supply-side policies of economic restructuring to boost production and create a demand for labor (Kim, 2016).

In this paper, Korea is defined as an underperforming economy, as it falls below the OECD average of social protection spending. This below average performance is considered an undesirable outcome considering Korea's goals as a developed state interested in increasing social protection outlays. Defined in this manner, the designation targets the current inability of a state, Korea in this study, to meet a certain goal desired by the state. It is not meant to be universal or absolute compared to other states that may not have the same goal. Therefore, underperformance becomes a matter of public administration and policy preference for the state being considered, and less so, a measure of macroeconomic indicators. Nevertheless, an analysis of macroeconomic indicators is needed to gauge the foundation

upon which public policy can be built. Therefore, a comparative analysis of indicators to a state (or group of states) deemed to have achieved the goal could help ascertain the baseline from which progress must be made. The purpose of this paper is to attempt just that—to gauge the employment foundation of Korea upon which greater social protection outlays desired by the state can be met by the state.

Currently, Korea spends the least on social protection of all OECD countries (OECD, 2015b). Ideally, an increase in social protection outlays would be offset by increased government revenue through greater efficiency of revenue collection or new type of taxation. Although the amount of tax collected has increased by nearly 30% since 2010 (Bank of Korea, 2017), South Koreans still pay the lowest tax on personal income of the OECD countries, except for those living in the Slovak Republic (OECD, 2015c). Should tax rates increase, this would be offset by lower personal consumption and lower rates of newly hired workers. Therefore, Korea needs to increase social spending without raising taxes, and ideally, without simply printing or borrowing more money.

This paper hypothesizes that Korea's underperforming economy is one symptom of a much deeper problem. Overall, Koreans work fewer effort years (EY)¹ than the best performing OECD states, limiting the amount of government revenue that could potentially be spent on social protection. This hypothesis is based on the belief that Korea has a number of unique socio-structural factors that affect employment and therefore constrain macroeconomic output. These factors include a preference among companies for forced retirement at the age of 55 years, mandatory military service for males aged between 19 and 26 years, an exceptionally high rate of university enrollment among young people, a gap in the employment rate of male and female workers, and labor productivity ranked 29 of 34 OECD countries (OECD, 2015a, p. 23). The hypothesis will be tested by considering the employment lifespan and productivity of Korea's workers compared to the average respective values of their OECD counterparts and sub-

¹ *Effort years* are a measurement generally used in microeconomics to indicate the number of workers necessary over a period in years to implement a project. Here, it is used in a different context, namely macroeconomics. EY here indicates the total shortfall or surplus of laborers based on labor participation rates over the period of a state's cumulative labor force lifespan compared to labor participation at the rates of a comparative benchmark state or group of states over that same span.

sequently calculating effort years in macroeconomic terms (EYm) for Korea. Here, EYm is developed as an indication of the number of workers necessary for the total hours worked by a country's labor force to meet a specified goal.

The method offered in this paper is unorthodox and structured for parsimony. It is meant as a starting point for policymakers and theorists to rethink their beliefs about employment and labor. Generally, within the paradigm of productivity, labor is viewed from two fundamental perspectives, namely the number of employed laborers (often denoted as the labor participation rate) and the productivity of labor. However, in the post-2008 financial crisis economy, this paradigm may shift, as many economists note that GDP slowed considerably and a full recovery has yet to occur. This thinking is aligned to the secular stagnation hypothesis, which reemerged in 2013 (Teulings & Baldwin, 2014). The International Labor Organization (ILO) and World Bank concluded that "policy responses [to the 2008 financial crisis] led to a recovery in GDP growth, but not a significant increase in jobs" (ILO & World Bank, 2012, p. 2). Furthermore, Dabla-Norris et al. (2015, p. 6) note "advanced economies have experienced a secular decline in growth and average labor productivity over the last four decades." They conclude that labor supply issues "did not significantly slow the long-run growth trend" (2015, p. 7), and argue that the "prospects for boosting medium-term growth in advanced economies via increasing factor accumulation alone are likely limited" (2015, p. 5). In addition, Brynjolfsson and McAfee (2011) argue that increases in technological innovation and their increased contribution to production are major culprits behind the stagnation of employment opportunities. This is echoed by Frey and Osborne (2013) and the McKinsey Global Institute (2017). The upshot from the McKinsey study is that future employment skills will need to be highly flexible and laborers will cobble together hours from jobs and tasks currently relegated to one occupational category, meaning the displacement of labor with an accompanied reduction in available jobs. If this task-based, flexible employment environment arises, then the hours worked and tasks performed may matter more than the static accounting for the number of categorized occupations and jobs within a society. If predictions regarding occupational and task redundancy through technological innovation are even partially correct, and secular stagnation continues, then a focus on hours worked may become paramount in the future analysis of

employment.

Recognition of this changing environment for labor and productivity in the post-2008 era is the impetus for the construction of this unorthodox method for viewing employment and labor as a means of reaching societal goals. Moving forward, the subsequent section demonstrates Korea as an underperforming economy in the OECD context and then defines the socio-structural factors that constrain EY for Korea. We then calculate EY comparatively for Korea in national and OECD terms. Subsequently, the data calculated in terms of EYm is analyzed to determine the accuracy of the hypothesis. Finally, concluding remarks are made on whether EYm will be a useful measurement in the future.

Structural Considerations

Structurally, Korea faces a number of unique socio-structural problems. First, Korea is an aging society with increasing levels of life expectancy. However, an almost singular economic focus on development from 1961 to 1991 means that little government revenue was put into social welfare programs, leaving few benefits for the retired elderly. Hence, as mentioned earlier, Korea ranks first in the OECD in terms of elderly poverty. The residual effect is a slow rolling out of welfare programs. Korea currently ranks last among OECD nations in social spending at a paltry 10.6% of GDP. The OECD average for social spending was 21.6% in 2014 (OECD, 2015b). In addition, Korea's tax revenue as a percentage of GDP in 2014 was the third worst in the OECD, at 24.6%, and seventh worst in per capita terms—USD 6,882 compared to the OECD average of USD 15,950 (OECD, 2016h). For Korea to reach the average OECD outlay for social spending, the country must add 11% of GDP to its current level of social spending. OECD data from 2013 (the most recent for Korea) shows general government spending—central, state, and local governments and the social security funds controlled by these units—in Korea to be the lowest in the OECD at 31.8% of GDP (OECD, 2016d). This being the case, Korea must increase its general government spending by an additional 34.6% compared to current spending, a difficult prospect.

Another area of general concern, and one area the government has yet to address adequately, is the high rates of self-employment, unpaid family employment, and irregular employment in the country (see Table 1). The

Bank of Korea categorizes self-employed and unpaid family workers together under the heading *unpaid workers*. This category comprises 25.86% of the economically active population. Statistics from 2014 show that Korea had a self-employment rate of 26.79% compared to the OECD average of 17.14% (OECD, 2016g). Still, it is hoped that self-employed individuals will make some money. More disturbing from a consumption standpoint is that 4.41% of the economically active population comprises unpaid family workers and an additional 6% of daily workers. These two groups can do little to boost consumption. In total, 51.47% of the economically active population is irregular workers, causing heightened job insecurity and constraining consumption. The plight of irregular workers is extensively covered in the press (see Denney, 2015; Jeon, 2014; Korea Herald, 2016), including their lack of enrollment in current social welfare programs like the national health plan or the national pension plan (Joongang Daily, 2017). A simple shift of irregular workers to the ranks of regular workers may fuel consumption, increase government revenue, and increase social welfare spending. However, further investigation enables one to discern other possible structural conditions affecting employment.

Table 1.
Economically Active Population by Status, in 1,000s of Persons and %, 2015

	1000s of persons	%
Employed	25,936	100
Regular Employees	12,588	48.53
Self-Employed	5,563	21.45
Temporary Employees	5,086	19.61
Unpaid Family Workers	1,144	4.41
Daily Workers	1,556	6

Note. Adapted from Bank of Korea, 2016.

As mentioned earlier, this paper hypothesizes that the age of retirement, mandatory military service, university enrollment rates, a gender gap in employment, and a labor productivity gap compared to other states affect EY of employment and ultimately EYm. The effective age of retirement is significant for this paper's hypothesis, which states that Koreans work fewer effort years in total than their OECD counterparts.

Table 2.
Average Effective Age of Retirement Versus Normal Retirement Age, 2014

Korea	Effective	72.9 (M)	70.6 (F)
	Normal	61.0 (M)	61.0 (F)
OECD	Effective	64.6 (M)	63.2 (F)
	Normal	64.0 (M)	63.1 (F)

Note. (M) denotes Males; (F) denotes Females. Adapted from OECD, 2016a.

Table 2 shows that Korean men and women effectively work an average of 8.3 and 7.4 years longer respectively than does the average OECD worker. This seems offset by lower labor force participation rates among younger Korean workers (see Table 3), which is consistent with the hypothesis. Specifically, Korean males must do compulsory military service (or community service) between the ages of 19 and 29 years (with deferrals). The terms of service currently range from 21 to 24 months, with most males choosing to do their service between the ages of 20 and 24 (Chae & Son, 2017). In addition, Korean education enrollment rates are substantially higher for men and slightly lower for women compared to their OECD counterparts (see Table 4). Last, there does appear to be a significant gap between Korean men and women in the labor force during the prime working years of 25–54. This allows the OECD average for labor force participation in these years to outpace the Korean rate. Therefore, it appears that higher education enrollment rates, military service for men, and a gap in the employment rate between men and women could account for the gap in labor participation rates and thus, total years worked over a lifetime between Korea and the OECD average. Although consistent with the hypothesis, direct causation and/or statistical correlation are not elaborated here. The point is to deduce whether these hypothesized socio-structural factors correlate to a shortfall or surplus in EY allowing for the determination of a starting point relative to a benchmark from which public policy progress can be made. Nonetheless, the analysis performed shortly allows for general claims regarding the effect of certain structural factors.

Table 3.
Labor Force Participation Rates, % by Age and Gender, 2014

		15-64	15-24	25-29	25-54	55-59	60-64	65-69	70-74
	Men	78.56	24.59	77.23	91.31	87.39	74.2	59.63	41.66
Korea	Women	57.01	32.51	73.37	64.78	57.82	46.31	33.55	27.1
	Total	67.83	28.65	75.37	78.25	72.56	59.83	45.5	33.57
	Men	79.68	51.1	88.38	91.23	80.06	58.68	31.72	19.36
OECD	Women	62.81	43.13	71.47	71.96	61.8	40.22	19.05	10.44
	Total	71.17	47.17	79.91	81.51	70.72	49.12	25.03	14.55

Source. OECD, 2016f.

Table 4.
Enrollment Rate, % in Same Age Group, 2013

		15-19	20-29
	Men	86	38.4
Korea	Women	88.3	23.6
	Men	82.69	26.57
OECD	Women	84.54	30.12

Source. OECD, 2016b.

Method

The method developed here is descriptive. It does not show causality and does not prove or analyze statistical correlations. The method attempts to determine whether socio-structural factors that may be limiting labor force participation warrant further study. To make this determination, it measures labor participation of varying age groups against two variables: 1) the percentage of active employment participation within the state under study, and 2) the percentage of active employment participation of the state (or states) used as the benchmark. A comparison of these results determines what is labeled here as EY in an aggregate, macroeconomic sense. EY tells us whether there is a shortfall or surplus of active labor in the state under study compared to the benchmark. If there is a shortfall, further study of socio-structural factors may be warranted to determine how best to increase the rate of active employment participation. However, if results of the EY calculations show no shortfall, or perhaps a surplus of

active labor, then it can be deduced that efficiency of productivity or other factors outside of labor force participation (such as politics) constrain the ability of the state to reach its desired goal.

As the method is comparative, there are two fundamental requirements of the benchmark state or states: 1) the state must be at a roughly equivalent level of economic development, and 2) the state must already have attained the goal desired by the state under study. The first requirement is necessary, because a comparison of EY between vastly different states would be pointless. For example, in our current study of social protection spending by Korea, a comparison of working years between labor in Afghanistan and Korea would yield results, but no matter the outcome, it is doubtful Afghanistan could generate comparable social protection spending to Korea. The second requirement is necessary, because setting a benchmark that has not achieved the desired goal is counterintuitive—how can one measure against a standard that is incomplete? For our study, the benchmark is the OECD, or specifically, the active employment participation rate that has helped generate the current level of social protection spending by OECD states. The selection of the OECD was not only because OECD metrics are important to Koreans, but also because the level of development and labor productivity are comparable.

Translations models have been used for years to measure the impact of various components on economic output. Barro confirmed that fertility rates, population growth, mortality, population density, and population size had an effect on output. Translations models added education, health, democratic institutions, terms of trade, rule of law, and more to determine their effect on per capita output growth (Kelley & Schmidt, 2007). However, the developed states of the OECD have already achieved comparable levels of progress in these indicators. Therefore, one supposition is that the impacts of such indicators on productivity are negligible comparatively. This supposition is borne from the conclusions in the ILO & World Bank report (2012) mentioned earlier. Furthermore, even if Korea did make fractional gains in these indicator areas, such gains could take decades to compound, meaning Korea would not achieve the OECD average in the short or medium term. Hence, with all variables held constant (education, terms of trade, democratic institutionalism, etc.), how can Korea catch up? What is the baseline from which a developed state (in our case Korea) can improve upon the socio-structural constraints that may be limiting labor pro-

ductivity? A logical baseline may be EYm calculated to discover the possible demographic (labor) impacts necessary to spur greater economic growth. This is manageable when efficiency of production is considered.

To calculate EYm for a particular state, the following variables are needed: working age population (WAP), percentage of active employment participation (PAP), average annual hours worked (H) per worker in the labor force, and efficiency of production (E_p) by the labor force. These must be calculated in comparative terms against a state (or group of states) that have already attained the goal for which EYm is being calculated. The following two calculations are required:

$$EY = [(WAP_a \times PAP_1) - (WAP_a \times PAP_2)] + [(WAP_b \times PAP_1) - (WAP_b \times PAP_2)] + \dots$$

Where EY is effort years (number of workers necessary), WAPa is working age population of the first age category, WAPb is working age population of the second age category, PAP1 is the percentage of active employment participation for the first country, and PAP2 is the percentage of active employment participation of the second country.

$$EYm = \frac{[(EY \times H) / E_p]}{H}$$

Where EYm is effort years in macroeconomic terms for a country, EY is effort years (number of workers necessary), E_p is efficiency of productivity, and H is the average annual hours worked by employees.

The first equation for EY registers the gap in labor when comparing the working age population in each age category using the active employment participation rate of the state under study and the benchmark. If EY is negative, it indicates a shortfall in labor attributable to the socio-structural factors that encouraged investigation, meaning the correlation and causation of factors on this shortfall warrants further study. Closing the gap on EY does not in itself correct the overall shortfall in production, although it may come close. Closing the overall shortfall in production will likely require a combination of closing the EY gap while adding additional labor or increasing efficiency of productivity. Here, the second equation for EYm becomes necessary. This equation determines the total number of laborers immediately necessary, based on current levels of efficiency of productivity,

to eliminate the overall shortfall in production. If adding more laborers at the current level of efficiency of productivity is difficult, the efficiency of productivity indicator could be altered to help policymakers determine future projections of EYm. In theory, EYm should be a negative number. The closer EYm is to “0” (zero), the more efficient the utilization of labor, which should not be confused with efficiency of productivity. Closer to zero occurs when the EY shortfall is non-existent or minimal. This means that active employment participation is on par with the benchmark. A positive result indicates that the state under study has misallocated labor in terms of achieving their goal and must correct this inefficient utilization of resources.

Application and Analysis

Applying the formulas to the case of Korea is straightforward. Fairly reliable data exists for all four variables, namely working age population (WAP), percentage of active employment participation (PAP), average annual hours worked (H) per worker in the labor force, and efficiency of production (Ep) by the labor force. Table 5 shows Korea’s working age population. The data is from a forecast by Korea’s Ministry of Employment and Labor (MOEL) for medium and long-term employment, broken down into various age groups. Although the data is from 2013, Korea’s population numbers have not altered significantly enough to impede close approximation.

Table 5.
Working Age Population for Korea in 2013 by Age and Gender in 1,000s of Persons

	15-64	15-19	15-24	25-29	25-54	55-59	60-64	over 65
Men	18,030	1,677	3,034	1,720	12,101	1,717	1,178	2,553
Korea Women	17,922	1,585	3,185	1,608	11,751	1,732	1,253	3,591
Total	35,952	3,262	6,219	3,328	23,853	3,448	2,430	6,145

Adapted from Lee, Gong, & Kim, 2015.

Table 6 shows the variable percentage of active employment participation for Korea and the OECD. Table 6 is a copy of Table 3 in section II. The variable is for both age and gender in 2014, while the OECD numbers are an average of the group’s states.

Table 6.
Labor Force Participation Rates, % by Age and Gender, 2014

		15-64	15-24	25-29	25-54	55-59	60-64	65-69	70-74
Korea	Men	78.56	24.59	77.23	91.31	87.39	74.2	59.63	41.66
	Women	57.01	32.51	73.37	64.78	57.82	46.31	33.55	27.1
	Total	67.83	28.65	75.37	78.25	72.56	59.83	45.5	33.57
OECD	Men	79.68	51.1	88.38	91.23	80.06	58.68	31.72	19.36
	Women	62.81	43.13	71.47	71.96	61.8	40.22	19.05	10.44
	Total	71.17	47.17	79.91	81.51	70.72	49.12	25.03	14.55

Source. OECD, 2016f.

For the variable of average annual hours actually worked per worker in a state, the OECD recommends using their data for trending purposes only, and not using only data for one year for comparative purposes. For that reason, the data here for Korea and the OECD as a group is an average of annual hours actually worked for the five-year span of 2010–2014. The average for Korea is 2,124 hours actually worked while the OECD averages 1,772 hours per worker (OECD, 2016e).

The OECD's "level of GDP per capita and productivity" indicator represents the final variable—efficiency of productivity. The indicator is a comparative assessment of GDP per hour worked in US dollars at constant prices, namely the 2010 PPPs. In 2014, the OECD average was listed as 45.9, while Korea was listed as 31.2 (OECD, 2016c). This means that Koreans are working at 62.77% efficiency compared to their OECD counterparts.

To create a baseline, one first needs a comparison of effort years across the life span of employment between Korea and the OECD. To do this, one must multiply the working age population of Korea by the percentage of those active in employment in Korea for different age groups. Then one must multiply the working age population of Korea by the percentage of persons active in employment in the OECD. Tables 7 and 8 provide the results of these calculations. After this, the calculation of the EY formula from above can be applied, and the number will show either a surplus or shortfall of labor comparatively (see Table 9).

Table 7.

Estimated Labor Force from Working Age Population of Korea for Korea Percentages of Participation

			15-64	15-24	25-29	25-54	55-59	60-64	65+
Korea	Men	%	78.56	24.59	77.23	91.31	87.39	74.2	50.65
	Women	%	57.01	32.51	73.37	64.78	57.82	46.31	30.33
	Total	%	67.83	28.65	75.37	78.25	72.56	59.83	39.54
Korea (at Korea % working)	Men	1,000 persons	14,164	746	1,328	11,049	1,500	874	1,293
	Women	1,000 persons	10,212	1,035	1,180	7,612	1,001	580	1,089
	Total	1,000 persons	24,385	1,781	2,508	18,665	2,501	1,454	2,430

Note. OECD data uses 65+ as an age category. This percentage for Korea is the average of the 65-69 and 70-74 age ranges adapted from Lee, Gong, & Kim, 2015.

Table 8.

Estimated Labor Force from Working Age Population of Korea for OECD Percentages of Participation

			15-64	15-24	25-29	25-54	55-59	60-64	65+
OECD	Men	%	79.68	51.1	88.38	91.23	80.06	58.68	31.72
	Women	%	62.81	43.13	71.47	71.96	61.8	40.22	19.05
	Total	%	71.17	47.17	79.91	81.51	70.72	49.12	25.03
Korea (at OECD % working)	Men	1,000 persons	14,366	1,550	1,520	11,040	1,375	691	810
	Women	1,000 persons	11,256	1,374	1,149	8,456	1,070	504	684
	Total	1,000 persons	25,586	2,934	2,659	19,443	2,438	1,194	1,538

Table 9 presents interesting data regarding possible socio-structural factors impacting the Korean workforce. The first important item is Korea's total shortfall of labor in EY, as represented by the figure -775. This indicates a shortfall of 775,000 jobs compared to OECD labor participation over the aggregate lifespan of labor. The second important item is the difference in gender that constitutes that shortfall of labor. The participation of Korean women laborers constitutes 99.48% of the shortfall of EY, a shortfall of 771,000 jobs compared to the shortfall in male labor of 4,000 jobs. In response to these results, one can make a number of quick deductions.

Table 9.

Results of the Calculation of EY, Korea Compared to the OECD Average by age category (Men, Women, and Total in 1,000s of Persons)

		15-64	15-24	25-29	25-54	55-59	60-64	65+	Total
Men	Korea LF actual	14,164	746	1,328	11,049	1,500	874	1,293	
	Korea LF at OECD %	14,366	1,550	1,520	11,040	1,375	691	810	
	Difference between Korea LF actual and Korea LF at OECD LF %	-202	-804	-192	9	125	183	483	-4
Women	Korea LF actual	10,212	1,035	1,180	7,612	1,001	580	1,089	
	Korea LF at OECD %	11,256	1,374	1,149	8,456	1,070	504	684	
	Difference between Korea LF actual and Korea LF at OECD LF %	-1,044	-339	31	-844	-69	76	405	-771
Total	Korea LF actual	24,385	1,781	2,508	18,661	2,501	1,454	2,382	
	Korea LF at OECD %	25,586	2,924	2,659	19,496	2,445	1,195	1,494	
	Difference between Korea LF actual and Korea LF at OECD LF %	-1,201	-1,143	-151	-835	56	259	888	-775

Note. LF denotes Labor Force. The OECD considers prime working years to be 15-64. Korea's MOEL considers youth employment to be ages 15-29. Discreet age categories 15-64 and 25-29 overlap other age categories and are shown here separately for reference only.

First, mandatory military service for males is a fairly benign characteristic in its effect on EY. The same can be said of high university enrollment rates for men. Longer working years and labor participation later in life seemingly offset any shortage of labor participation from these two factors. Second, high university enrollment rates for women may have some effect on labor participation and EY, with Korean women showing a large shortfall in labor compared to their OECD counterparts from the ages of 15-24 years. However, Korean women begin to make up this shortfall between the ages of 25-29 years. Third, the preference for mandatory retirement at the age of 55 years has seemingly little effect on the overall shortfall of EY. In fact, Korean males have a surplus in participation rates that grows steadily from the age of 55, and women begin to overcome their shortfall in participation rates at the age of 60. Last, it appears that labor force participation rates by gender are a significant socio-structural factor impacting EY in Korea. Where male workforce participants make up their shortfall in labor in later years, Korean female workers never seem to catch up, even by working longer years than their OECD counterparts, as evidenced in Table 2.

The results of this EY analysis warrants further investigation of the em-

ployment gender gap in Korea and how it can be altered to effect EY. The disparity in shortfall of EY labor based on gender should be a priority for policymakers. The shortfall of EY labor by males in the age group 15–24 years may warrant further study to analyze properly causation or correlation, but as males generally overcome this shortfall over the span of EY, this seems a secondary concern. However, even if correcting the overall shortfall in EY, we know that closing the gap does not relieve the total shortfall of EYm, as we must account for the efficiency of productivity.

When we apply the formula for EYm from above, we calculate how many jobs Korea must add immediately to the workforce at current Korean worker efficiency of productivity levels to have a baseline comparison of overall production possibility. We know the EY is a shortfall of 775,000, and we know Koreans work an average of 2,124 hours/year. This yields a shortfall of 1,649,975,000 hours. If we divide this by Korea's efficiency of productivity—62.77%—we ascertain that Korea must work 2,628,604,429 hours to match OECD levels. As hours worked (H) in the EYm formula cancel out, one can divide EY by E_p to determine the number of jobs equivalent that must be added to the labor force to meet OECD levels. This equates to 1,234,666 new jobs immediately at Korean efficiency levels. Of course, Korea must keep these jobs, while adding new jobs each year to maintain OECD levels and reach its desired social protection spending levels (all other factors held constant). The calculation of EYm in hours is interesting if one believes the prognoses of Brynjolffson and McAfee (2011), Frey and Osborne (2013), and the McKinsey Global Institute (2017) to be probable. If technology eliminates redundant occupations and tasks, and forces workers to cobble together hours from varying tasks and jobs, the shortfall in hours may be more interesting to policymakers than the number of full-time worker equivalents needed to clear the total shortfall in EYm.

Conclusions and Policy Prescriptions

This paper hypothesizes that Korea's underperforming economy, as described in terms of OECD social protection spending, is one symptom of a much deeper problem. Koreans work fewer effort years overall in macroeconomic terms (EYm) than the OECD average, limiting the amount of government revenue that could potentially be spent on social protection

spending. This hypothesis is based on the belief that Korea has a number of unique socio-structural factors that affect employment and therefore constrain macroeconomic output. These factors include a preference among companies for forced retirement at the age of 55, mandatory military service for males aged between 19 and 26, an exceptionally high rate of university enrollment among young people, a gap in the employment rate of male and female workers, and the efficiency of labor productivity.

To test the hypothesis, two formulas were created. The first measures the aggregate active employment participation of a workforce compared to a benchmark state/s. This calculation produces effort years (EY) of aggregate employment to determine a surplus or shortfall of productive labor in a state. The second formula measures the additional number of workers necessary to overcome the total shortfall of labor (EYm) when efficiency of productivity is included. EYm creates a baseline of necessary additional labor—all other factors held constant—to reach the desired goal of a state.

The paper measured EY and EYm for South Korea by comparing Korea to the same metrics averaged for the OECD states. As Korea consistently measures itself against other OECD metrics, this seemed appropriate. The calculation of EY reveals interesting results. First, Korea has an overall EY shortfall of 775,000 jobs. Second, Korean males constitute only 0.52% of the EY shortfall. High university enrollment rates, mandatory military service, and forced retirement at the age of 55 years have a negligible impact on male labor EY, as males tend to make up the shortfall with longer working years compared to their OECD counterparts. Third, female labor EY accounts for 99.48% of the total EY shortfall, with Korean females lagging in active employment participation rates compared to their OECD counterparts until the age of 60 (except for a small surplus in the 25–29 years age category). Therefore, it appears that Korea's gender employment gap may be the most significant socio-structural factor in Korea's overall EY shortfall. When EY is coupled with an efficiency of labor productivity rate slightly below two-thirds of the OECD average, Korea's EYm becomes a total shortfall of slightly over 1.2 million workers. These results allow significant room for policy suggestions.

Most significant is that policies to help boost female employment participation rates for all age groups below 60 years of age should be prioritized. Much is written regarding the employment gender gap in Korea. Much of this work focuses on closing the gap pertaining to certain socio-structural

factors such as the wage gap, hiring gap, gap in management positions, gap in university enrollments, and the gap in regular/irregular employment (see Cho, 1996; Cho & Lee, 2015; ILO, 2016; Yoon, 2010). Revisiting these works and expanding on them seems warranted. The method provided in this paper does not speak to causality; however, the female rate of active employment participation has risen from 50.05% in 2010 to 56.19% in 2016, according to OECD data (OECD, 2017a). This coincides with a decrease in wages, from 41.65% in 2010 to 36.65% in 2014, compared to the male median average wage (OECD, 2017b). This considerable wage gap may have a significant impact on the growth of female labor participation in the country and should probably be investigated further.

In addition, focus on youth employment and peak wage policies may warrant some scrutiny. The basic idea behind the peak wage system is two-fold: increase the retirement age, allowing older workers to stay employed longer, while simultaneously lowering the wages of older workers, thereby freeing up salary for the hiring of younger workers (Lee & Cho, 2013). However, for Korean males, this may be less of a priority considering the limited shortfall in EY over the lifespan, and Korean women have a surplus in labor in the latter years of youth employment—25–29 years of age. Besides, Hutchens (2007) and Mitani (2007) have both shown that companies prefer hiring from the inside or keeping older workers when the position requires several years of experience or specific skills. As the greatest shortfall for young people occurs in the 15–24 years age group, for males and females, reform in education may be contemplated as a way to lower university enrollment rates and increase labor participation at a younger age for Korean workers. This may lessen the total EY shortfall, although it will do little to ease the gender gap in labor participation.

Obviously, the method for EYm could use fine-tuning and a more in-depth analysis of factors affecting effort years. Nonetheless, it is hoped the method can be used by any state to create a baseline of labor force activity in a goal-oriented, comparative manner. In the case of Korea, there is little doubt the state is underperforming in relation to reaching its goals of social protection outlays. Applying the EYm method allows for certain general deductions regarding the effects of some socio-structural factors that may be impacting growth. Perhaps Korean policymakers can consider EYm when contemplating future labor and gender policies, while trying to attain their goal of greater social protection spending.

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