

**Work and Happiness: Estimating the Well-Being Implications of
Work Hour Reduction**

By

ABOAGYE, Mark Sefa

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

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ABSTRACT

WORK AND HAPPINESS: ESTIMATING THE WELL-BEING IMPLICATIONS OF WORK HOUR REDUCTION

By

Mark Sefa Aboagye

In many OECD countries, governments have passed legislations that seek to reduce the regular hours of work per worker. This has been largely due to increasing evidence on the negative implications of long hours of work on the health, well-being, and productivity of workers. This study answers the question, does a mandatory reduction in the regular hours of work affect the well-being of workers? We exploit a mandatory stepwise reduction in the regular hours of work in Korea from 2004 to estimate the impact using a staggered difference-in-difference specification. We find that while the policy improved the workers' life satisfaction, it had no significant effect on job satisfaction nor labor income. This impact stems from increases in satisfaction with work hours, family relations, and social relations. We further found that male, older (above 40 years), and low- and average-income workers benefited more from this policy than their counterparts.

JEL Codes: I31, M54, J08, J22, J28

Keywords: Subjective well-being, work hours, Job Satisfaction, Life Satisfaction, Korea.

일과 행복: 근로시간 단축의 웰빙적 의미 추정

마크 세파 아보아기

많은 OECD 국가들에서, 정부는 근로자 1 인당 정규 노동 시간을 줄이려는 법안을 통과시켰다. 이는 장시간 노동이 노동자의 건강, 웰빙, 생산성에 미치는 부정적인 영향에 대한 증거가 증가했기 때문이다. 이 연구는 정규 노동 시간의 의무적인 단축이 노동자들의 복지에 영향을 미치는가라는 질문에 대한 답을 준다. 우리는 2004 년부터 한국의 정규 근무시간을 단계적으로 단축하여 시차 차이에 대한 시차를 두고 그 영향을 추정 우리는 그 정책이 노동자들의 삶의 만족도를 향상시켰지만, 그것이 직업 만족도나 노동 소득에 큰 영향을 미치지 않았다는 것을 발견한다. 이러한 영향은 근무시간, 가족관계, 사회관계 등에 대한 만족도가 증가함에 따라 발생한다. 또한 남성, 고령자(40 세 이상), 저소득 및 일반 근로자들이 상대 근로자들보다 이 정책의 혜택을 더 많이 받는다는 사실을 발견했다.

키워드: 주관적 웰빙, 근무시간, 직업만족도, 생활만족도, 대한민국.

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In Loving Memory of my Grandmother

Elizabeth Adwoa Boatema

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LIST OF ABBREVIATIONS

| | |
|-------|---|
| DID | Difference-in-difference |
| KLIPS | Korean Labor and Income Panel Study |
| KRW | Korean Won |
| OECD | Organisation of Economic Co-operation and Development |
| SWB | Subjective well-being |

INTRODUCTION

1.1 Background

The study of the socioeconomic consequences of long working hours has become an important issue in labor economics and occupational psychology in recent times. More specifically, recent studies have explored how prolonged hours of work affects workers (Golden & Wiens-Tuers, 2006; Pouwels et al., 2008; Booth & van Ours, 2009; Wang, 2015). This growing interest stems from the prevalent notion, supported by empirical evidence (Kivimäki et al., 2015; Afonso et al., 2017; Fadel et al., 2019), that working for long hours is pernicious to the well-being and health of workers. Moreover, it has been found that long hours of work may hamper the productivity of workers and increase the rate of truancy and injury at the workplace (Pencavel, 2015).

Although there is a growing body of literature that studies how the hours worked by individuals affect their well-being, this literature shows little agreement on the direction and nature of the linkage between these variables. Whereas studies like Pouwels et al. (2008) demonstrate that life satisfaction and work hours are negatively correlated, other studies (Rätzel, 2009; Knabe & Rätzel, 2010; Muffels & Kempermann, 2011; Wang, 2015) rather found an inverted U-shaped relationship between the two variables. Moreover, there are studies (Booth & van Ours, 2009; Willson & Dickerson, 2010) that could not establish any significant relationship between the two variables. Even more so, other studies such as Wooden et al. (2009) argue that in the determination of an individual's well-being, the total work hours of the individual is not as important as the discrepancy between the individual's preferred hours and the actual hours.

While the extant literature has focused on the ramifications of long hours of work, to the best of my knowledge, only a few have considered the effect of government interventions meant to reduce working hours on workers' well-being. Even more so, less attention has been paid to

the workers' perception of well-being. Estimating this effect is even more critical now when more governments around the world continue to pass work hour reduction legislations in their quest to ameliorate the established health, productivity and employment consequences of long working hours as well as to improve the well-being of their labor force (Kivimäki et al., 2015; Pencavel, 2015; Afonso et al., 2017; Fadel et al., 2019). As a matter of fact, countries such as Sweden, France, Germany, Portugal, Japan, Finland, South Korea, etc. have in the past decades legislated an abatement of the standard work hours.

According to Schwab (2017), governments usually resort to labor market legislation as a means to remedy diverse market failures. Most frequently, it is justified as a tool to enhance the well-being of a particular group of people in the economy, especially workers. However, the research and discourse usually tend to focus more on the overall labor market effect of the legislation using so-called objective measures of well-being. These studies tend to neglect the perception of the affected groups and individuals about the effect of the legislation on their well-being – a gap which this study intends to bridge.

Hence, this study quantitatively explores the impact of reduced work hours on workers' subjective well-being in the context of an exogenous reduction in the length of the standard workweek of Korea in 2004. We attempt to address the question: *what are the implications of work hour legislation for workers' well-being?* More specifically, We identify the general relationship between well-being and work hours and estimate the hours at which various subjective well-being measures are maximized. We also try to answer the question: *do workers increase their overtime hours to compensate for the lost time?* Furthermore, the study answers the questions: *are there any gender, age, or income level differences in how workers' well-being is affected by the policy?* and *how are they affected by government-legislated work hour reduction?* However, this paper is not intended to be a comprehensive evaluation of global

work hour reduction policies since similar policies in other countries may have different impacts due to the differences in cultural, administrative and legal systems.

The empirical analysis employs the KLIPS (Korea Labor and Income Panel Study) dataset from 2001 to 2015 for the general work hour-well-being analysis and from 2001 to 2009 for the policy analysis to estimate the policy's Average Treatment Effect (ATE) using a staggered difference-in-difference combined with fixed-effect (FE) estimation framework.

The findings confirmed the inverted U-shaped correlation between SWB and hours of work. Furthermore, we found that while the policy increased life satisfaction, it had no effect on job satisfaction. More specifically, the positive effect was a result of increases in satisfaction with work hours, satisfaction with family relations and satisfaction with social relations. We also found that effect of the policy was more dominant in male workers, older workers (above 40 years), and low- and average-income workers.

The remainder of the paper is divided into six main parts. Part 2 discusses related extant literature on the topic. This is followed by Part 3 which outlines the data and methodology used in the empirical analysis. The next part then reports the results of the analyses on how working hours influence the various subjective well-being measures. Part 5 discusses the implications of the findings. Finally, Part 6 concludes the study with recommendations for policy and research.

1.2 The Policy

Historically, Korea has been known for long working hours. It is known to have one of the longest working hours among OECD countries. Until the 1950s, Korea did not have any law which formally set the standard workweek. The first attempt to regulate working hours was in 1953 when the Labor Standard Act was enacted. It was the first legislation that standardized working hours across all sectors (all firms with more than 5 employees or more) by pegging

the standard workweek at 48 hours and also mandating payment for overtime work. In efforts to improve the living conditions of employees and to reach OECD standards, subsequent reforms were made in 1989 and 1998 to reduce the working hours to 46 hours and 44 hours respectively.

In September 2003, the Korean government passed the legislation – an amendment of the Labor Standard Act – which mandated all firms in Korea to adopt a 40 hours’ standard workweek starting from July 2004. This amendment reduced standard work hours in a week from 44 to 40 hours. The policy aimed to improve the quality of life as well as promote a well-balanced economy. According to this law, the regular work hours per week should not exceed 40 hours, meaning the maximum regular work hours per day was pegged at 8 hours. The implementation of this law was to be done gradually in six phases based on the number of employees a firm has. Starting from firms with 1000 or more employees in July 2004, the policy was to be adopted gradually till 2011 when firms with less than 20 employees were also required to join. The table below (Table 1.0) gives a breakdown of the implementation schedule.¹

Table 1.0: Five-Day Workweek Implementation Schedule

| Phase | Firm size | Implementation Date |
|--------------|-----------------------------|----------------------------|
| 1 | Employees \geq 1000 | July 2004 |
| 2 | 300 \geq Employees < 1000 | July 2005 |
| 3 | 100 \geq Employees < 300 | July 2006 |
| 4 | 50 \geq Employees < 100 | July 2007 |
| 5 | 20 \geq Employees < 50 | July 2008 |
| 6 | Employees < 20 | By 2011 |

Note: ‘ \geq ’ means greater than or equal to and ‘<’ means less than.

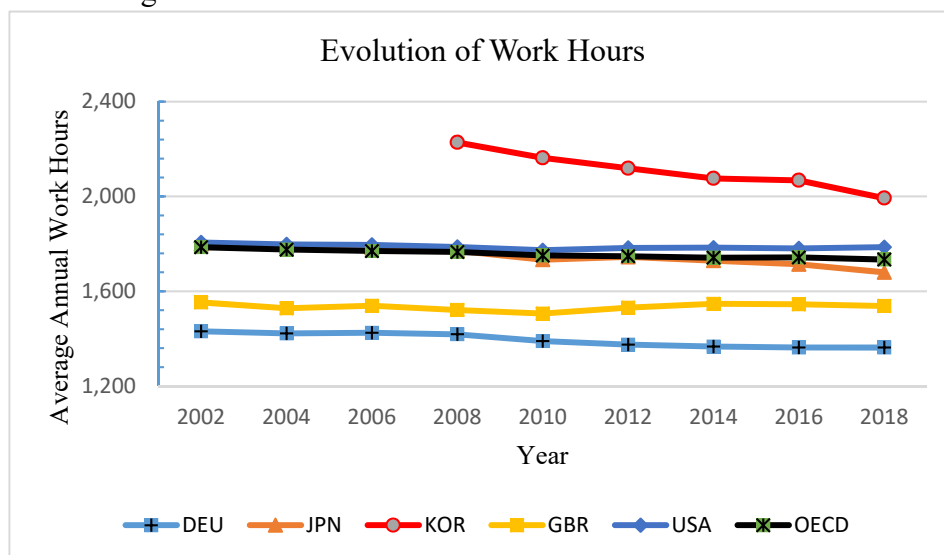
This legislation, besides reducing working hours, changed the overtime policy as well as the annual leave allocation. The maximum overtime hours allowed under this policy were 12 hours

¹ For more details on the law, read Article 49 of the Korea Labor Standard Law, Act No. 6974 (September 15, 2013)

on weekdays and 16 hours on weekends for which workers were entitled to an overtime wage rate of 150% of their ordinary wage rate. Moreover, employees may choose paid time off (PTO) instead of overtime pay. This is similar to Compensation Time Off in the US, where workers may choose a paid vacation time rather than an overtime wage. Furthermore, the number of days an employee was entitled to paid annual leave was increased from 10 days to 15 days. Additionally, employers were required to compensate their employees for unused annual leave.

Although the government continues to make efforts to decrease regular working hours, the average actual work hours of Korean workers is still relatively high. For instance, according to OECD statistics in 2008, Korea’s annual average work hours were 2,228 hours, the highest among OECD countries. This was about 36% higher than that of Germany, and more than 20% higher than that of the US, Japan, and the OECD average. Even in recent years, the number is considered high as it averaged 1,993 hours in 2018 which was 259 hours more than the OECD average (OECD, 2020). Figure 1.1 shows a graphical representation of how work hours have changed since 2001 in some OECD countries.

Figure 1.1 – Evolution of Work Hours in OECD Countries



1.3 Theoretical and Conceptual Framework

According to the standard neoclassical economic theory of labor supply, an hour of work produces ‘marginal disutility’, which is commensurate to an hour’s loss of leisure (Clark, 1973). This model is based on the theory that individual happiness or well-being is maximized through a combination of the consumption of goods and leisure. To be able to consume goods, however, the individual needs to devote some of his/her time to work to earn income. This is known as the consumption-leisure tradeoff model which posits that individuals have to make an economic tradeoff between using their time to work in order to earn income for consumption and using their time for leisure activities. In other words, if an individual works less, he/she can consume more leisure and fewer goods, and vice versa. Thus, while work in itself decreases satisfaction, the income generated from it increases satisfaction making the net effect ambiguous.

However, some studies on the so-called ‘psychic income’ suggest that aside from the monetary rewards (income), some workers attach value to the job in itself. This means individuals get some level of direct satisfaction or happiness from doing a particular job. This may be due to factors that are known to significantly influence individual happiness such as social participation and engagement or the nonpecuniary benefits such as friends, fame, power, etc. (Phillips, 1967; Farzin & Akao, 2011).²

The orthodox approach to assessing the link between work and satisfaction is to specify a framework that identifies employment as a critical determinant of life satisfaction. In such models, researchers try to estimate how an individual’s employment status affects his/her subjective well-being while holding constant other factors such as household income level. Among such models is the one that uses the number of hours worked as a predictor of the well-

² See (Fetter, 1927) Chapter 3: Goods and Psychic Income and (Dorman, 2014) page 355 for more details.

being of both workers and their families. Nevertheless, this method of estimation has produced mixed and ambiguous results. While some researchers found a positive relationship, others found a negative relationship (Pouwels et al., 2008). Moreover, others found an inverted U-shaped relationship between the two variables (Knabe & Rätzel, 2010) while others found no significant relationship (Booth & Van Ours, 2008; Willson & Dickerson, 2010).

The ambiguity surrounding this relationship is mainly because most of the empirical models used to estimate the relationship between the two variables (work hours and happiness) usually face two fundamental issues: endogeneity and functional form misspecification. First, endogeneity usually stems from the fact that fluctuations in working hours are very hardly exogenous of individual characteristics. This means individuals self-select into the sample based on some individual characteristics that are likely to be correlated to life satisfaction. This increases the possibility of omitted variable bias especially when the individual characteristics are not measurable. Moreover, there may be a confounding variable that affects both working hours, happiness and income simultaneously. Second, some researchers ignore the fact that the relationship may not always be linear. This is mainly because finding the right functional form for working hours in the model may prove to be a daunting task. This may lead to naive estimates that could be misleading. Hence, a majority of the studies looking at this relationship usually do very little to make causal inferences. In other words, many of these studies generally do not go beyond correlation analysis.

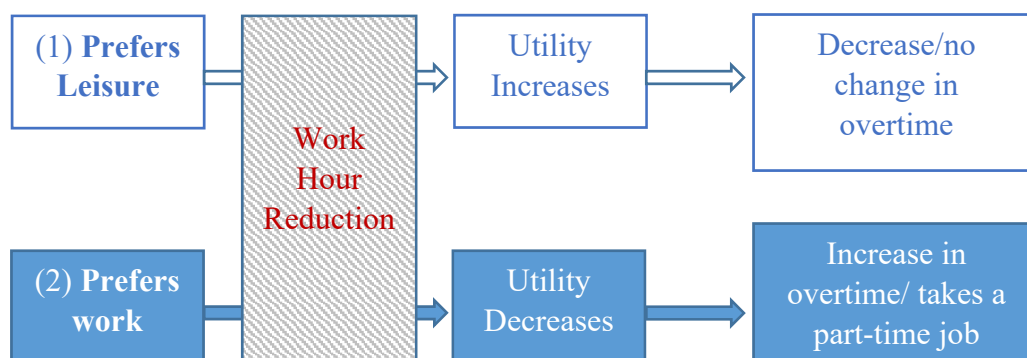
The following conceptual framework sets the stage for the empirical analysis. According to the standard neoclassical theory of labor supply, workers have to make a tradeoff between work and leisure. Thus, we assume there would be generally two types of workers (1) those who prefer leisure and (2) those who prefer to work. The legislation of shortening the workweek would affect the utility of both workers differently. For the first worker who prefers leisure, a

reduction in work hours would positively affect his/her utility. However, for the second worker who prefers to work more, the legislation would negatively affect his/her utility.

The effect of the legislation on their utility would also elicit different responses from the workers with regards to compensating for the reduced hours. The worker whose utility is positively affected would either not change or even possibly reduce his/her overtime work hours (based on the assumption that he/she would use the new free time for leisure activities). On the other hand, the worker whose utility is negatively affected would try to compensate for the lost utility by either increasing his/her overtime work hours or if possible, take a part-time job (based on the assumption that work increases his/her utility more than leisure).

To test whether the changes in overtime work hours are not merely as a result of changes in wage, we use the wage elasticity of overtime labor supply (percentage change in overtime hours divided by the percentage change in wages). If the elasticity is equal to zero, this indicates that the workers' utility increased (although wages changed, their overtime hours remained constant). However, if the elasticity is undefined (infinity), this means the policy failed to achieve its purpose of increasing the utility of workers (their overtime hours increased despite no change in wages). [Figure 1.2](#) shows a graphical representation of this framework.

Figure 1.2 – Conceptual Framework



RELATED LITERATURE

Having discussed the policy and the theoretical basis for this study, in this section we review the extant literature on working hours and well-being. Before the review, it is important to clarify the meaning of well-being given its central role in this study. In traditional economic theory, well-being is usually equated to income levels or the satisfaction derived from the consumption of goods. Generally, economists use income levels of individuals as a measure of well-being. However, this method of measuring utility or individual happiness is inadequate as it ignores the non-market aspects of individual well-being (Easterlin, 1995; Holländer, 2001; Clark et al., 2008). Hence, our use of well-being in this study refers to subjective well-being (SWB, henceforth). According to Edward Diener, one of the most cited authors on SWB, SWB is “a person’s cognitive and affective evaluations of his or her life as a whole. These evaluations include emotional evaluations of events as well as cognitive judgments of satisfaction and fulfillment” (Diener et al., 2002, p.63). Thus, in this context, SWB refers to how people evaluate their happiness and overall life satisfaction. Moreover, in this study, we use SWB, happiness, and utility interchangeably since it has been found (Diener et al., 2002; Golden & Wiens-Tuers, 2006; Veenhoven, 2012; Diener, 2020) to generally have a similar meaning.

The literature on SWB has generally received scant attention in economics and public policy. This is mainly because, until recent decades, economic researchers rejected empirical studies on SWB, citing various issues with the reliability and validity of SWB data (Easterlin, 2001; Holländer, 2001; Krueger & Schkade, 2008; Fischer, 2009). However, Holländer (2001) argues that the term ‘utility’ is overly abstract and without accepting measures of SWB, economists cannot make their usual welfare and policy inferences. According to him, SWB is not only measurable but has also been proven to have theoretical precision. Hence, in recent decades, the number of empirical studies that use SWB measures for economic analysis has increased

rapidly (Blanchflower & Oswald, 1998; Di Tella et al., 2001; Blanchflower & Oswald, 2004; Van Praag & Baarsma, 2005; Clark, 2003; Luechinger, 2009; Clark & D'Ambrosio, 2015).

Although many of the studies hardly agree on a similar array of determinants of SWB, the employment status of individuals has been found, by a majority of them, to significantly affect SWB (Clark & Oswald, 1994; Winkelmann & Winkelmann, 1998; Blanchflower & Oswald, 2004). Clark and Oswald (1994), using measures of mental well-being to estimate the disutility of unemployment, found that the level of life satisfaction was higher among employed persons than their unemployed counterparts. Their findings revealed that unemployment caused more unhappiness than marriage separation (Clark & Oswald, 1994). Other studies have also found similar results, especially the fact that unemployment and welfare of individuals have a strong negative correlation (Winkelmann & Winkelmann, 1998; Blanchflower & Oswald, 2004). According to Blanchflower and Oswald (2004), the welfare loss or unhappiness produced by unemployment is proportionately higher than the consequent loss of income. This is, however, inconsistent with the neoclassical theory of labor supply which posits that work only produces disutility.

Despite the increase in the economic literature on the relationship between employment and SWB, the researchers generally concentrate on the work hours and job satisfaction relationship (Clark & Oswald, 1994; van Praag et al., 2003). Even among the studies which estimate this relationship, they have uncertain results. For example, while Clark and Oswald (1994) found a weak negative correlation between the two variables, van Praag et al. (2003) rather found an inconclusive relationship. Moreover, other studies estimate how working hour flexibility affects job satisfaction (Origo & Pagani, 2006; Kelliher & Anderson, 2008; McNall et al., 2009; Grözinger et al., 2010; Kelliher & Anderson, 2010; Hanglberger, 2012). Grözinger et al. (2010) found that preferences in work hours are highly correlated with job satisfaction. This is consistent with the other studies which argue that current arrangements of work hours have a

toll on the satisfaction of workers, since in most countries, work hours are rarely flexible. Similarly, based on data from Germany, [Hanglberger \(2012\)](#) found that, especially among full-time workers, the higher the workers' ability to choose their hours, the higher their level of job satisfaction. However, [Kelliher and Anderson \(2008\)](#) argue that while working hour flexibility positively affects job satisfaction, it comes at a perceived cost of losing opportunities for career advancement.

Another related growing body of literature is the effect of work hours, especially long periods of work, on family well-being ([Major et al., 2002](#); [Golden & Wiens-Tuers, 2006](#); [Hughes & Parkes, 2007](#)). Workers are often faced with the challenge of balancing their limited time between work and spending time with their families. Especially for married couples and employees with children, making this decision is sometimes quite daunting.³ According to [Golden and Wiens-Tuers \(2006\)](#), long hours of work, including overtime work, negatively affect family well-being. Similarly, [Major et al. \(2002\)](#) argue that the higher the work hours, the more work interferes with family which negatively affects family well-being. Additionally, [Hughes and Parkes \(2007\)](#) argue that long working hours have negative effects because it complicates the ability of the individual to find a proper balance between his/her family responsibilities and the job.

Notwithstanding, some recent papers concentrate on the general SWB effects of working hours by estimating the linkages between life satisfaction and work hours while controlling for individual or household income ([Booth & Van Ours, 2008](#); [Pouwels et al., 2008](#); [Booth & van Ours, 2009](#); [Rätzel, 2009](#); [Wooden et al., 2009](#); [Knabe & Rätzel, 2010](#); [Willson & Dickerson, 2010](#)). Among the first studies to make this estimation is [Pouwels et. al \(2008\)](#) which found that work hours and life satisfaction are negatively correlated, however, only significant among

³ This is a well-documented fact with a broad literature especially in occupational psychology. Studies such as [Michel et al. \(2011\)](#) show how this leads to role strain and work-family conflict.

male workers. This estimation was, however, based on only a single cross-sectional dataset rendering it inadequate for causal inference. In a similar study, [Knabe and Rätzel \(2010\)](#) used a longitudinal version of the same dataset and allowed for nonlinearity. They argued that while working hours had an inverted U-shaped relationship with life satisfaction, the effect was rather negligible. Other studies ([Rätzel, 2009](#); [Muffels & Kempermann, 2011](#)) using the same dataset confirm that the work hours-happiness curve is inverse U-shaped. Other researchers did not find any significant effect ([Booth & Van Ours, 2008](#); [Booth & van Ours, 2009](#); [Willson & Dickerson, 2010](#)). Even more so, other studies such as [Wooden et al. \(2009\)](#) found that in the determination of an individual's well-being, the total work hours of the individual is not as important as the discrepancy between the individual's preferred hours and the actual hours.

One common thing about many of these studies is that they generally estimate a model where they equate SWB to a function of average weekly work hours (W), income (I), and other explanatory variables (X'). This can be mathematically depicted as $SWB = f(W, I, X')$. Moreover, they use a linear specification while only a few allow for nonlinearity ([Knabe & Rätzel, 2010](#); [Muffels & Kempermann, 2011](#)). However, this framework has fundamental issues such as reverse causality and functional form misspecification. These issues generally make the interpretation of estimates very limited and sometimes problematic.

Considering the above issues, some recent studies have exploited variations in work hours to estimate its impact on happiness ([Rudolf, 2014](#); [Collewet & Loog, 2015](#); [Wang, 2015](#); [Lepinteur, 2019](#)). Using data from Korea and exploiting the 2004 mandatory work hour reduction in Korea, [Rudolf \(2014\)](#) found that although there was a significant increase in satisfaction with work hours, life and job satisfaction were not significantly affected. A similar work by [Collewet and Loog \(2015\)](#), taking advantage of an exogenous variation in work hours among German public sector workers, found that life satisfaction and hours of work have an inverted U-shaped relationship among full-time employees. Particularly for men, the estimated

relationship between additional hours and happiness was negative, while the relationship was insignificant for their female counterparts (Collewet & Loog, 2015). Likewise, Wang (2015) used Korean data and a government-induced change in work hours to estimate the impact of long hours on several measures of SWB. Allowing for non-linear relationships between the variables, the study argues that, long hours of work have a significant impact on work hour-related happiness, but a negligible effect on income-related happiness. This means the work hour reduction may only have an impact on satisfaction with work hours and leisure (Wang, 2015). Also exploiting mandatory changes in the overtime policies in Portugal and France, Lepinteur (2019) found that reduced work hours increased both satisfaction with leisure and job satisfaction.

The review suggests that despite the increase in literature on this topic, the findings do not converge. This is because work hours are highly endogenous; even when a mandatory change is imposed, it might be affected by factors that simultaneously affect the well-being of workers. Furthermore, work hours, working conditions, work ethics, and economic conditions vary greatly among countries, thus causing the findings to differ. Another reason could be the robustness of the estimation methods used.

Hence, this study employs various robust estimation methods that allow for the elimination of endogeneity and account for unobserved regional and employee heterogeneity. Furthermore, it goes beyond the estimation of the impact of the policy on happiness, to estimate its impact on overtime work and wages. This will allow for checking how consistent the results of possible changes in happiness are in the context of changes in overtime hours and income. Therefore, this study tries to expand the literature which, so far, only focuses on the changes in life satisfaction with no consideration for corresponding changes in overtime variables from both employers and employees. The study further does a decomposition analysis to estimate the

gender, age, and income level differences in the well-being responses to a reduction in work hours.

DATA AND METHODOLOGY

3.1 Data and Variables

The empirical analysis employs 10 waves of the KLIPS dataset from 2001 to 2015. KLIPS is a nationally representative longitudinal survey conducted by the Korea Labor Institute. It is conducted on about 5,000 urban households and its over 13,780 individual members aged 15 years and above. The survey has been held annually since its launch in 1998 with the latest publicly available wave conducted in 2017 (wave 20).⁴ The survey uses a standardized questionnaire that covers an array of labor-related topics such as earnings, household income, and expenditure, economic activity, life satisfaction, education, vocational training, labor market mobility, demographics, etc. The survey maintains an excellent performance and retention rate with an average retention rate of over 76% of the initial sample.⁵

Major variables central to this study included in the dataset are the two main subjective well-being questions – general life satisfaction and job satisfaction – which are further decomposed into more specific domain questions. For general life satisfaction, it specifically asks “*Overall, how satisfied or dissatisfied are you with your life?*”. It further requires respondents to use the same 5-point interval scale for this question “*How satisfied or dissatisfied are you with the following aspects of your life?*” Leisure, Household Income, Social relations, Family relations, etc. For job satisfaction, the survey specifically asks “*Overall, how are you satisfied or dissatisfied with your main job?*”. Moreover, it asks specific domain questions which might be related to the reduction in working hours such as “*How satisfied or dissatisfied are you with the following aspects of your main job?*” Working hours, Wages/earnings, etc.

⁴ The datasets are available on the KLI website to download online free of charge

⁵ According to Korea Labor Institute, the retention rate in the 2nd wave (1999) was 87.6%, 80.9% in 2000. After wave 4 in 2001, with a retention rate of 77.3%, it stabilized at an attrition rate of 1% per annum. The latest wave, 2017, had a retention rate of 67.1%.

There are five response categories to each of the above-mentioned questions, which is a Likert-scale ranging from 1 to 5, where 1= “*Very satisfied*”, 2= “*Satisfied*”, 3= “*Neither satisfied nor dissatisfied*”, 4= “*Dissatisfied*” and 5= “*Very dissatisfied*”. During the empirical analysis, these satisfaction variables are reverse coded so that 1= “*Very Dissatisfied*” and 5= “*Very satisfied*” for the sake of convenience and easy reference. Thus, the reverse coding allows for the higher values to indicate higher satisfaction and vice versa. We consider satisfaction with leisure, household income, family relations, and working hours in addition to job satisfaction because they could be important channels for the possible changes in life satisfaction (happiness) after the reduction in work hours.

The data is restricted to observations aged 20 to 65 since those are the usual ages at which most people are economically active. In other words, most people enter the labor force at about age 20 and exit or retire from the labor force usually after age 65. It is further restricted to only wage-workers since the policy mainly targeted full-time wage workers. In the dataset, the wage-workers are further divided into two groups based on the type of work hours, whether full-time or part-time, which allows for the distinction between eligible and non-eligible individual workers.

We construct an eligibility variable to indicate whether an individual was eligible for a reduction in their work hours at a particular time or not. Since the policy sought to shorten the workweek of full-time workers from 44 hours to 40 hours, it is logical to assume that part-time workers and full-time workers who worked less than or equal to 40 hours were not eligible for this legislation. Thus, those who were eligible were full-time workers whose average weekly work hours exceeded 40 hours in 2003. Additionally, the information on firm size is used to determine which members of the eligible group were treated in which particular year as there was a staggered adoption of the work hour reduction policy based on the firm size. Furthermore, the sample for the policy is restricted to only those with data in 2003.

Table 3.1: Summary Statistics of Dependent Variables

| <i>Variables</i> | (1) Total | (2) Eligible | (3) Non-eligible | (4) Others |
|-------------------------------------|----------------|-----------------|---------------------|----------------|
| Life satisfaction | 3.37 (0.60) | 3.38 (0.59) | 3.26 (0.65) | 3.37 (0.60) |
| Satisfaction with household income | 2.91 (0.72) | 2.93 (0.72) | 2.77 (0.77) | 2.92 (0.71) |
| Satisfaction with leisure | 3.06 (0.72) | 3.06 (0.73) | 2.96 (0.75) | 3.08 (0.70) |
| Satisfaction with family relations | 3.65 (0.60) | 3.69 (0.59) | 3.59 (0.65) | 3.63 (0.60) |
| Satisfaction with social relations | 3.49 (0.58) | 3.50 (0.58) | 3.44 (0.60) | 3.49 (0.57) |
| Job satisfaction | 3.23 (0.64) | 3.24 (0.64) | 3.14 (0.69) | 3.24 (0.63) |
| Satisfaction with work hours | 3.21 (0.77) | 3.17 (0.79) | 3.18 (0.77) | 3.24 (0.76) |
| Satisfaction with wages or earnings | 2.85 (0.76) | 2.85 (0.76) | 2.76 (0.80) | 2.86 (0.75) |
| Observations | 67,821 | 29,052 | 6,708 | 32,061 |

Notes: This table presents averages across all the years for the whole sample and as well as the eligible, non-eligible sample, and the rest who are not included in the policy analysis. The standard deviations are shown in parenthesis. The sample for this summary statistics is restricted to wage-workers. All the variables are on a 5-point scale with a minimum of 1 and a maximum of 5. The eligible group consists of full-time wage workers whose average weekly work hours in 2003 was more than 40 hours whilst the non-eligible group is composed of those whose average weekly work hours were 40 or less and part-time wage workers.

Table 3.1 shows the means and standard deviations of the SWB measures, which make up the main dependent variables. The mean of overall life satisfaction which is 3.37 (above the midpoint – neither satisfied nor dissatisfied) is greater than that of satisfaction with leisure and satisfaction with household income which are 3.06 and 2.91 respectively. While the former is above the midpoint, the latter is below. However, the average satisfaction with family relations and social relations, which are 3.65 and 3.49, are greater than overall life satisfaction. They have the highest averages among all the measures of satisfaction considered. The average job satisfaction (3.23) is a little bit higher than that of satisfaction with working hours and wages which are 3.21 and 2.85 respectively. Although the differences in satisfaction between the two

samples are not significant, it is worthy to note that, in all of the measures except for satisfaction with work hours, the eligible group is more satisfied than their non-eligible counterparts. This is an indication that those who work less than 40 hours weekly are happier with their work hours than those who work above 40 hours.

The KLIPS also contains comprehensive demographic and socioeconomic information, some of which were used as control variables in the analysis. They include household income, level of education, gender, age, number of kids, and marital status. The ‘*highest level of education attained*’ variable is converted into 8 dummy variables (ranging from no schooling to doctorate). Similarly, gender and marital status variables are converted into dummy variables. Also, the log form of the household income is used for convenient interpretation.

For further policy analysis of the corresponding impact on wage elasticity of overtime labor supply, other dependent variables including average weekly overtime hours and average weekly overtime wages are used. Some observations indicated unrealistic overtime hours, as high as 400 hours. Thus, we peg the maximum overtime hours at 40 hours. Additionally, we calculate the average weekly overtime wages using information from the monthly wages and weekly overtime hours. we divide the average monthly wages by a factor of the average weekly work hours and 4.33 to get the hourly wage rate ($hourly\ wages = \frac{monthly\ wage}{(4.33 \times weekly\ work\ hours)}$).

Given that the Korea Labor Standard Law requires employers to pay a 50% overtime premium, we multiply the average weekly overtime work hours a factor of 1.5 and the hourly wage rate to get the average weekly overtime wage ($weekly\ overtime\ wage = weekly\ overtime\ hours \times 1.5 \times hourly\ wage$). Furthermore, the overtime wages variable is used in its log forms – *Log of average weekly overtime wages*.

Table 3.2: Summary Statistics of Covariates

| <i>Variables</i> | (1) Total | (2) Eligible | (3) Non-eligible | (4) Others |
|-------------------------------------|-------------------|-------------------|---------------------|-------------------|
| Average weekly work hours | 47.9 (13.5) | 50.7 (12.7) | 41.7 (15.2) | 46.6 (13.2) |
| Work hours squared (divided by 100) | 24.8 (14.3) | 27.4 (14.8) | 19.7 (14.2) | 23.5 (13.5) |
| Age | 40.3 (10.8) | 41.8 (10.3) | 43.3 (10.7) | 38.2 (10.9) |
| Female | 0.40 (0.49) | 0.32 (0.47) | 0.53 (0.50) | 0.44 (0.50) |
| Married | 0.75 (0.43) | 0.81 (0.39) | 0.82 (0.38) | 0.68 (0.47) |
| Number of kids (0 ~ 6yrs) | 0.26 (0.57) | 0.26 (0.57) | 0.19 (0.51) | 0.28 (0.59) |
| Number of kids (7 ~12yrs) | 0.24 (0.55) | 0.28 (0.59) | 0.24 (0.56) | 0.20 (0.50) |
| Number of kids (13 ~ 15yrs) | 0.018 (0.14) | 0.019 (0.14) | 0.018 (0.14) | 0.018 (0.14) |
| Total Household Income (log) | 8.13 (0.71) | 8.15 (0.68) | 7.98 (0.78) | 8.13 (0.72) |
| <i>Level of Education</i> | | | | |
| No schooling | 0.0055 (0.074) | 0.0063 (0.079) | 0.012 (0.11) | 0.0034 (0.058) |
| Elementary School | 0.065 (0.25) | 0.069 (0.25) | 0.14 (0.34) | 0.047 (0.21) |
| Lower Secondary School | 0.094 (0.29) | 0.10 (0.31) | 0.14 (0.35) | 0.075 (0.26) |
| Upper Secondary | 0.35 (0.48) | 0.37 (0.48) | 0.35 (0.48) | 0.33 (0.47) |
| Associate Degree/Vocational | 0.17 (0.38) | 0.16 (0.36) | 0.096 (0.29) | 0.20 (0.40) |
| College | 0.26 (0.44) | 0.24 (0.43) | 0.18 (0.39) | 0.30 (0.46) |
| Masters | 0.043 (0.20) | 0.041 (0.20) | 0.065 (0.25) | 0.039 (0.19) |
| Doctorate | 0.0091 (0.095) | 0.0073 (0.085) | 0.018 (0.13) | 0.0088 (0.093) |
| <i>Other Variables</i> | | | | |
| Average weekly overtime pay (log) | 2.58 (0.85) | 2.56 (0.87) | 2.47 (0.90) | 2.63 (0.83) |
| Average weekly overtime hours | 10.4 (8.12) | 9.96 (7.66) | 9.67 (7.89) | 11.1 (8.64) |
| Observations | 68,114 | 29,166 | 6,722 | 32,226 |

Notes: Standard deviations are in parenthesis. This table presents averages across all the years for the whole sample and as well as the eligible, non-eligible sample, and the rest who are not included in the policy analysis. The standard deviations are shown in parenthesis. The eligible group consists of full-time wage workers whose average weekly work hours in 2003 was more than 40 hours whilst the non-eligible group is composed of those whose average weekly work hours were 40 or less and part-time wage workers.

In the dataset, some participants indicated average weekly work hours as high as 168 hours. These high average weekly work hours are unrealistic considering that in the whole week there is a maximum of 168 hours. This could be an error; thus, following Wang (2015), we peg the average weekly work hours at a maximum of 100 hours. Furthermore, we include the square of the average weekly work hours to allow for nonlinear estimation.

Table 3.2 shows the descriptive statistics for the main explanatory variables and others. There are 68,114 total observations composed of 29,166 ‘eligible’ observations, 6,722 ‘non-eligible’ observations and 32,226 observations which are excluded from the policy analysis. Out of the total observations, 40% of them are females, 75% are married, and the average age is 40.3 years (the non-eligible group, on average, have older workers). The average weekly work hours in the total sample are 47.9 hours which is very high compared to the government prescribed work hour limit. A further decomposition reveals that the eligible group works an average of 50.7 hours per week, while the non-eligible group, even though it is dominated by part-time workers, have average weekly work hours of 41.7 (also more than the legislated 40 hours). This is an indication that on average, the hours worked, even for part-time workers, is more than the government prescribed hours.

Overall, most of the people, making up 35% of the sample, on average have a high school diploma. This is followed by 26% college-degree holders, 17% 2-year professional or vocational diploma holders, 6.5% elementary school leavers, 4.3% masters-degree holders, and 0.91% doctorate-degree holders. However, it is also evident that the eligible group (full-time workers) are, on average, more educated (12.3 years) than the non-eligible group (11.8 years) which is mostly made up of part-time workers. The average weekly overtime working hours are 10.4 hours which is also high among the eligible group than the non-eligible group.

3.2 Empirical Strategy

The basic model used to test the relationship between the various subjective well-being measures and work hours is based on a panel fixed-effect estimation as below:

$$Y_{it} = \beta_0 + \beta_1 W_{it} + \beta_2 W_{it}^2 + X'_{it}\Omega + \alpha_i + \vartheta_t + \epsilon_{it} \quad (1)$$

where Y_{it} is the outcome variable of interest including life satisfaction, satisfaction with leisure, satisfaction with income, satisfaction with family relations, job satisfaction, satisfaction with work hours, and satisfaction with wages of individual i in year t ; W and W^2 indicate the average weekly work hours and its square respectively, X' represents a vector of time-variant observable individual characteristics, α_i represents time-invariant individual characteristics, ϑ is the year fixed-effects which controls for the effect of annual shocks which affects all individuals in all firms sizes such as the global financial crises in 2008, and ϵ is the error terms which assumes a normal distribution. β_1 and β_2 are the main coefficients of interest which are expected to be negative as the work hours increase past a certain threshold (in this case we assume this relationship would be evident when work hours go beyond the proposed forty hours). The dependent variables are standardized for a convenient interpretation of the estimation results.

The above specification only estimates the general SWB and work hour relationship. However, to isolate the causal impact of the shorter workweek legislation on well-being, we estimate the average treatment effects using the difference-in-difference (DID) method.

Let Y_{itf} represent the utility (well-being) of the individual (i) who works at a firm with a total number of employees or firm size (f) at the time (t). At a particular time, the work hours of employees at firm size f are reduced. However, consider only full-time workers with an average weekly work hour of more than 40 as the only eligible ones for the reduction. This assumption

is based on the fact that the policy reduced working hours to 40 hours and targeted full-time workers. Thus, full-time workers who were already working 40 hours or less and part-time workers were not eligible for a reduction under the policy. $ELIGIBLE_i$ is an indicator variable that is equal to 1 if the individual (i) was eligible for the work hour reduction (treatment group) and equal to 0 if the individual is not eligible for a work hour reduction (control group). The indicator variable $POST_{tf}$ is equal to 1 for all periods after the adoption of the policy for a firm with size f and is equal to 0 for all periods prior to the adoption of the policy. Let α_i represent all the time-invariant individual characteristics (individual fixed effect), ϑ_t represent the annual shocks which affect all individuals (time fixed effect), and ϵ_{itf} represent the stochastic error term. The general difference-in-difference model for the well-being of the individual is written as:

$$Y_{itf} = \delta_1 ELIGIBLE_i + \delta_2 POST_{tf} + \pi ELIGIBLE_i * POST_{tf} + \alpha_i + \vartheta_t + \epsilon_{itf} \quad (2)$$

Where π estimates the expected change in the utility of the eligible group minus the expected change in the utility of the non-eligible group.

$$\begin{aligned} \pi = & (E[Y_{i1f}^1 | ELIGIBLE_{if} = 1] - E[Y_{i0f}^0 | ELIGIBLE_{if} = 0]) \\ & - (E[Y_{i1f}^0 | ELIGIBLE_{if} = 0] - E[Y_{i0f}^0 | ELIGIBLE_{if} = 0]) \end{aligned} \quad (3)$$

However, since the time for the adoption of the policy varied based on the firm size, our specification will be a special variant of the general difference-in-difference specification using the “staggered adoption design” (Athey & Imbens, 2018). We allow the treatment period (POST) to vary based on the firm size (f) of the individual workers (i). This estimation assumes that the treatment effect does not change across all the treatment periods. The modified model is specified as follows:

$$Y_{itf} = \delta_1 ELIGIBLE_i + \delta_2 \sum_f POST_{tf} + \pi \sum_f (ELIGIBLE_i * POST_{tf}) + \alpha_i + \vartheta_t + \epsilon_{itf} \quad (4)$$

Failure to control for observable individual variables may annul the common trends assumption. Thus, equation (4) is modified to include individual-level characteristics such as age, marital status, number of kids between the ages of 0 to high school, level of education, and a single household level characteristic, total annual household income. Furthermore, to prevent any biases, we further control for firm size fixed effects assuming that the utility of workers in larger firms may be affected by some factors which might not affect the workers of smaller firms and vice versa. Additionally, since the policy was implemented based on firm size, it is only reasonable to control for unobservable firm size-related characteristics. Finally, we control for the individual's unobservable characteristics related to their region of residence (regional fixed effects). The final model is specified as follows:

$$Y_{itf} = \delta_1 ELIGIBLE_i + \delta_2 \sum_f POST_{tf} + \pi \sum_f (ELIGIBLE_i * POST_{tf}) + X'_{it}\Omega + \alpha_i + \vartheta_t + \rho_f + \tau_r + \epsilon_{itf} \quad (5)$$

where π is the coefficient of interest and is expected to be positive if the policy improved the well-being of the workers. X'_{itf} is a vector of observable time-variant individual characteristics, ρ_f is the firm size fixed effects, and τ_r measures the regional fixed effects. We use a 2-way clustering method for the standard errors; since the policy was implemented at a particular time based on the individual's firm size, we cluster the standard errors at firm size times year.

Furthermore, as stated in the conceptual framework, we conduct a second-level verification to see if workers increased their overtime hours to compensate for the 'lost' hours of work. We do this by measuring the wage elasticity of overtime labor supply.

$$OVT_{itf} = \delta_1 ELIGIBLE_i + \delta_2 \sum_f POST_{tf} + \omega \sum_f (ELIGIBLE_i * POST_{tf}) + X'_{it}\Omega + \alpha_i + \vartheta_t + \rho_f + \tau_r + \epsilon_{itf} \quad (6)$$

$$W_{itf} = \delta_1 ELIGIBLE_i + \delta_2 \sum_f POST_{tf} + \sigma \sum_f (ELIGIBLE_i * POST_{tf}) + X'_{it}\Omega + \alpha_i + \vartheta_t + \rho_f + \tau_r + \epsilon_{itf} \quad (7)$$

Where OVT_{itf} indicates the average weekly overtime hours and W_{itf} indicates the log of hourly wage. $\hat{\omega}$ and $\hat{\sigma}$ represent the average change in weekly overtime hours and log of hourly wage

respectively. Thus, the wage elasticity of labor supply (\mathcal{E}) is written as follows:

$$Elasticity(\mathcal{E}) = \frac{\Delta Overtime\ Work}{\Delta Wages} = \frac{\hat{\omega}}{\hat{\sigma}} \quad (8)$$

The Difference-in-difference (DID) estimation is based on the common trends assumption which states that in the absence of the treatment (policy), the rate of change of the dependent variable for both the treatment group and control group should be the same (Angrist & Pischke, 2008). This means whilst both groups do not necessarily need to be on the same level, the difference in the rate of change of the dependent variable between both groups should not be significantly different from zero. To validate this assumption, we run a falsification test using a ‘fake’ treatment year. Finally, since the dataset does not provide details on actual compliance with the policy, the estimation uses the eligibility status of an individual for treatment based on the assumption that all eligible workers had their work hours reduced, not who was actually treated. Thus, we can say this is an intention-to-treat (ITT) estimation.

RESULTS

4.1 Evolution of Work Hours and Well-being

Before presenting the main regression results, we summarize the evolution of work hours and the SWB variables from 2001 to 2015 in this section.

4.1.1 Evolution of Working Hours

This section provides an overview of how working hours have changed over the years. The analysis shows a substantial decrease in work hours.

Figure 4.1: Evolution of Work Hours

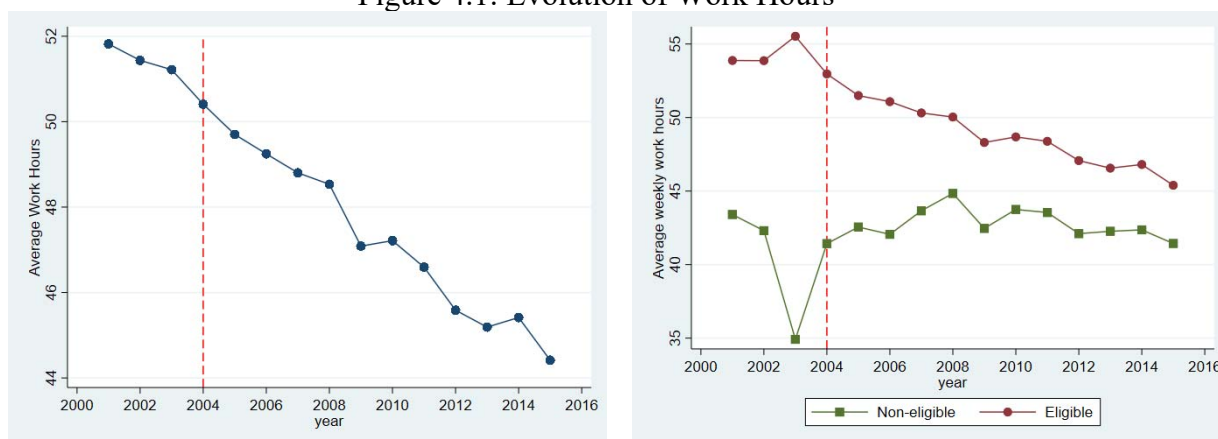


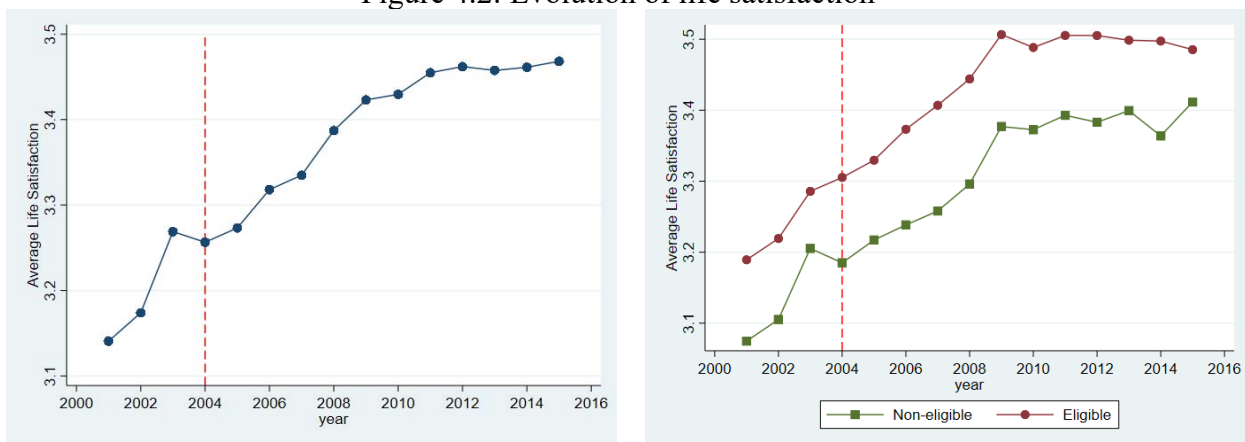
Figure 4.1 shows a continuous decrease in average weekly work hours since 2001. In 2004 during the first year of implementation of the legislation, there was a fall in work hours from a little over 50.5 hours to 49.5 hours (1-hour decrease). Between 2007 and 2008, there was a sharp decrease from 48.5 to 47 hours which marks the highest annual reduction during the implementation years. It continued to reduce to about 45.5 hours in the final year of implementation. This marks a decrease on work hours by approximately 5 hours during the years of implementations. As at 2015, it had further decreased to approximately 44.5 hours. Comparing the eligible and non-eligible groups reveals an interesting trend. Among the eligible group, work hours started to drop from 2003 when the policy was approved even before its implementation in 2004, whereas work hours sharply increased among the non-eligible workers mostly made up of part-time workers. In 2004 when the policy was initially rolled out

through to 2011 when the policy was expected to have been adopted by every firm, average work hours continued to drop among the eligible group. On the other hand, work hours increased among the non-eligible group. It is evident that after the policy, the wide gap in working hours between the two groups closed significantly.

4.1.2 Evolution of Well-being

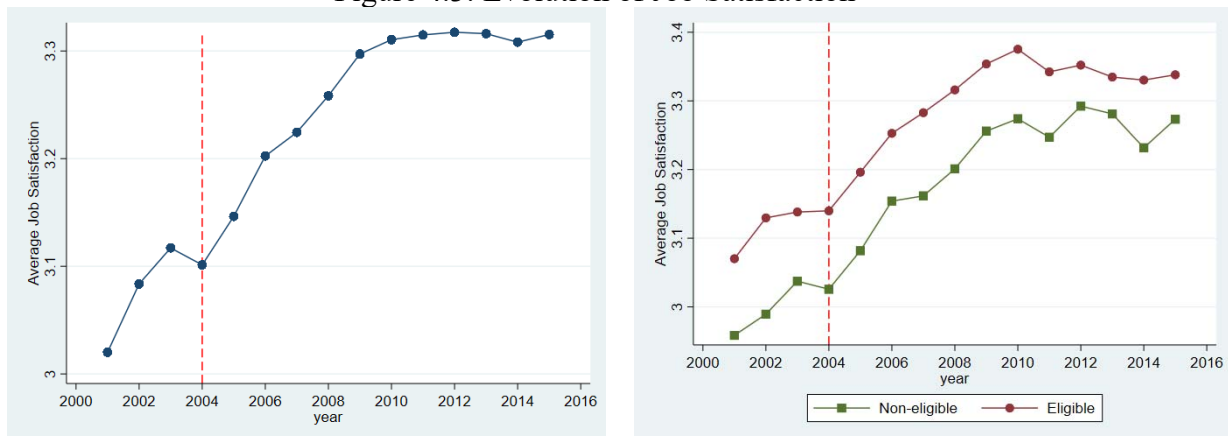
This section describes the changes in the various measures of SWB over the years. The trends indicate that, on average, well-being has increased over the years with a few exceptions where it dropped for a short stint and then recovered. The left-hand side graph of Figure 4.2 shows that in 2002, there was an approximately 3% increase in overall life satisfaction. However, it decreased by about 0.3%, a year prior to the policy's introduction. After the introduction of the policy, average life satisfaction increased steadily at an increasing rate of approximately 1.2% until 2009 when it began to slow down. The right-hand side diagram shows the trend based on a decomposition of the sample into eligible and non-eligible observations. It indicates that, on average, the eligible workers, over the years, have always had a higher level of life satisfaction than their non-eligible counterparts. Although there is a gap between both groups, the fluctuations in their life satisfaction levels follow a similar trend.

Figure 4.2: Evolution of life satisfaction



The evolution of job satisfaction has not been significantly different from that of life satisfaction. However, it must be noted that life satisfaction has over the years been higher than job satisfaction. This could be an indication that job satisfaction is a constituent of life satisfaction and not vice versa. From [Figure 4.3](#), it is evident that job satisfaction sharply increased by 2.46% in 2001, however, in 2002 the growth rate slowed down. Moreover, in 2003, prior to the introduction of the policy, job satisfaction experienced a decrease of about 0.98%. A year after the introduction of the policy, job satisfaction levels reached above 3.1 which is a 1.87% increase from the previous year. After the introduction of the policy, similar to life satisfaction, job satisfaction levels increased steadily at a rate of 1.6% until 2009 when it slowed down and began to decrease starting from 2012. It, however, increased from 2014 to 2015. Resembling the trend in life satisfaction, the members of the eligible group have a higher level of job satisfaction than the non-eligible workers. In 2012, however, the disparity in job satisfaction between the two groups of workers reduced drastically. While life satisfaction gap between the two groups seem to be diverging after 2011, the job satisfaction levels seem to be converging during the same period.

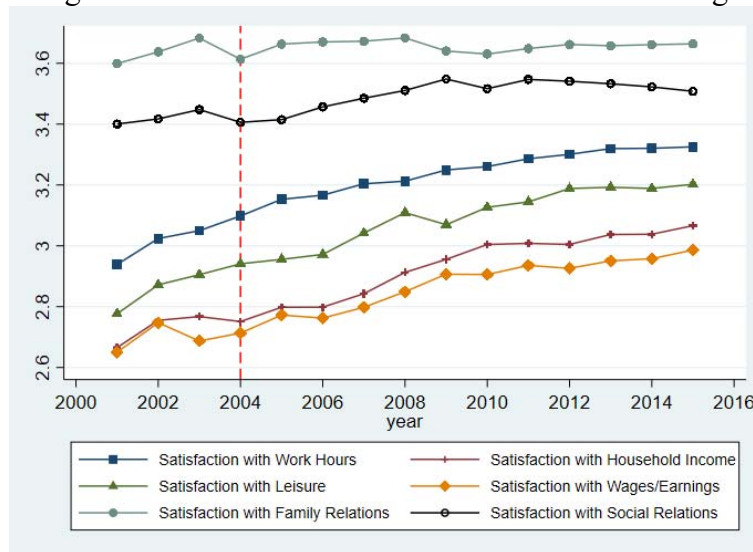
Figure 4.3: Evolution of Job Satisfaction



As seen from the descriptive statistics, the other SWB measures, besides life and job satisfaction follow a similar trend. [Figure 4.4](#) shows that satisfaction with household income, satisfaction with leisure, satisfaction with family relations, satisfaction with earnings and

satisfaction with work hours continue to increase. However, this increase is not very significant as compared to life satisfaction and job satisfaction. Another interesting observation is that satisfaction with family and social relations are relatively very high. In fact, satisfaction with family relations is even higher than both life satisfaction and job satisfaction. Nonetheless, the gap between satisfaction with family relations and the other measures, although very high, has reduced drastically since the introduction of the policy in 2004.

Figure 4.4: Evolution of other measures of well-being.



4.2 Relationship between Well-being and Work Hours

In this section, we report the findings of the fixed-effects regression of equation (1) which estimates the well-being and work hour relationship. In this estimation, we regress a quadratic function of average weekly work hours of the total sample on the 8 well-being measures under consideration. We control for various individual and household characteristics including age, level of education, marital status, number of kids, etc.

Table 4.1 contains the regression results. Column (1) reports the estimates of a specification with no control variables, column (2) reports the results of a specification with the full set of control variables plus individual and year fixed effects, and column (3) adds regional fixed effects to control for any disparities peculiar to a particular region of residence. The results in

column (2) and column (3) indicate, although modest, a statistically significant non-linear relationship between life satisfaction and work hours which is inverted U-shaped.

Table 4.1: Relationship between Life Satisfaction and Work Hours

| <i>Variables</i> | (1) | (2) | (3) |
|-------------------------------------|----------------------|----------------------|----------------------|
| Average weekly work hours | 0.0048** (0.002) | 0.0036* (0.002) | 0.0036* (0.002) |
| Work Hours Squared (divided by 100) | -0.0046** (0.001) | -0.0037** (0.001) | -0.0038** (0.001) |
| Age | | 0.0214*** (0.002) | 0.0213*** (0.002) |
| Married | | 0.2301*** (0.028) | 0.2340*** (0.028) |
| Total Household Income (log) | | 0.1379*** (0.010) | 0.1371*** (0.010) |
| Number of kids (0 ~ 6yrs) | | -0.0226 (0.012) | -0.0235 (0.012) |
| Number of kids (7 ~12yrs) | | -0.0158 (0.011) | -0.0159 (0.011) |
| Number of kids (13 ~ 15yrs) | | 0.0135 (0.039) | 0.0143 (0.039) |
| Individual Controls | NO | YES | YES |
| Year Fixed Effect | YES | YES | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 67,738 | 66,801 | 66,801 |
| Adjusted R^2 | 0.353 | 0.357 | 0.358 |

Notes: This table reports the OLS estimates for the 2001 to 2015 sample. The dependent variable is standardized for easy interpretation of the results. Robust Standard errors clustered at the individual level in parentheses. Other control variables include 8 dummies of the level of education (1=No Schooling; 8=Doctorate).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Further calculations with the coefficients of Work Hours (W), $\frac{\partial y}{\partial W} (0.003605W - \frac{0.003752W^2}{100})$,

show that the optimal number of hours required to maximize life satisfaction is 48.04 hours.

This means when work hours fall below or rises above 48.04 hours, life satisfaction falls.

Furthermore, the table shows that a 1-year increase in age increases life satisfaction by 0.021

standard deviations, the life satisfaction of married people is 0.24 standard deviations higher

than unmarried workers, and a 1 percentage point increase in household income increases life

satisfaction by 0.14 standard deviations.

Table 4.2 reports the results for the relationship between job satisfaction and work hours. The estimates in column (3), which are more robust with controls for individual, year, and regional fixed effects, indicate that there is a non-linear relationship, which is inverted U-shaped, between the two variables and is statistically significant at 0.001. In fact, job satisfaction is maximized when work hours are set at an average of approximately 43 hours per week. The other indicators show that a 1-year increase in age corresponds to a job satisfaction increase of 0.02 standard deviations, and a household income increase of 1% corresponds to a job satisfaction increase of 0.098 standard deviations.

Table 4.2: Relationship between Job Satisfaction and Work Hours

| <i>Variables</i> | (1) | (2) | (3) |
|-------------------------------------|-----------------------|-----------------------|-----------------------|
| Average weekly work hours | 0.0084*** (0.002) | 0.0078*** (0.002) | 0.0077*** (0.002) |
| Work Hours Squared (divided by 100) | -0.0095*** (0.001) | -0.0090*** (0.001) | -0.0090*** (0.001) |
| Age | | 0.0221*** (0.002) | 0.0221*** (0.002) |
| Married | | 0.0509 (0.027) | 0.0503 (0.027) |
| Total Household Income (log) | | 0.0980*** (0.010) | 0.0981*** (0.010) |
| Number of kids (0 ~ 6yrs) | | -0.0102 (0.013) | -0.0110 (0.013) |
| Number of kids (7 ~12yrs) | | 0.0022 (0.011) | 0.0021 (0.011) |
| Number of kids (13 ~ 15yrs) | | 0.0588 (0.038) | 0.0587 (0.038) |
| Individual Controls | NO | YES | YES |
| Year Fixed Effect | YES | YES | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 67,674 | 66,738 | 66,738 |
| Adjusted R^2 | 0.359 | 0.362 | 0.362 |

Notes: This table reports the OLS estimates for the 2001 to 2015 sample. The dependent variable is standardized for easy interpretation of the results. Robust Standard errors clustered at the individual level in parentheses. Other control variables include 8 dummies of the level of education (1=No Schooling; 8=Doctorate).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.3 reports the estimates of the regression of work hours on the life satisfaction channels. Both satisfaction with leisure and satisfaction with household income have a statistically significant inverted U-shaped relationship with work hours. Both of these measures are

maximized when employees spend an average of 22.2 hours and 50 hours per week respectively. However, the regression on satisfaction with social relations shows a significant U-shaped relationship whereas satisfaction with family relations, although it shows a U-shaped relationship, is not statistically significant.

Table 4.3: Relationship between Channels of Life Satisfaction and Work Hours

| <i>Variables</i> | (3) Satisfaction with Household Income | (4) Satisfaction with Leisure | (5) Satisfaction with Social Relations | (6) Satisfaction with Family Relations |
|------------------------------|--|--|---|---|
| Average weekly work hours | 0.006*** (0.001) | 0.004* (0.002) | -0.004* (0.002) | -0.002 (0.002) |
| Work Hours Squared (/100) | -0.006*** (0.001) | -0.009*** (0.002) | 0.004** (0.001) | 0.002 (0.001) |
| Age | 0.021*** (0.002) | 0.028*** (0.002) | 0.000 (0.002) | -0.007*** (0.002) |
| Married | 0.052 (0.029) | 0.008 (0.030) | 0.191*** (0.029) | 0.264*** (0.031) |
| Total Household Income (log) | 0.245*** (0.010) | 0.124*** (0.010) | 0.081*** (0.010) | 0.100*** (0.010) |
| Number of kids (0 ~ 6yrs) | -0.051*** (0.013) | -0.062*** (0.013) | 0.001 (0.013) | 0.032* (0.013) |
| Number of kids (7 ~12yrs) | -0.023* (0.011) | -0.015 (0.012) | 0.001 (0.012) | -0.003 (0.012) |
| Number of kids (13 ~ 15yrs) | 0.008 (0.041) | 0.008 (0.046) | -0.019 (0.043) | -0.059 (0.045) |
| Individual Controls | YES | YES | YES | YES |
| Year Fixed Effect | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES |
| Observations | 66,802 | 66,797 | 66,798 | 66,798 |
| R^2 | 0.506 | 0.441 | 0.393 | 0.414 |

Notes: This table reports the OLS estimates for the 2001 to 2015 sample. The dependent variable is standardized for easy interpretation of the results. Robust Standard errors clustered at the individual level in parentheses. Other control variables include 8 dummies of the level of education (1=No Schooling; 8=Doctorate).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.4 reports the results for the association between satisfaction with work hours and work hours (Column 1) and satisfaction with wages/earnings and work hours (Column 2). For satisfaction with work hours, although it also shows an inverted U-shaped relationship, it looks as if at any level of work hours, satisfaction with work hours is negative. On the other hand,

estimates for satisfaction with wages or earnings are statistically significant showing an inverted U-shaped correlation. Satisfaction with wages is maximized at approximately 50 hours per week while satisfaction with work hours will be maximized when current hours are reduced by approximately 14 hours.

Table 4.4: Relationship between Channels of Job Satisfaction and Work Hours

| <i>Variables</i> | (1) Satisfaction with Work Hours | (2) Satisfaction with Wages/Earnings |
|------------------------------|--|--|
| Average weekly work hours | -0.004* (0.002) | 0.007*** (0.002) |
| Work Hours Squared (/100) | -0.014*** (0.002) | -0.007*** (0.001) |
| Age | 0.020*** (0.002) | 0.022*** (0.002) |
| Married | -0.033 (0.029) | 0.035 (0.031) |
| Total Household Income (log) | 0.060*** (0.010) | 0.129*** (0.010) |
| Number of kids (0 ~ 6yrs) | 0.001 (0.013) | -0.018 (0.013) |
| Number of kids (7 ~12yrs) | 0.023* (0.012) | -0.011 (0.011) |
| Number of kids (13 ~ 15yrs) | 0.034 (0.048) | 0.093* (0.041) |
| Individual Controls | YES | YES |
| Year Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 66,805 | 66,812 |
| R^2 | 0.460 | 0.440 |

Notes: This table reports the OLS estimates for the 2001 to 2015 sample. The dependent variable is standardized for easy interpretation of the results. Robust Standard errors clustered at the individual level in parentheses. Other control variables include 8 dummies of the level of education (1=No Schooling; 8=Doctorate).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3 Impact of the policy

After estimating the general association between well-being and work hours, we now estimate the impact of the policy. This section reports the regression results based on equation (5) to evaluate the impact of the policy on well-being, work hours, income, and overtime work and wages. Although the adoption of the policy started in 2004 and ended in 2011, in this analysis we use data from 2001 to 2009. This is because there was a strict and systematic adoption of the policy annually based on firm size from 2004 up until 2008 when all firms, except those with less than 20 workers, had adopted it. For the firms with less than 20 workers, they were given the freedom to gradually reduce their working hours between 2009 and 2011 with no specific rule on when exactly to adopt it. This means it would be difficult to determine the exact year in which a particular firm with less than 20 workers adopted the policy. Thus, for accuracy, we limit the policy analysis to the years with specific rules on when to adopt the policy.

4.3.1 Balance Test

One condition required for estimating causality between two variables is randomization (Angrist & Pischke, 2008). This means selection into the sample for the analysis should be random. Since this study is based on a quasi-experimental design, we can only ensure randomization if we select a sample with no systematic difference between the control and treatment groups at the baseline. This section uses the balance test to check for any systematic differences between the two groups based on some individual covariates in 2003. Table 4.5 reports the results of the balance test based on individual covariates such as age, marital status, number of kids (from newborn babies to high school students), level of education and household income. Column 1 reports the averages for the non-eligible group (control), column 2 for the eligible group (treated), and column 3 is the differences between the two groups (treatment group average minus control group average). The non-eligible workers are, on

average, about 1.75 years older than the eligible workers. However, an age gap less than two years cannot be considered as a very significant difference in this context. Similarly, the eligible workers have on average, about 0.66 more years of schooling which is about 8 months. This difference is also not very significant in this context. However, the annual household income of the eligible workers is about KRW1.86 million more than the non-eligible workers. Finally, for marital status and the number of kids, there is no systematic difference. Even though we found a few differences in age, level of education and household income, it is still safe to assume that the sample is very close to random. However, to prevent these minor differences from biasing the estimates, we include both the variables that show differences and those that do not show differences as control variables.

Table 4.5: Balance Test at the Baseline – 2003.

| <i>Variable</i> | (1) Control | (2) Treatment | (3) Diff(T-C) |
|----------------------------------|--------------------|--------------------|----------------------|
| Age | 39.619 (11.530) | 37.914 (10.681) | -1.705*** (0.417) |
| Married | 0.747 (0.435) | 0.723 (0.448) | -0.024 (0.017) |
| Number of kids (0yrs~highschool) | 0.780 (0.940) | 0.792 (0.923) | 0.012 (0.036) |
| Total years of schooling | 11.957 (4.125) | 12.617 (3.273) | 0.661*** (0.133) |
| Total Household Income (log) | 7.706 (0.889) | 7.892 (0.659) | 0.186*** (0.028) |
| Observations | 858 | 3,244 | 4,102 |

Notes: This table reports the differences between the control group and the treatment group at the baseline (2003). Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3.2 Falsification Test

Before we estimate the impact of the policy, we first test the common trends assumption which states that without the policy, there would have been no systematic difference in the rate of change in the well-being of the eligible and non-eligible workers (Angrist & Pischke, 2008). To do this, we conduct a falsification test by estimating equation (5). However, we use a

placebo treatment year (2002). While the adoption of the policy started in 2004, in this test, we assume that all the eligible workers were treated in 2002. The expectation is that if the common trends assumption holds, then the DID estimator would not be significantly different from zero. [Tables 4.6](#) reports the results for the falsification test. In column 1, we do not include any individual control variables, whilst in column 2, we add various individual control variables. In column 3, which is the most robust among all three, we include firm size fixed effects and regional fixed effects. As expected, the estimates from all the three specifications are not statistically significant.

Table 4.6: Falsification Test Using 2002 as Treatment Year

| | (1) | (2) | (3) |
|---|------------------|------------------|------------------|
| <i>Panel A: Dependent Variable – Life Satisfaction</i> | | | |
| DID (Placebo x Eligibility) | 0.024 (0.047) | 0.031 (0.045) | 0.030 (0.045) |
| Individual Controls | YES | YES | YES |
| Firm Size Fixed Effect | NO | NO | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 24,819 | 24,642 | 24,642 |
| R^2 | 0.469 | 0.474 | 0.475 |
| <i>Panel A: Dependent Variable – Job Satisfaction</i> | | | |
| DID (Placebo x Eligibility) | 0.061 (0.039) | 0.043 (0.042) | 0.043 (0.042) |
| Individual Controls | YES | YES | YES |
| Firm Size Fixed Effect | NO | NO | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 24,764 | 24,587 | 24,587 |
| R^2 | 0.486 | 0.489 | 0.489 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3.3 Impact on Life Satisfaction

This section analyses the policy's effect on life satisfaction and its related channels. [Table 4.7](#) reports the estimates of the OLS regression based on equation (5) which shows the effect of the policy on life satisfaction. In column 1, we do not include any individual control variables,

whilst in column 2, we add various individual control variables. In column 3, which is the most robust among all three, we include firm size fixed effects and regional fixed effects. The estimates of the three specifications are not significantly different from each other. Column 3 reports that the policy positively affected life satisfaction. The difference-in-difference estimator shows that life satisfaction increased by 0.19 standard deviations which is statistically significant. This means the policy achieved its purpose of improving the well-being (overall life satisfaction) of the workers as expected.

Table 4.7: Impact of the Policy on Life Satisfaction

| <i>Variables</i> | (1) | (2) | (3) |
|--------------------------|-----------------------|----------------------|-----------------------|
| Post | -0.1991*** (0.057) | -0.1985** (0.057) | -0.2077*** (0.057) |
| DID (Post x Eligibility) | 0.1801** (0.057) | 0.1778** (0.057) | 0.1782** (0.058) |
| Individual Controls | YES | YES | YES |
| Firm Size Fixed Effect | NO | NO | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 17,339 | 17,227 | 17,227 |
| R^2 | 0.474 | 0.479 | 0.481 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). In this estimation, we assume that the pre-introduction period is 2001 and the post-introduction period is all years after 2002. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We, additionally, evaluate the impact of the policy on the channels of life satisfaction including satisfaction with leisure, household income, family relations, and social relations. [Table 4.8](#) presents the regression estimates of the overall life satisfaction channels. Column 1 contains the estimates of the policy's effect on satisfaction with household income, column 2 satisfaction with leisure, column 3 satisfaction with social relations, and column 4 satisfaction with family relations. While Column 1 and column 2 show negative and positive effects on satisfaction with household income and leisure respectively, both estimates are not statistically significant. However, in column 3 and column 4, the estimates indicate a positive impact of the policy on satisfaction with social relations and family relations respectively. While satisfaction with social relations increased by 0.17 standard deviations, satisfaction with family relations

increased by 0.26 standard deviations, both of which are statistically significant. This indicates that the increase in overall life satisfaction is a result of increases in satisfaction with family and social relations due to the reduced work hours.

Table 4.8: Impact of the Policy on Life Satisfaction Channels

| | (1) Satisfaction with Household Income | (2) Satisfaction with Leisure | (3) Satisfaction with Social Relations | (4) Satisfaction with Family Relations |
|--------------------------|--|-------------------------------------|---|--|
| Post | 0.0504 (0.060) | -0.1092 (0.061) | -0.1947** (0.057) | -0.3192*** (0.063) |
| DID (Post x Eligibility) | -0.0721 (0.069) | 0.0993 (0.073) | 0.1683** (0.060) | 0.2598*** (0.066) |
| Individual Controls | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES |
| Observations | 17,226 | 17,224 | 17,222 | 17,223 |
| R^2 | 0.528 | 0.449 | 0.406 | 0.437 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3.4 Impact on Job Satisfaction

Table 4.9 reports the OLS regression results based on equation (2) which shows the policy's effect on job satisfaction.

Table 4.9: Impact of the Policy on Job Satisfaction

| Variables | (1) | (2) | (3) |
|--------------------------|--------------------|--------------------|--------------------|
| Post | -0.0351 (0.062) | -0.0397 (0.060) | -0.0538 (0.059) |
| DID (Post x Eligibility) | 0.1120 (0.064) | 0.1133 (0.062) | 0.1202 (0.061) |
| Individual Controls | NO | YES | YES |
| Firm Size Fixed Effect | NO | NO | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 17,292 | 17,180 | 17,180 |
| R^2 | 0.483 | 0.486 | 0.487 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The column 1 specification does not have any individual control variables, whilst in column 2,

we add various individual control variables. In column 3, which is the most robust among all three, we incorporate firm-size fixed effects and regional fixed effects. The estimates are robust to all three specifications. Although the estimates indicate an increase in job satisfaction due to the policy, they are not statistically significant. This means the policy did not have any significant influence on job satisfaction.

We further estimate the impact of the policy on the channels of job satisfaction. [Table 4.10](#) reports the regression results for the job-related channels of well-being. While column 1 reports the results for the policy’s effect on satisfaction with work hours, column 2 reports the estimates of the policy’s effect on satisfaction with wages or earnings. The policy, per the results, had a positive impact on satisfaction with work hours. More specifically, after the policy’s adoption, satisfaction with work hours increased by 0.26 standard deviations. However, there was no statistically significant impact of the policy on satisfaction with wages or earnings.

Table 4.10: Impact of the Policy on Job Satisfaction-related Channels

| | (1) Satisfaction with Work Hours | (2) Satisfaction with Wages/Earnings |
|--------------------------|--|--|
| Post | -0.2182*** (0.054) | 0.0553 (0.066) |
| DID (Post x Eligibility) | 0.2625*** (0.054) | 0.0149 (0.063) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 17,223 | 17,230 |
| R^2 | 0.466 | 0.468 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3.5 Impact on Income

While the main focus of this paper is to estimate how the policy affected subjective well-being, it would also be interesting to know how it affected the income of the workers since income has been found to be a major channel for variations in subjective well-being. Therefore, in this

section, we estimate the policy’s effect on the labor income of the workers using the average monthly wage to represent *earned labor income*.

Table 4.11: Impact on Income (Average Monthly Wages)

| Variables | (1) | (2) | (3) |
|--------------------------|----------------------|----------------------|----------------------|
| Post | 24.463*** (5.961) | 22.432*** (5.675) | 21.899*** (5.784) |
| DID (Post x Eligibility) | 5.466 (6.489) | 5.946 (6.187) | 6.450 (6.157) |
| Individual Controls | NO | YES | YES |
| Firm Size Fixed Effect | NO | NO | YES |
| Regional Fixed Effect | NO | NO | YES |
| Observations | 17,357 | 17,249 | 17,249 |
| Adjusted R^2 | 0.575 | 0.583 | 0.582 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include the log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.11 reports the impact of the policy on the labor income (average monthly wage) of the workers. Column (1) reports the estimates of the specification without control variables, in column (2) we include the full set of control variables but not firm and regional fixed effects, and in column (3) we include the firm and regional fixed effects. The estimates indicate that the policy did not have any statistically significant effect on the wages of the eligible workers. Although not statistically significant, we can see that the monthly wages increased by approximately KRW 60,000. However, since the estimates are not statistically significant, we can conclude that the policy did not significantly affect the income of the workers.

4.3.6 Impact on Work Hours

Table 4.12 reports the estimates of the impact of the policy on average weekly work hours. While column 1 contains the estimates for the full sample, columns 2 and 3 present the estimates for the female and male subsamples respectively. In all three specifications, we control for individual, year, regional and firm size fixed effects. The column 1 estimates indicate that the policy had a negative impact on average weekly work hours. Specifically,

average weekly work hours decreased by approximately 5.6 hours (about 336 minutes). Moreover, comparing column 2 and column 3 reveals that the decrease in work hours does not significantly differ between females and males.

Table 4.12: Impact of the Policy on Average Weekly Work Hours

| <i>Variables</i> | (1) | (2) | (3) |
|--------------------------|-----------------------|-----------------------|-----------------------|
| | Full Sample | Female | Male |
| Post | 3.9036*** (1.100) | 3.8670** (1.172) | 3.6202* (1.430) |
| DID (Post x Eligibility) | -5.5706*** (1.165) | -5.0788*** (1.272) | -5.1311*** (1.473) |
| Individual Controls | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES |
| Observations | 17,303 | 6,299 | 11,004 |
| R^2 | 0.544 | 0.556 | 0.527 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3.7 Impact on Overtime Work Hours and Wages

As discussed above, the policy also has the potential to affect overtime work hours and wages. We can use this analysis to verify whether those who were happy with the reduced work hours maintained or even reduced their overtime hours and/or those who were unhappy with the policy increased their overtime hours to compensate for the reduced hours. The hourly wage analysis allows us to verify whether the change in overtime work (if any) is purely a result of wage change or as a result of the policy.

Table 4.13 reports the results for the impact of the policy on average weekly overtime work hours (column 1) and average hourly wages (column 2). In both estimations, we control for individual, year, firm size and regional fixed effects, as well as individual control variables. Although not reported, other specifications without the regional and firm size fixed effects produce similar estimates. The results in column 1 indicate that there was no change in average weekly overtime work hours; although not significant, it shows a decrease in overtime work.

However, in column 2, we find that the average hourly wage increased by 5 percentage points. This indicates that, even though hourly wages increased, on average, it did not motivate workers to increase their overtime (elasticity (ϵ)=0); thus, we can state that the average worker was satisfied with the policy.

Table 4.13: Impact of the Policy on Overtime Work and Wages

| <i>Variables</i> | (1) | (2) |
|--------------------------|-------------------------------|----------------------------|
| | Average Weekly Overtime Hours | Average Hourly Wages (Log) |
| Post | 0.4732 (0.272) | 0.0150 (0.020) |
| DID (Post x Eligibility) | -0.1494 (0.322) | 0.0525* (0.021) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 17,303 | 17,249 |
| R^2 | 0.430 | 0.795 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.4 Heterogeneity Analysis

One way to identify heterogeneity in the effect of the policy is to measure the policy's effect on different subsamples. In this section, we conduct various decomposition analyses of the impact of the policy based on the individual and household characteristics of the workers such as gender, household income levels, and age.

4.4.1 Gender Heterogeneity

One way to examine the different well-being responses to the policy is to analyze the impact of the policy for each gender subsample.

Table 4.14 reports the results of the gender heterogeneity estimation for life satisfaction and job satisfaction. Panel A reports the estimates for the female subsample while Panel B presents that of the male subsample. The four columns show two different specifications for both life satisfaction and job satisfaction. The estimates in Panel A imply that the policy had no

significant influence on the life satisfaction and job satisfaction of the female workers. However, in Panel B column (4) the results indicate that the policy had a statistically significant impact on the male workers' life satisfaction; the policy increased life satisfaction by approximately 0.20 standard deviations for the male workers. This indicates that the change in overall life satisfaction was driven by the effect of the policy on the male workers but not the female workers.

Table 4.14: Heterogeneity by Gender – Life Satisfaction and Job Satisfaction

| <i>Variables</i> | Life Satisfaction | | Job Satisfaction | |
|--------------------------------|-------------------|-----------|------------------|---------|
| | (1) | (2) | (3) | (4) |
| <i>Panel A: Females</i> | | | | |
| Post | -0.1891* | -0.1990* | -0.0607 | -0.0748 |
| | (0.094) | (0.096) | (0.074) | (0.078) |
| DID (Post x Eligibility) | 0.1448 | 0.1493 | 0.0947 | 0.0851 |
| | (0.095) | (0.099) | (0.086) | (0.087) |
| Individual Controls | NO | YES | NO | YES |
| Firm Size Fixed Effect | NO | YES | NO | YES |
| Regional Fixed Effect | NO | YES | NO | YES |
| Observations | 6,308 | 6,270 | 6,287 | 6,249 |
| R^2 | 0.483 | 0.489 | 0.464 | 0.471 |
| <i>Panel B: Males</i> | | | | |
| Post | -0.2059** | -0.2193** | -0.0126 | -0.0306 |
| | (0.072) | (0.072) | (0.082) | (0.080) |
| DID (Post x Eligibility) | 0.1983** | 0.2015** | 0.1058 | 0.1149 |
| | (0.072) | (0.073) | (0.081) | (0.077) |
| Individual Controls | NO | YES | NO | YES |
| Firm Size Fixed Effect | NO | YES | NO | YES |
| Regional Fixed Effect | NO | YES | NO | YES |
| Observations | 11,031 | 10,957 | 11,005 | 10,931 |
| R^2 | 0.466 | 0.475 | 0.492 | 0.498 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We further estimate the gender heterogeneity in the impact of the policy on the channels of life and job satisfaction. [Table 4.15](#) reports the results of the gender heterogeneity estimation for satisfaction with work hours, wages/earnings, leisure, household income, family relations, and social relations.

Table 4.15: Heterogeneity by Gender – Other Measures of Satisfaction

| | (1) | (2) | (3) | (4) | (5) | (6) |
|--------------------------------|-----------------------|--------------------|---------------------|---------------------|-----------------------|-----------------------|
| | Work Hours | Wage/ Earnings | Leisure | Household Income | Family Relations | Social Relations |
| <i>Panel A: Females</i> | | | | | | |
| Post | -0.1291 (0.089) | 0.0924 (0.091) | -0.0502 (0.087) | 0.0225 (0.094) | -0.3389*** (0.089) | -0.3746*** (0.093) |
| DID (Post x Eligibility) | 0.1763 (0.102) | -0.0744 (0.093) | 0.0193 (0.107) | -0.0969 (0.107) | 0.2280* (0.103) | 0.2741** (0.099) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 6,263 | 6,269 | 6,271 | 6,274 | 6,272 | 6,271 |
| R ² | 0.469 | 0.448 | 0.478 | 0.548 | 0.434 | 0.414 |
| <i>Panel B: Males</i> | | | | | | |
| Post | -0.2766*** (0.072) | 0.0300 (0.080) | -0.1681* (0.073) | 0.0633 (0.067) | -0.3059*** (0.085) | -0.0477 (0.056) |
| DID (Post x Eligibility) | 0.3105*** (0.064) | 0.0498 (0.076) | 0.1674* (0.077) | -0.0599 (0.075) | 0.2736** (0.082) | 0.0599 (0.057) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 10,960 | 10,961 | 10,953 | 10,952 | 10,951 | 10,951 |
| R ² | 0.464 | 0.480 | 0.429 | 0.518 | 0.437 | 0.402 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results in column (1) indicate that the policy had a statistically significant positive effect (0.31 standard deviation increase) on the satisfaction with hours of the male workers but no significant impact on that of the female workers. Similarly, whilst there was an increase of about 0.17 standard deviation in the satisfaction with leisure of the male workers, there was no impact on that of the female workers. However, the estimates in column 6 indicate that there was a statistically significant 0.27 standard deviations increase in the female workers' satisfaction with social relations while there was none for that of the male workers. Finally, column 5 shows that there was an increase of 0.23 standard deviations and 0.27 standard deviations in the satisfaction with family relations of the female and male workers respectively,

both of which are statistically significant. Although there was no overall effect of the policy on satisfaction with leisure, the decomposition analysis indicates that the policy had a positive effect on male workers' satisfaction with leisure without any significant effect on the females.

4.4.2 Income Heterogeneity

Another way to identify heterogeneity in the response to the policy is to estimate the impact of the policy on a subsample based on household income levels. In this section, we estimate the policy's impact on the well-being of workers whose household income is above the average household income and that of those whose income is below or equal to the average. The average annual household income of both the eligible and non-eligible workers in the full sample is approximately KRW36,368,590.

Table 4.16: Heterogeneity by Income Level – Life Satisfaction and Job Satisfaction

| <i>Variables</i> | (1) Life Satisfaction | (2) Job Satisfaction |
|---|--------------------------|-------------------------|
| <u>Panel A: Above Average Household Income</u> | | |
| Post | -0.0503 (0.093) | -0.0987 (0.094) |
| DID (Post x Eligibility) | 0.0312 (0.100) | 0.1327 (0.102) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 6,399 | 6,381 |
| R^2 | 0.537 | 0.564 |
| <u>Panel B: Below Average Household Income</u> | | |
| Post | -0.3051*** (0.087) | -0.0489 (0.068) |
| DID (Post x Eligibility) | 0.2266* (0.087) | 0.0873 (0.079) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 10,828 | 10,799 |
| R^2 | 0.482 | 0.483 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. Panel A consists of workers whose total household income is above the average and Panel B contains workers whose average income is below or equal to the average. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.16 reports the results of the income heterogeneity estimation for life satisfaction and job satisfaction. Column (1) Panel B shows that the policy had a statistically significant positive effect (increased by 0.23 standard deviations) on the life satisfaction of the low- and average-income workers whereas it did not have any significant effect on that of the high-income workers. This means the increase in overall life satisfaction was driven by the low- and average-income workers whose life satisfaction increased due to the policy.

Table 4.17: Heterogeneity by Income Level - Other Measures of Satisfaction

| <i>Variables</i> | (1) | (2) | (3) | (4) | (5) | (6) |
|---|-----------------------|--------------------|---------------------|--------------------|-----------------------|-----------------------|
| | Work Hours | Wage/ Earnings | Household Income | Leisure | Family Relations | Social Relations |
| <i>Panel A: Above Average Household Income</i> | | | | | | |
| Post | -0.3254*** (0.091) | 0.1295 (0.088) | 0.1367 (0.119) | -0.0374 (0.098) | -0.1844 (0.105) | -0.0503 (0.126) |
| DID (Post x Eligibility) | 0.2790** (0.098) | -0.0467 (0.096) | -0.1097 (0.124) | 0.1096 (0.113) | 0.1109 (0.107) | 0.0719 (0.134) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 6,396 | 6,395 | 6,395 | 6,392 | 6,392 | 6,392 |
| R^2 | 0.551 | 0.563 | 0.563 | 0.510 | 0.494 | 0.466 |
| <i>Panel B: Below Average Household Income</i> | | | | | | |
| Post | -0.1737* (0.077) | 0.0293 (0.087) | 0.0595 (0.089) | -0.0971 (0.081) | -0.4093*** (0.098) | -0.3022*** (0.078) |
| DID (Post x Eligibility) | 0.2186** (0.079) | 0.0278 (0.090) | -0.1083 (0.096) | 0.0625 (0.088) | 0.3734*** (0.101) | 0.2022* (0.086) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 10,827 | 10,835 | 10,831 | 10,832 | 10,831 | 10,830 |
| R^2 | 0.482 | 0.450 | 0.505 | 0.471 | 0.470 | 0.450 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variable is used. Panel A consists of workers whose total household income is above the average and Panel B contains workers whose average income is below or equal to the average. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Moreover, we estimate the income heterogeneity in the impact of the policy on the channels of life and job satisfaction. Table 4.17 reports the results of the income heterogeneity estimation

for satisfaction with work hours, wages/earnings, leisure, household income, family relations, and social relations. While the policy increased the satisfaction with work hours of both income groups, there exists a modest disparity of 0.06 standard deviations in the magnitude of the impact among the two groups (0.28 standard deviations for the high-income workers and 0.22 for the low- and average-income workers). Panel B column (5) and column (6) respectively show 0.37 and 0.20 standard deviations increase in satisfaction with family relations and satisfaction with social relations for the low- and average-income workers. However, in Panel A, we find that except for satisfaction with work hours, there was no significant impact on the high-income workers. This also indicates that the majority of the increase in life satisfaction was driven by an increase in the life-related satisfaction channels of the low- and average-income workers.

4.4.3 Age Heterogeneity

There could also be heterogeneity in the response to the policy based on the age of the workers. In this section, we examine the differences in response to the policy based on two age groupings – Group A is composed of workers who are between 20 and 40 years old whereas Group B is made up of workers who are above 40 years old. This distinction assumes that at ages between 20 and 40, workers have active lives and might either require more leisure time for their social activities or might want to devote more time to their work to make progress in their career. On the other hand, workers who are over 40 years old are relatively not active. Furthermore, their health and energy levels may not support long hours of work. Thus, they would prefer shorter working hours. Therefore, whilst the expected response for the younger workers is ambiguous, we expect the older workers to respond positively to the policy.

[Table 4.18](#) reports the results of the age heterogeneity estimation for overall life satisfaction and job satisfaction. While there was an increase in the life satisfaction of the older workers, there was no significant impact on that of the younger workers. Specifically, the overall life

satisfaction of the workers above 40 years old increased by 0.22 standard deviations. This means the increase in life satisfaction was mainly driven by older workers whose life satisfaction increased due to the policy. However, the job satisfaction of both groups was not statistically impacted by the policy. This is consistent with our prediction of a positive response from the older workers.

Table 4.18: Heterogeneity by Age – Life Satisfaction and Job Satisfaction

| <i>Variables</i> | (1) | (2) |
|---|----------------------|--------------------|
| | Life Satisfaction | Job Satisfaction |
| <i>Panel B: Above 40 years</i> | | |
| Post | -0.2207** (0.072) | -0.1177 (0.104) |
| DID (Post x Eligibility) | 0.2180** (0.076) | 0.1808 (0.100) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 8,295 | 8,275 |
| R^2 | 0.520 | 0.526 |
| <i>Panel A: 40 years and Below</i> | | |
| Post | -0.2318** (0.081) | -0.0170 (0.079) |
| DID (Post x Eligibility) | 0.1650 (0.086) | 0.0882 (0.089) |
| Individual Controls | YES | YES |
| Firm Size Fixed Effect | YES | YES |
| Regional Fixed Effect | YES | YES |
| Observations | 8,932 | 8,905 |
| R^2 | 0.483 | 0.486 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variables is used. Panel A contains workers who are 40 years and below and Panel B consists of workers who are over 40 years old. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Similarly, we analyze the possibility of age heterogeneity in the impact of the policy on the life and job satisfaction channels. Table 4.19 reports the results of the age heterogeneity estimation for satisfaction with work hours, wages/earnings, leisure, household income, family relations, and social relations. Column (1) shows that the policy increased satisfaction with work hours of both age groups. Panel A, column 1 indicates that the satisfaction with work hours of the

younger workers increased by 0.34 standard deviations which is higher than that of the older workers (Panel B, column 1) which increased by 0.22 standard deviations. Column (5) indicates policy had a positive effect on satisfaction with family relations of both groups of workers and that there is no significant difference in the impact on both workers. Furthermore, in column (6) we find that the younger workers' satisfaction with social relations increased by 0.25 standard deviations whereas that of the older workers did not change.

Table 4.19: Heterogeneity by Age* - Other Measures of Satisfaction

| <i>Variables</i> | (1) | (2) | (3) | (4) | (5) | (6) |
|---|-----------------------|--------------------|---------------------|--------------------|-----------------------|-----------------------|
| | Work Hours | Wage/ Earnings | Household Income | Leisure | Family Relations | Social Relations |
| <u>Panel A: Above 40 years</u> | | | | | | |
| Post | -0.1612 (0.099) | 0.0689 (0.099) | 0.0684 (0.094) | -0.1191 (0.073) | -0.2779** (0.089) | -0.1092 (0.104) |
| DID (Post x Eligibility) | 0.2239* (0.106) | -0.0374 (0.101) | -0.1002 (0.112) | 0.0826 (0.081) | 0.2585** (0.095) | 0.1134 (0.114) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 8,300 | 8,302 | 8,296 | 8,295 | 8,294 | 8,293 |
| R ² | 0.501 | 0.515 | 0.572 | 0.497 | 0.470 | 0.441 |
| <u>Panel B: 40 years and Below</u> | | | | | | |
| Post | -0.3280*** (0.075) | 0.0827 (0.098) | 0.0182 (0.080) | -0.0894 (0.098) | -0.3479*** (0.081) | -0.3106*** (0.081) |
| DID (Post x Eligibility) | 0.3391*** (0.076) | 0.0227 (0.101) | -0.0320 (0.085) | 0.0968 (0.112) | 0.2300** (0.084) | 0.2532** (0.090) |
| Individual Controls | YES | YES | YES | YES | YES | YES |
| Firm Size Fixed Effect | YES | YES | YES | YES | YES | YES |
| Regional Fixed Effect | YES | YES | YES | YES | YES | YES |
| Observations | 8,923 | 8,928 | 8,930 | 8,929 | 8,929 | 8,929 |
| R ² | 0.478 | 0.468 | 0.523 | 0.447 | 0.450 | 0.418 |

Notes: Standard errors clustered at firm size times year are shown in parentheses. The standardized form of the dependent variables is used. Panel A contains workers who are 40 years and below and Panel B consists of workers who are over 40 years old. The individual control variables include log of household income, age, marriage dummy, number of kids (0yrs to high school), 8 dummies of the level of education (1=No Schooling; 8=Doctorate). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

DISCUSSION OF FINDINGS

5.1 Discussion of Findings

In this section, we put forward an overview of the findings, what they mean and their implications. The trends in the changes in work hours indicate that, overall, work hours in Korea continue to decrease rapidly. However, an interesting revelation is that whilst the regular work hours of full-time workers who used to work more than the specified work hours (40 hours per week) before the policy continue to decrease, that of part-time workers and regular workers who used to work less than 40 hours before 2004 continued to increase until 2011 when it began to drop. According to [Seong \(2005\)](#), this could be an indication that employers tried to absorb the reduced work hours of their employees by increasing the work hours of full-time workers who were working less than 40 hours and/or increasing the work hours of their part-time workers or even possible employing more part-time workers. This means whilst the intensive margin of the full-time workers decreased, that of part-time workers and “underutilized” full-time workers increased. Between 2003 and 2004, more part-time workers were hired in firms with over 1000 workers, whilst the number of part-time workers in firms with less than 1000 employees reduced ([Seong, 2005](#)).

Furthermore, we found that between work hours and happiness (both life satisfaction and job satisfaction), the relationship is inverted U-shaped. This is consistent with the extant literature ([Rätzl, 2009](#); [Knabe & Rätzl, 2010](#); [Muffels & Kempermann, 2011](#); [Collewet & Loog, 2015](#); [Wang, 2015](#)). However, there was no significant relationship between family well-being and work hours. The relationship is said to be inverted U-shaped because at very low hours of work, any increment in work hours relates to a corresponding increase in well-being. However, as work hours continue to increase, its positive effect on well-being reaches a maximum (no change) and then begins to decline. This point at which an increase in work hours maximizes well-being is known as the optimum work hours. We find that the optimum work hours differ

for both job and life satisfaction; while job satisfaction is maximized at 43 hours per week, life satisfaction is maximized at 48 hours per week. However, the majority of the workers have their average weekly work hours above the optimum work hours.

Moreover, as expected, the policy analysis revealed that the work hour reduction policy had a negative impact on average weekly work hours. In other words, the policy decreased the average weekly work hours by about 5.6 hours. Further decomposition of this impact revealed that the change in work hours of the female and male workers was statistically similar. Likewise, the policy caused an increment in life satisfaction and its related channels, including satisfaction with family relations and social relations. The biggest impact of the policy was realized in the satisfaction with work hours followed by satisfaction with social relations. However, there was no overall impact on job satisfaction and one of its related channels, satisfaction with wages/earnings. Similarly, there was no overall impact on some life satisfaction-related channels such as satisfaction with leisure and household income. These results, therefore, confirm the hypothesis of the study and the objective of the policy that well-being increases when working hours are reduced. Besides, even with the results which are not statistically significant, we find that the direction of change is consistent with our expectations.

We argue that there are three possible explanations for the failure of the policy to have the expected positive impact on job satisfaction. Firstly, the optimum work hours required to maximize job satisfaction are around 43 hours, however, under this policy, the standard number of hours per week is 40 hours plus an extra 12 hours of overtime work hours. Therefore, a reduction to a level that is 3 hours lower or including overtime hours which makes work hours still higher than the optimum working hours might rather reduce job satisfaction. Secondly, although work hours reduced as seen in the results, employers might have tried to absorb the lost time by increasing the work intensity or modifying the format of holidays and leave (Seong, 2005; Rudolf, 2014). In fact, Rudolf (2014), using a sample of 899 workers, found a 9.7%

increase in the probability that work intensity increased after the reduction in the statutory work hours. This means workers would have to do the same amount of work, but now, in a shorter period of time. Thus, while they had the chance to go home early, they were expected to do more work per hour than before. Thus, increased work intensity might counteract any increment in job satisfaction effect of the policy. [Bakker et al. \(2006\)](#) argue that an increase in the intensity of work can negatively affect employee well-being (job satisfaction) due to increased stress levels. Finally, it could also be because some employers did not comply with the said policy; eligible workers, especially those in the private sector used in the analysis of this study, might not have actually gotten their work hours reduced. However, there is not enough data in the KLIPS dataset to confirm this assumption.

We also evaluated the impact of the policy on the income of the workers using their nominal average monthly wages as a proxy for their labor income. We found no statistically significant effect. However, although the estimates are not significant, their direction of change contains interesting information. It shows that there was an increase in average monthly wages of about KRW 60,000. As stated earlier, this cannot be significantly attributed to the policy. A better proxy for measuring the effect on income would have been the average annual earned income. However, this information is not included in the dataset until 2003 (our analysis is based on data from 2001 to 2009).

Additionally, we found that the policy had no significant impact on average weekly overtime work hours even though the average hourly wage went up by about 5 percentage points. In fact, although not significant, the sign of change in overtime work was negative. This could be a confirmation that the workers became happier (increased life satisfaction) after the reduction in their work hours so they decided not to compensate for the 'lost' time. This is consistent with the prediction in our conceptual framework that if the utility of workers increases they may either not change their overtime hours or even reduce overtime work. Nonetheless, care

must be taken when interpreting this argument since the decision to work overtime may depend on the availability of overtime work and approval from the employer. Furthermore, the policy did not only change work hours but also modified the definitions of overtime hours and the required remuneration.

To reveal any heterogeneity in the impact of the policy, we conducted various decomposition analysis based on gender, age, and household income levels. We found that while the policy had no effect on the life and job satisfaction of the female workers, it generated a significant increase in the life satisfaction of the male workers. Similarly, while there was a positive effect on the satisfaction with work hours of the male workers, there was no such impact on the female workers. Interestingly, even though there was no overall impact of the policy on satisfaction with leisure, we found that the policy increased the male workers' satisfaction with leisure. Finally, while there was a positive impact on the female workers' satisfaction with both family relations and social relations, only the satisfaction with family relations of the male workers was positively affected. This indicates that while there might be similarities in the response to the policies, there are also significant gender differences with regard to the impact of the policy.

The study also reveals that whilst the policy increased the life satisfaction of the older workers (above 40 years old), there was no significant impact on the younger workers (ages 20 to 40). Also, the impact on satisfaction with work hours, although positive for both age groups, was significantly higher among the younger workers. Moreover, while there was an increase in the satisfaction with family relations, the magnitude of the impact for both groups of workers was similar. Finally, the policy had a positive effect on the younger workers' satisfaction with social relations but did not have any impact on that of the older workers. This indicates that the well-being and free time needs of younger workers are different from that of the older workers.

Finally, we found that the increase in life satisfaction was driven by the workers whose household income is below or equal to the average household income of about KRW 36 million. Similarly, the positive impact of the policy on satisfaction with both family and social relations was exclusive to the low- and average-income workers. Moreover, although there was a positive impact on both groups' satisfaction with work hours, it was more dominant among the high-income workers. These findings indicate that the policy impacted low- and average-income workers more than their high-income counterparts. The possible explanation for this could be the wage effect of the policy; they receive the same wages for relatively fewer hours of work (increase in base hourly wages) as found in this study.

5.2 Limitations of the Study

Whilst we are confident about the internal validity of this study and have also shown that the findings are robust to different specifications, care must be taken when interpreting its external validity or generalizing the results. This is because the design and implementation of the policy, as well as the policy-setting, might differ from other contexts. Furthermore, there are numerous unobservable determinants of happiness such as cultural values and perceptions of well-being which might differ across countries and regions. Thus, the findings in this study cannot be a general representation of how people across the globe or in different regions would respond to a statutory reduction in working hours. Notwithstanding, the findings could be of great help to policymakers and researchers across the globe.

Secondly, the findings of this study are restricted to the assumption that all eligible workers had a reduction in their work hours at the designated time. This assumption may be difficult to confirm due to data limitations. In other words, the study assumes 100% compliance with the requirements of the policy since the dataset does not have enough information on the compliance rate. Non-compliance can introduce bias in the estimates; this could either

overestimate or underestimate the effect on well-being. Thus, the results should be taken as based on an intention-to-treat (ITT) estimation.

Moreover, the analysis is based on workers' self-reported firm size which might not be accurate. This is because some workers might not accurately know the number of employees at the firm, especially when the firm is relatively big. Similarly, the work hour variable used is based on the employees' reported figures; as seen from the analysis, some workers reported as high as 148 hours per week which is unrealistic. Inaccuracies in the reported firm sizes and work hours may affect the grouping of the workers into control and treatment groups. The best option would have been to use employer reported firm size and work hours. However, limitations in the dataset do not allow this. Notwithstanding, the specifications used for the analysis eliminates some of these measurement errors.

CONCLUSION

This paper evaluates the effect of statutory reductions in work hours on the subjective well-being of workers. Generally, the findings indicate that the policy had a positive impact on life satisfaction but had no significant impact on job satisfaction. Further analysis revealed that this positive impact on life satisfaction was through increases in satisfaction with work hours, family relations, and social relations. Furthermore, regarding heterogeneity, the policy effect was more compelling among male workers, older workers, and low- and average-income workers. The study further revealed that the current work hour arrangement pegs working hours higher than the optimum working hours. Thus, we recommend that any future efforts to improve workers' well-being through work hour reduction should target the optimum working hours to maximize the well-being of workers. Moreover, since the findings show that the policy does not benefit different groups of workers equally, alternative and/or complementary policy efforts should be made to increase the well-being of those groups of workers whose subjective well-being was not significantly impacted by the policy, including female workers, younger workers, and high-income workers. Although these insights are based on data from Korea, other countries with long work hours can take lessons from this study to improve the well-being of its workers.

Further research can include information on the compliance rate. Knowledge of the extent to which employers complied with the regulation to reduce work hours would help tell a full story about the impact of the policy. Secondly, it is expected that when work hours are reduced, workers would use the new 'free time' for self-development, leisure activities, family activities, etc. However, to the best of our knowledge, no study has focused on how workers use their time after work hours are reduced. This is important because, research has shown that increased leisure time may increase unhealthy lifestyles such as smoking, alcoholism, etc. Therefore, future studies can try to fill this gap.

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