

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF ECONOMICS

UNDERSTANDING THE EFFECTS OF EMPLOYMENT LEGISLATION ON FEMALE
PARTICIPATION IN THE LABOR FORCE FROM 1980-2004

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SPRING 2016

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Economics and Supply Chain Management
with honors in Economics

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ABSTRACT

The purpose of this paper is to understand the effects employment legislation has on female participation in the labor force. On a broader level, this paper explores how formal institutions influence the labor market outcomes of women, and the driving factors that can improve these outcomes. To proxy for employment legislation I use a labor market rigidity index referred to as LAMRIG. Using an Original Least Squares multivariate regression and fixed effects model, I test the effects of LAMRIG on the FLPR with controls for economic standing, health, education, political representation, and fertility. Overall results show a weak significance and negative relationship between the two variables. However, the results differ widely when the data divides by region.

TABLE OF CONTENTS

LIST OF FIGURES	iii
LIST OF TABLES	iv
ACKNOWLEDGEMENTS	v
Acknowledgements	vi
Chapter 1 - Introduction	1
Chapter 2 - Literature Review	4
Chapter 3 - Data	15
Chapter 4 - Methodology and Model	17
Chapter 5 - Results and Discussion	19
Chapter 6 - Conclusion	24
Appendix	26
BIBLIOGRAPHY	30

LIST OF FIGURES

Figure 1 U-Shape Female LFPR.....6
Figure 2 FLPR Global Trend10

LIST OF TABLES

Table 1 Female Employment Growth Rates	13
Table 2 - World FLPR Results.....	26
Table 3 - Asia FLPR Results	27
Table 4 - Latin America & Caribbean FLPR Results	27
Table 5 - Europe FLPR Results	28
Table 6 - MENA FLPR Results	28
Table 7 - Sub-Saharan Africa FLPR Results	29
Table 8 - FLPR 15 - 24 Results	29

Acknowledgements

I would like to extend my sincerest thanks to my thesis supervisor, Dr. James Tybout for his patience, guidance, and overall support in completing this thesis. Thank you to Dr. Khanjan Mehta for enabling me to participate in academic research and explore entrepreneurship. I would also like to thank Professor Russell Chuderwicz for his immense support and advice over the last four years. Finally, thank you to Dr. Bee Yan Roberts for being an integral figure in my education, inspiring my future plans, and helping me develop the tools to follow through with them.

Chapter 1

Introduction

Governments must focus on improving their countries' labor market conditions to increase female participation in the labor force. Since 2000, governments have renewed their focus and emphasis on gender equality in the form of the Millennium Development Goals (MDGs). Former United Nations Secretary-General Kofi Annan went as far to say that reaching gender equality was a "prerequisite" to achieving the MDGs in poverty and education (United Nations 2005). Countless studies have been conducted on the tremendous private and social returns of increasing girls' and women's education, and income, which benefit themselves, their children, and their country's economic growth (World Bank, 2011). Therefore, female participation in the labor force (FPLF) and its driving factors have become a growing field of interest in economics as researchers and policy makers determine how it can improve.

The simple relationship between economic development and FPLF is that economic growth creates more opportunities for women to work, which adds more women to the labor force and drives economic growth. However, this relationship should be interpreted with caution. Ester Duflo argues and provides evidence that both economic development and FPLF have less of an effect on each other than previously thought, but maintains that these concepts are intrinsically tied together (Duflo, 2012). Furthermore, a country with high economic growth or development does not always translate to having a large proportion of FPLF. Women continue to face many social and political challenges in finding and attaining *gainful* employment everywhere. The challenges are even greater in developing countries (Verick, 2014). Logically, we must look beyond economic growth and instead, study the political and social factors that shape the female labor market. These intangible and systemic factors stem from a country's

institutions. Social institutions have a large effect on FPLF, as the influences of religion and culture in each country have constructed a view of a 'woman's place' in a society (Antecol, 2000). The measurement of these social, or informal, institutional influences is difficult given their imprecise nature.

A more productive endeavor is to observe the effect of political factors, or formal institutional factors, on FPLF. Both laws and policies that are gender-neutral or directly focused on women have the potential to have widespread impact on labor markets. For example, laws in Middle East and North African (MENA) countries that are intended to protect women, like limiting the number of hours that they can work, actually create higher costs for employers and discourages the hiring of them (World Bank, 2008). Unsurprisingly, MENA countries have the some of the lowest levels of FPLF in the world. A term that encapsulates the higher cost of hiring or firing is labor market rigidity, where a labor market takes time to adapt to changes and fluctuations due to rigidities like the laws in MENA countries. In addition, laws can also be of benefit to women in removing barriers and encouraging labor force participation in the form of paid maternity leave and no discrimination policies. In 1988, China passed regulations for women that were designed to protect and promote them in the labor force, which created an environment far more appealing to potential workers (Regulations Concerning Labor Protection...). Therefore, employment legislation and policies can have a direct and important impact on the FPLF (Campos and Nugent, 2012).

As governments look to improve FPLF, understanding the effects of employment legislation on female labor force participation rates (FLPR) provides a clearer path to improving

labor market opportunities for women.¹ Governments would be able to determine what institutional factors, or laws, have detrimental, nonexistent, or positive effects on the labor market for women in their country.

This paper seeks to determine the relationship between employment legislation and the FPLF through empirical evidence. The paper begins with a literature view that explores existing research on FPLF, the determinants of the FLFP, the ties between institutions and FPLF, and the implications of a stagnant FLPR. Next, the paper explains the data, methodology, and model used to determine the effect of employment legislation on the FLPR. The paper concludes with a discussion of the results from analysis, along with limitations and suggestions for future research. I expect to see that employment legislation has a significant and positive relationship with the FLPR as more rigid employment legislation laws offer more protections and improved conditions for women, which in turn encourages higher participation in the labor force.

¹ The female labor force participation rate (FLPR) is a numerical representation of the FPLF for the purposes of this paper.

Chapter 2

Literature Review

This section of the paper will provide an overview of the literature on FPLF, its determinants, the effect of institutions on the FLPR, and the causes behind a stagnant, global FLPR. Studying this literature inherently involves a discussion on gender inequality, and its role in both areas. The last fifteen years have produced numerous theoretical and empirical studies as gender inequality becomes a growing priority for international community.

The Origins of Female Participation in the Labor Force

Studies on the relationship between gender gaps and economic growth cite the labor force participation gender gap as a prime example of this relationship. In a review of this literature Cuberes and Teiginier 2012 present a foundational paper that outlines the main theories behind gender inequality and economic growth (Cuberes, D., & Teignier, M). Becker and Lewis (1973) produced one of the first papers on this subject, where they concluded that the income elasticity of investing in the quality of a child through education was greater than increasing the number of children (Becker, G., & Lewis, 1973). Consequently, a rise in household income eventually translates into reduced fertility, and in turn, an opportunity for women to enter the labor force. Another explanation for how a rise in household income enables increased FPLF is technological progress as suggested by Greenwood, Seshadri and Yorukoglu 2005. Innovations like the microwave, refrigerators, and washing machines drastically reduced the time needed to do housework, and allowed women more time and opportunities to participate in the labor force. Galor and Weil assume that men and women have an equal endowment of mental abilities, and that men also have a larger amount of physical strength. The result is that women are more suited towards service-based, white-collar jobs, and that structural changes in an economy toward these

types of jobs would increase FPLF. In recent times, we have observed this structural shift to service-related jobs, and according to Ngai and Petronoglo this shift makes up 44 percent of the increase in female work hours and a modest decrease in men's work hours (Cuberes, D., & Teignier, M).

Evidently, FPLF is a significant component in the relationship between gender inequality and economic growth. The pioneering work of Mincer (1962) on labor force participation of married women drastically altered how labor participation and female labor participation are determined. He introduced three concepts of time: work at home, work at the market, and leisure. He factored all three into a theoretical model that differentiated between transitory and permanent income. With empirical evidence, Mincer was able to show that wage has a positive impact on labor supply and provided a new framework in which we analyze it.

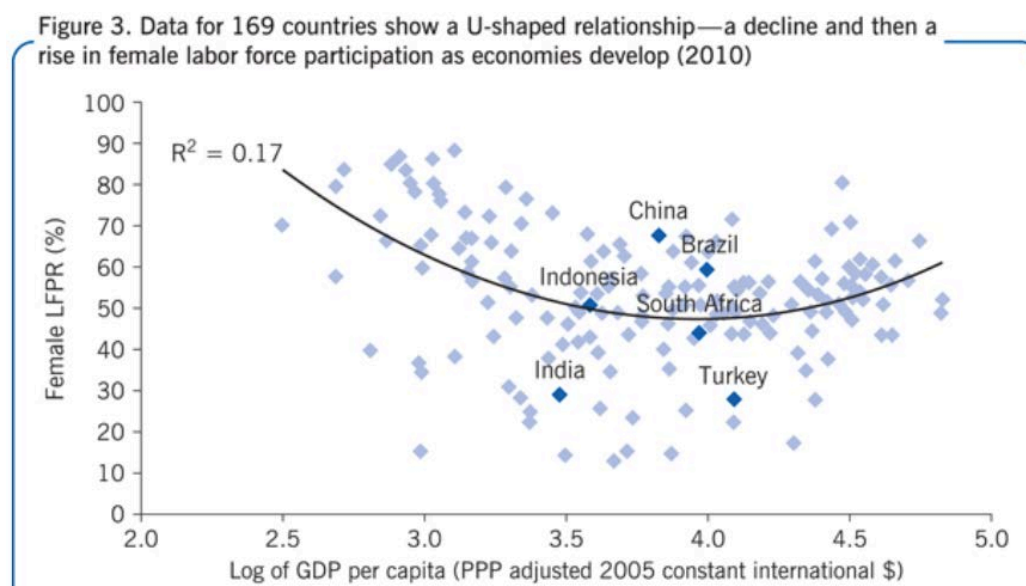
The U-Shaped Hypothesis

As research on FPLF increased, Sinha (1967) presented a surprising observation of the female labor participation rate (FLPR) across countries (Fatima). In a range from poorest to riches countries, the FLPR followed a U-shaped curve where poor countries and highly developed countries had a high FLPR, while middle countries had a lower rate. Sinha's explanation, was that a poor country's reliance on its agricultural sector in early development created the need for female agricultural workers. However, the rise of industrialization and urbanization eliminated the need for female agricultural workers and increased the income of the country, creating a downward sloping curve. As a country continues to develop and industrialize, the FLPR continues its inverse response. Once a country has reached advanced development, the corresponding growth of white-collar, service job provides an opportunity for women to re-enter the labor force. Through further studies this U-shaped pattern has been reproduced and

confirmed, Goldin (1995) showed that this pattern was present between 1967 and 1990 (Goldin).

A modern day study by Lechman and Harleen verified that the U-shape was present between 1990 and 2012 across 162 countries, however high FLPR in low-income countries was not positively confirmed due to the presence of Middle East and North African states (Lechman, Ewa., & Kaur, H.).

Figure 1 U-Shape Female LFPR



Verick, S. (2013). Female Labor Force Participation in Developing Countries. *IZA World of Labor*.

FLFP Determinants

Equally as important to the FPLF are its determinants, which can help us understand how the FLPR is affected by other variables. The first foray into the study of FPLF determinants was by Mahoney (1961), where 427 women in St. Paul, Minnesota were observed. The results of the paper provided the first indications of what drove FPLF, which Mahoney grouped into economic considerations, social unit family considerations, and personal considerations. A problem that occurs when observing the determinants of FPLF are their uniqueness to the country or region in question. The FPLF determinants of the United States vastly differ from Rwanda for a variety of

reasons, with access to resources being a commonly noted cause. In a study by Cebula and Williams (2006), they observed that determinants of women's participation in the US labor force were mainly due to the cost of living and considerations of work ethic (Cebular, Richard., & Williams, A). They also cited age, disability status, obesity, family size, family income, and non-U.S. citizenship as pertinent factor to consider as well. The quality of common determinants like education and age vary significantly depending on a country's geographic location and economic standing. For example, a woman's age is a difficult determinant to measure because life expectancies across countries vary widely. In the case that we can still choose determinants that transcend borders like life expectancy at birth, fertility, and education levels, potentially crucial factors like daycare and parental leave are not found everywhere.

Informal Institutions

Informal institutions are one of the most influential and difficult determinants of FLFP and gender inequality, and were brought to prominence by work of Reimers (1985) (Reimers, C.). She theorizes that 'culture' or stigma is a large driver of gender gap differences, and that it indirectly affects FLFP through other determinants. In her paper, Reimer observes married, white and black female labor participation rates in the United States and seeks to explain these differences. She suggests current conditions that involve wages, family, and environment are not the cause, but instead the cultural differences from their historical past. Antecol (2000) suggests that the greater the stigma that exists towards women in a given country, the less likely they are to have quality education, a low fertility rate, access to healthcare, and an opportunity to formally join the labor force (Antecol).

In addition to informal institutions, informal employment has become heavily scrutinized in the realm of labor markets. Lewis (1954) introduced the idea of the 'informal sector' to

describe employment outside of modern boundaries, citing examples such as shoe shiners or unpaid family laborers. The informal sector makes up a significant amount of low income countries' GDP, but operates without government supervision or regulation. Gunther and Luanov (2011) present opposing theories and literature on whether informal employment, otherwise known as the "economy of the poor", is an opportunity or last resort for poor individuals (Gunther, I., & Launov, A.). Women make up a majority of informally employed individuals in doing house-based work or running vendor shops in the streets. However, the issue from the perspective of FLFP and gender inequality is that women are voluntarily or involuntarily in the informal sector due to a lack of opportunities in the formal sector. When women lack quality inputs or are in poor environments, the opportunity to obtain formal and gainful employment is low.

The intersection of formal and informal institutions and their ability to affect the FLFP was depicted in a model created by Doepke and Tertilt (2009). In a household family, the husband holds the most power and will always choose the wellbeing of their children over their wife's wellbeing. Therefore, these fathers will choose for their daughters and other women to have legal rights so that they may live better lives, and their sons can marry women with legal rights resulting in better educated grandchildren. Once human capital has reached a critical point due to technological progress, men with voting rights will vote for pro-women empowerment governments for the benefit of their daughters, which results in equal power between the husband and wife. Doepke and Tertilt are able to convey that potential property rights can enable women, while a lack of these rights would harm them.

Formal Institutions

Formal institutions present some of the best opportunities to reduce gender inequality and increase the FPLF as suggested in the Food and Agriculture Organization's (FAO) 2011 report on the Women in Agriculture. They observed 4700 agricultural plots of which female farmers had 20% lower yields than their male counterparts, all else held equal, which highlighted the lack of formal institutional support that women needed in the labor market (FAO.). Further investigations showed that female farmers did not and still do not have widespread access to agricultural extension workers (FAO). These extension workers provide technical expertise and advice to help farmers improve their land, water, and overall crop management. This represents an overarching pattern of a government's investment in economic development for women and not covering the last mile. While governments have invested tremendous amounts of capital into girls' education and health, many have not worked to provide opportunities in the labor market for girls that have finished their education. According to the 2012 World Bank Report on Gender and Development, laws still in in developing countries that restrict women's working hours to ensure that they can take care of their children and require a man's permission for women to work. This type of legislation has harmed women's ability to enter, stay, and excel in the labor market. Ironically, many of those same governments that have spent millions of their own currency trying to improve conditions for women created those types of laws.

Flaws in Observing the Female Labor Participation Rate

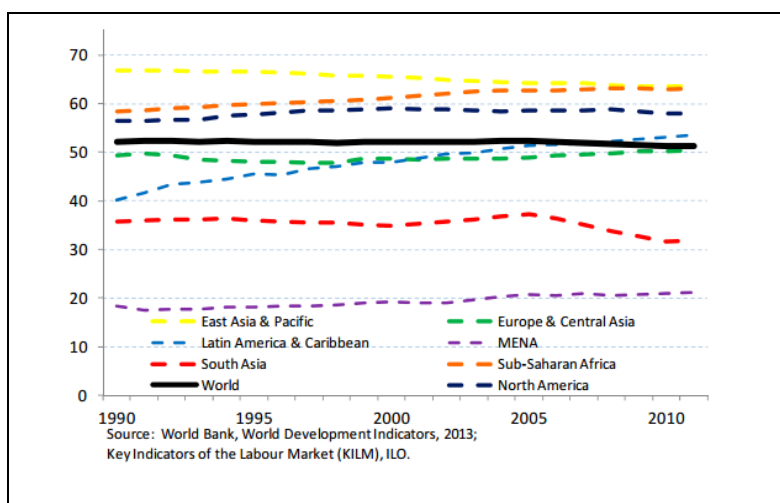
Many weaknesses appear in the literature of FLFP and gender inequality, and one of the largest is the inaccuracy of the FLPR as described in the World Bank 2012 Report (World Bank). The rate provides a mere snapshot of a current point in time, and like GDP in relation to the economy, does not accurately depict actual progress in its value. Instead, observing a women's

productivity, allocation of time, and earnings provides a far clearer picture of the state of FPLF in a country (World Bank). Another weakness is the incomparable, microeconomic studies on the FPLF, which prevents wide spread recommendations because the studies do not have enough similarities.

Implications of the Stagnating Global FLPR

Over the last two and half decades, the FLPR has remained at a stagnant 50% (Elborgh-Woytek, 2013). Prior to the 1990s, FPLF grew tremendously, however, in the last 25 years we have not seen an improvement globally. While declaring any conclusions based on a global average is an ill-fated endeavor, this fact does provoke an interesting question. What has caused this phenomenon and why?

Figure 2 - FLPR Global Trend



Elborgh-Woytek (2013). *Women, Work, and the Economy: Macroeconomic Gains from Gender Equity*.

As can be noted from the graph, the global average disguises the large and fluctuating regional trends that occur within it. Specifically, the declines in East and South Asia, the stagnant trend in North American, European, and MENA countries, along with an uptick in Latin American, and

Sub-Saharan Africa countries' rates. While some trends have more simple explanations than others do, the overall result is surprising. The answer to this 'mystery' and the variation in regional trends is the result of many factors including education levels, labor segregation between economic sectors and occupations, economic crises.

Increase in Education Levels

The recent rise in female secondary and tertiary enrollment is cited as an explanation for the stagnant or decrease in employment for women. Across the board, youth female participation rates have decreased significantly. This decrease corresponds with a respective increase in girls and young women attending more secondary and tertiary levels of schooling (Elborgh-Woytek, 2013). This increase in attendance would have a negative effect on the immediate female labor participation rate. However, the participation rate will increase in the end as women become more productive, generate more income, and contribute to economic growth because of their education. On the opposite end of the spectrum, as populations age more women will exit the labor force and subsequently decrease the participation rate as well (Elborgh-Woytek, 2013). The ageing trend will differ across regions as countries like India enter their demographic window of opportunity, which will increase the participation rate of adult females. On the other hand, Western European countries continue to see their working populations shrink as more females exit the labor force and less women replace them.

Sectorial and Occupational Segregation

Over the last two decades, there has been an extremely slow shift from women working in the agricultural sector to either manufacturing or service sectors (Bourmpoula, 2012). Given that agricultural work provides lower income, less skill development, and is less productive than other areas of work in the economy, reducing the amount of women in the agricultural sector is

imperative to improved labor market outcomes. In 2012, one-third of women in the world are still employed in agricultural jobs and could be at risk to losing them. The disproportionate amount of women in this sector is a prime example of sectorial segregation, where women are directly or indirectly prevented from moving into certain sectors. However, with agricultural technologies advancing, and economies all over the world shifting toward technology and service based economies, opportunities in the agriculture industry will continue to shrink. In a globalized world where opportunities center on manufacturing, information, and health services, the lack of transition from agriculture represents another area where women can experience a higher unemployment growth rate (Bourmpoula, 2012). Another trend in sectorial segregation is that women tend to gravitate to more flexible jobs and careers, which can hurt their career progression and job choices. Jobs that allow them to balance their hours and meet their family commitments are rare, if nonexistent, in many countries. Moving in and out of the workforce to raise children in currently conditions would make reentry difficult. In addition, to sectorial segregation, occupational segregation is when there is over-representation of a gender in one field like nursing or teaching instead technology and engineering (Bourmpoula, 2012). These high concentrations crowd women out and cause them to receive lower pay and less opportunities than their male counter parts. Overall, occupational and sectorial segregation squeeze women into sectors and roles with little growth opportunities and leave them more vulnerable to supply and demand shocks as will be evidenced next

Global Recession and its effects on South Asia

A recent and large factor in the decreasing or stagnant trends of female labor force participation is the Global Recession from 2008 to 2009 (Bourmpoula, 2012). Its repercussions caused unemployment to spike in many regions and their female labor markets. The unique

aspect of the crisis is its occurrence affected certain regions in different ways or not at all. Latin America, Central and South Europe, and Sub-Saharan Africa and their respective female employment growth rates remained largely unaffected by the crisis. However, the peculiar case is in the South and East Asian countries as their economies were largely unaffected by the crisis, but their female growth rates suffered heavily. As seen below:

Table 1 Female Employment Growth Rates

Employment Growth Female (%)	Average from 1992 – 2006	Average from 2007 to 2012
World	1.8	.95
Central & South Europe	.3	1.2
East Asia	1.2	.58
South Asia	2.6	-.1
Latin America & Caribbean	3.7	2.53
Middle East	6.2	3.1
Sub-Saharan Africa	3.3	2.82

South Asian economies shed three million female jobs over the 2007 - 2012 period, which the International Labor Organization and International Monetary Fund mostly attribute to the garment industry and the export sectors overall (Bourmpoula, 2012). Over six years, the employment progress in South Asia was wiped out, and exposed a persistent and more serious issue encapsulated in its export sectors. Vulnerable employment remains a large barrier to the improvement of the number and quality of employment opportunities for women. In fact, 50% of employed women in the world are on the fringes of the labor market as family workers (Bourmpoula, 2012). Most lack the economic, legal, and social protections that are afforded to

their male counterparts. In times of economic crises, women will always be more at risk in developing countries as they make up a majority of those in vulnerable employment. Many of the jobs considered within vulnerable employment exist in the informal sector, and constitute a large and missing piece of FLPR (Bourmpoula, 2012). Therefore, economic crises, like the Great Recession in 2008-2009, can depress female labor participation rates, and exacerbate the vulnerable and informal factors that harm women's labor market outcomes.

The stagnant trend in the FLPR can be unmasked by the varying regional trends of which it is composed. Furthermore, increases in secondary and tertiary female education, lack of transitions from sectorial, occupational, and vulnerable employment, along with a vulnerability to economic crises has prevented the steady increase of female labor participation around the world. While many region-specific factors are at play, these general trends help identify the obstacles that lie in the way of shifting FLPR upward.

The goal of this literature review was to provide a broad overview of the many factors and issues that affect both gender inequality and FPLF and presents many unanswered questions. What are the effects of formal vs informal institutions of the FLPR? How can formal institutions be used to improve FPLF the most? What can low and middle income countries do to better prepare females for job opportunities?

Through empirical evidence, this paper will focus on measuring the effect of formal institutions, in this case employment legislation, on FPLF with an end goal of determining if legislation has an effect on FPLF.

Chapter 3

Data

The core index and subsequent data used for the empirical analysis in this paper comes from Campos and Nugent (2012), in which they created an index capturing the rigidity of labor market laws. The index is based on the *de jure* measure, or letter-of-the-law approach, to accurately and objectively reflect a country's employment legislation. The name of this index measure is 'LAMRIG', which will be used to reference the index data in this paper. The LAMRIG index is built upon the seminal work done by Botero, Djankov, La Porta, Lopez de Silanes, and Shleifer (now noted as BDLLS, 2004) on rigidity of employment protection laws for 85 countries in 1997. The two upgrades in the LAMRIG index were the expansion of the time range and number of countries. This index ranges from 1960 to 2004 and is grouped into five-year multiples, which enabled a maximum of nine data points per country. This expansion allows for a stronger understanding of rigidity over time as the year range is long enough to observe any potential changes. There are 169 countries in the index, with 140 having at least one data point and roughly 130 countries with multiple data points. For my purposes, I analyzed 144 countries during the period between 1980 and 2004. The LAMRIG variable is based on 0 to 3.5 scale, with higher values indicating more rigid labor laws and more difficulty entering and exiting the market (CJNN, 2012).

The source of these upgrades and the driving influence behind the scoring comes from the authors' use of NATLEX, which is an index from the International Labor Organization (ILO). NATLEX spans 150 countries since the 1940s, and breaks a country's legislation into 20

law categories. The five categories that are factored into LAMRIG are the following:

“Conditions of work (Hours of work, weekly rest, and paid leave), Employment Security, Termination of employment, Conditions of employment (Labor contracts, wages, and personnel management) and General provisions (Labour codes, general labor and employment acts)” (Campos, Nauro and Nugent, Jeffery, 2012).

The categories were laid over the 85 countries in the BDLLS index to see if the results corresponded with each other. Once a match was realized, the scoring was applied to the additional 60 countries. To ensure accurate numbers, a rigorous comparison was done amongst samples from the BDLLS and World Bank *Doing Business Surveys*, other existing labor rigidity indices, and random individual case studies. Through their analysis, the authors concluded that neither political factors nor the legal origin of these laws accounted for the variation of LAMRIG. Instead, they found an inverse relationship between trade liberalization and LAMRIG, and that trade liberalization in a previous five-year period has a negative effect on the current five-year period. This finding corresponds to the notion that workers respond to the liberalization of the economy through their votes or lobbying.

The World Bank data set was a compilation of the female labor participation rates from 144 countries between 1990 and 2004. The shorter time range was due to the lack of available data for many developing countries, especially in the pre-1990s time period. Additionally, the 144 countries were selected to correspond to the countries included in the labor rigidity index. Many developing countries did not have consecutive data points until the later half of the 1990s or into the early 2000s, which put more weight on developed countries particularly in the early half of the dataset. All data was shaped into panel form to enable time series regressions in STATA.

Chapter 4

Methodology and Model

With a suitable proxy for formal institutions in the form of the LAMRIG variable, the goal was to understand the effect that employment legislation has on FPLF over time and across countries. To do so the following fixed effects model was used:

$$\begin{aligned} FLPR = & \beta_0 + \beta_1 lamrig + \beta_2 tfr \\ & + \beta_3 gdp_per_capita_log + \beta_4 secondary_school_enrollment \\ & + \beta_5 ministerial_proportion + \beta_6 life_expectancy_birth + \varepsilon \end{aligned}$$

The remaining variables included in this equation, in addition to ‘lamrig’, are control variables. The total fertility rate was included to control for how the number of children conceived affects a women’s ability to work. The log of GDP per capita was calculated to focus on the change in the measure per country as its nominal value would bias developed countries, especially when there is more data available for them. Secondary school enrollment (female) was used to account for education, as primary enrollment is a weaker indicator and tertiary data was scarce. The proportion of women in ministerial position was to account for the political influence of women, while life expectancy at birth (female) was used to estimate the health of potential workers in that country.

Given the wide range of countries and periods, the analysis began with a 25 year scope using all 144 countries’ female labor participation rate with a time span from 1980 – 2004. While there was data as far back as 1960, there were too many missing values to draw meaningful conclusions with the data. The results from the regressions guided the direction of the analysis.

Given the varying trends between regions, the data was further broken down into pre-established regions: Asia, Europe, Latin America and the Caribbean, MENA countries, and Sub-Saharan Africa. In addition, a comparison between youth females and adult females was done to account for the age distribution.

In deciding between a fixed or random effects model, I chose a fixed effects model. Given the panel data's breadth in time and countries, both could have been applicable. Fixed effects would discern the impact of LAMRIG over time, whereas random effects would observe its impact between countries. Since countries range widely in terms of economic development, legal and political systems, and culture, an random effects model could bias the results significantly. Therefore, the use of a fixed effects model allowed for culture, race, and similar variables that are difficult to measure to be accounted for over time.

Chapter 5

Results and Discussion

The fixed effects model is a strong fit for the female labor participation rate (FLPR). An Ordinary Least Squares (OLS) multivariate regression produced an r^2 value of .9262. All of the inputs returned highly significant with the exception of the lamrig and log of GDP per capita, which were weakly significant and insignificant respectively. The coefficients of the inputs moved in the expected directions, with the exception of lamrig, which was negative. The results of this regression (Table 2) are available in the Appendix. As discussed in the determinants of the FLPR, education, health, number of children and female political representation all show to be strong indicators in the regression. To gain a better sense of how lamrig's effect changed throughout different regions and test the robustness of my results, I split the data into regional subsets: Asia, Europe, Latin America, MENA countries, and Sub-Saharan Africa. A regional breakdown also enabled a deeper and more robust analysis of the data as it applies to the unique characteristics of each region. All regions, except Europe, displayed an r^2 greater than the original fixed effects model of .9262. In addition, I tested the Youth FLPR to observe whether a certain age group was negatively 'pulling' on the FLPR. In terms of magnitude, the weakly significant and negative relationship between lamrig and the global FLPR translated to a -.55 decrease in the FLPR for every single unit of increase in the lamrig. However, a further look at the regions provides differing results for lamrig and the other inputs.

In the Asian subset (Table 3), lamrig had a highly significant and very positive relationship with the FLPR, while log GDP per capita returned insignificant. The r^2 was the highest of the regional subsets with a .9718 correlation. Moreover, a one-unit increase in the

lamrig corresponded to a 4% increase in the Asian FLPR, which was the strongest coefficient of all inputs included. This strong result supports my hypothesis that an increase in labor market rigidity (employment legislation) provides more social and economic protections and improved working conditions for women. These overall advancements provide more attractive circumstances in which to join the labor force. Since lamrig is composed of many types of labor laws, as shown in Chapter 3, any number of progressive law changes can improve worker rights like contract enforcement, paid leave, or employee safety requirements. Evidence of this interpretation of lamrig can be seen when China's Ministry of Commerce enacted Regulations Concerning the Labor Protection of Female Staff and Workers in 1988. At this time, women were experiencing heavy sectorial and occupational segregation. This new law brought on sweeping changes in the form of three months of maternity leave, the outlawing of employer discrimination against women applicants, adequate facilities for pregnant women, and importantly, punishment for non-compliance with any regulations outlined in the law (Regulations Concerning Labor Protection...). While it can be argued that the labor market became more rigid due to the added regulations on employers, evidence and common sense suggest that current and prospective female participants in the labor force would have benefitted tremendously from the improved conditions, and subsequently increased the FLPR in China².

The Latin America and Caribbean (Table 4) subset produced similar results to the Asian subset, where there was a significant and positive relationship between 'lamrig' and FLPR. Although its coefficient was weaker than the Asia coefficient, the model still fit very well with an r^2 of .9775. Notably, secondary school enrollment produced a significant and negative relationship with the FLPR, which supports common sense economics that an increase in

² Note: FLPR was not measured in China until 1990, which explains a lack of statistical evidence from China between 1988 and 1989 to support this conclusion.

education enrollment reduces the potential length of time in the labor force, and decreases the FLPR. Similar results for secondary school enrollment were shown in the Asia subset.

In Europe (Table 5), both life expectancy at birth (female) and lamrig returned insignificant and the subset had the worst fit with the model with an r^2 value of .8596. Given many countries in Europe have been highly developed over an extended period of time (beyond the 1980s), there are excellent healthcare services and systems in place for citizens. Therefore, the general population's high life expectancy ensures there would be a minimal, if nonexistent, effect on the the FLPR over time. The lamrig result indicates that labor market rigidity has no significant effect on the FLPR. A review of the lamrig data shows there was not a significant change in most European countries' lamrig score over the the 25-year time period, which instead saw greater changes in its score in the years prior to 1980. Arguably most European countries had finished their transitions toward socialistic regimes where workers' rights and employment legislation were prioritized.

While both the MENA (Table 6) and Sub-Saharan countries' (Table 7) data better fit the model than the European countries, both returned insignificant values for lamrig. Similar to the Europe subset, a review of their lamrig scores showed little change over time, and therefore had little effect on the FLPR. However, unlike Europe, the insignificance and lack of change in lamrig may be attributed to the lack of progress in employment legislation as opposed to strongly established labor standards. Both regions are known for their less accommodating legal stances for women. Only last year were women were granted the right to vote in Saudi Arabia, while five Sub-Saharan countries continue to enable *legal* discrimination against women (Sub-Saharan Africa).

After conducting a regional analysis, I wanted to test the robustness of my data by analyzing the age distribution of FLPR. While I had available data on women between 15 and 24, data on the FLPR of 24 + females was not available. Since the 15-24 age range represents a prime period in which more and more women are enrolling in secondary and tertiary education, women 'leave' the labor force for a temporary period. This would cause the FLPR to be lower than anticipated, and an OLS multivariate regression on the FLPR for 15 to 24 year olds (Table 8) indicated a strong negative and significant relationship between lamrig and FLPR 1524. However, its fit of the model was weaker than the original regression with an r^2 of .6546. While no definitive conclusions can be made on the age distribution of the FLPR due to data availability, the negative 'pull' of the youth FLPR due to education attainment can be attributed to creating a lower FLPR.

Limitations

While the results of my analysis look promising, they must be interpreted with caution. The lamrig index references 20 law categories, and therefore to understand its true effect on the FLPR would require an in-depth analysis of a country's specific laws over time that pertained to those categories and FLPR. The aforementioned example of the Chinese regulations implemented in 1988 is a small insight into the level of depth required to observe the true effect of lamrig. In addition, lamrig's slow rate of change over time indicates the need for a large time range. Three of the five regional analyses I conducted did not change very much over twenty-five years. A more complete dataset with control variables that stretched back to 1960 would have provided more observations and a conclusive direction on the significance of the p value for the overall regression. While much of my regional analyses were excellent fits to the model, my model was simplistic, which allowed plenty of room for omitted variable bias. Specifically, rural

and urban employment rates differ vastly in developing countries, and due to lack of data I was unable to account for these differences within countries in my model. However, I would expect that the effect of employment legislation on rural and urban regions could vary and affect the overall result. In addition to omitted variable biases, there could also be simultaneity bias. A key assumption I made was that none of my explanatory variables were correlated with any of the other explanatory variables I included, which would create bias. In my case, the log of GDP per capita and the life expectancy in years (female) could have a strong correlation as a richer country would improve the life span of its citizens through greater access to better health services. Lastly, in a multivariate regression, there can be multiple sources of covariation. In this case, the variable for women in ministerial positions might respond to the FLPR or be affected by unobserved factors (culture, religion etc.) instead of actually causing a change in the FLPR. While both my methodology and data are flawed, I establish the relationship between employment legislation and the FLPR from 1980 – 2004.

Chapter 6

Conclusion

I aimed to answer the question of how employment legislation related to FPLF. With government expenditures in girls' and women's education and health totaling to billions of dollars of investment, little focus has been on the 'last mile' issue of employment for women. As healthier and more educated women enter the labor force, governments must do more to create a better labor market environment for one of their largest sources of economic growth. If governments can determine which of their types of actions directly influence the labor market outcome of their female citizens, there would be a tremendous opportunity to improve FPLR and quality of employment.

Using the LAMRIG index to proxy for employment legislation between 1980- 2004, I empirically estimate its effect on the FLPR. I show that across 144 countries and 25 years, there is a weakly significant and negative relationship between lamrig and the FLPR. This indicates that the increase in employment legislation and subsequent labor market rigidity make it more difficult for women to enter the labor force. However, this overall relationship differed widely from the regional analysis I conducted in Asia, Latin America, Europe, Sub-Saharan Africa, and the MENA countries. In Asia and Latin America, which have experienced the highest growth in FLPR in recent times, larmig had a significant and positive relationship with the FLPR. This indicates that an increase in employment legislation improves the working conditions of current and potential female workers in those countries. These two regions also have a high proportion of women in vulnerable employment, which amplifies the positive effect of employment legislation. On the other hand, the three remaining regions did not return any significant relationship with lamrig and the FLPR. A review of the data showed that the lamrig scores in these countries from 1980 – 2004 changed very little, which translated to an insignificant effect on the lamrig.

The implications of this research are that the effects of formal institutions are highly dependent on the region or country in which they exist. Furthermore, the policy and laws created through these institutions require an extended period of time to observe their true impact. Importantly, laws and policies are an art form as much as they are based in hard evidence and facts, which is to say that crafting an initiative that will achieve its target without any unintended consequences is a near impossible feat. Policy makers should also proceed with caution when choosing how to measure the success of a new policy or law. Measurements like the FLPR only provide a snapshot of an existing situation rather than capturing the important nuances that make up a female labor participant's decision making. In the future, research should move toward country based studies and observe the effect that formal institutions can have on a women's time expenditure, child rearing, and decision making. I have provided evidence that employment legislation can improve the labor market for women, but a more thorough analysis must be done in order for policy makers to shape their country's labor market environment in a way that enables women to reach their full productive potential and drive economic growth.

Appendix

Table 2 - World FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	- .5180457	.054
tfr	1.123079	0.00
gdp_per_capita_log	- .72179	.648
secondary_school_enrollment	- .0942977	0.00
ministerial_proportion	.7746923	0.00
life_exepect_birth	.2032218	0.00
_cons	- 11.60198	0.00
r²	.9262	
Sample Size	1,245	

Table 3 - Asia FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	4.316494	0.00
tfr	1.941586	0.00
gdp_per_capita_log	.6019609	.209
secondary_school_enrollment	-.02053656	0.00
ministerial_proportion	.8065521	0.00
life_expect_birth	.6601601	0.00
_cons	-50.32665	0.00
r^2	.9718	
Sample Size	143	

Table 4 - Latin America & Caribbean FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	1.245767	0.00
tfr	1.6399	0.00
gdp_per_capita_log	- 1.04527	.209
secondary_school_enrollment	-.057043	0.00
ministerial_proportion	.8571625	0.00
life_expect_birth	.1691989	0.236
_cons	- 9.979587	0.00
r^2	.9775	
Sample Size	144	

Table 5 - Europe FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	- .4766627	0.196
tfr	2.931614	0.00
gdp_per_capita_log	2.270043	.209
secondary_school_enrollment	- .08111398	0.00
ministerial_proportion	.83065485	0.00
life_expect_birth	.1806053	0.236
_cons	- 42.27669	0.00
r^2	.8596	
Sample Size	344	

Table 6 - MENA FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	- .06151315	0.827
tfr	.1247738	0.279
gdp_per_capita_log	1.369508	.209
secondary_school_enrollment	- .035224	0.00
ministerial_proportion	.8136994	0.00
life_expect_birth	.0062753	0.886
_cons	- 10.2485	0.001
r^2	.9814	
Sample Size	148	

Table 7 - Sub-Saharan Africa FLPR Results

Variables	Coefficients	P-Value (< .05)
lamrig	.3432867	0.572
tfr	- 3.18049	0.00
gdp_per_capita_log	- 1.926253	.005
secondary_school_enrollment	- .2191123	0.00
ministerial_proportion	.8285666	0.00
life_expect_birth	.0622096	0.338
_cons	- 28.83119	0.00
r^2	.9306	
Sample Size	269	

Table 8 - FLPR 15 - 24 Results

Variables	Coefficients	P-Value (< .05)
lamrig	- 2.67985	0.00
tfr	1.812749	0.00
gdp_per_capita_log	2.208671	0.00
secondary_school_enrollment	- .1658743	0.00
ministerial_proportion	.6683701	0.00
life_expect_birth	.4443402	0.00
_cons	- 40.82929	0.00
r^2	.6546	
Sample Size	1,245	

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EDUCATION

The Pennsylvania State University, Schreyer Honors College University Park, PA
Bachelor of Arts in Economics and Supply Chain Management Graduation Date: May 2016

Awards: Dean's List and Superior Academic Achievement Fall 2012 – Spring 2015

Skills: Basic Python, Proficient in Microsoft Office and Stata, Advanced in Excel

Work Experience

Intel Corporation (Phoenix, Arizona) Summer 2015

Supply Chain Analyst Intern – Mergers and Acquisitions Integration

- Identified integration improvement opportunities and made recommendations to enable a smoother integration of future acquired employees (up to 3000+)
- Analyzed Intel's integration processes by reviewing the size and scope of completed deals and external benchmarking

M/A-COM Technologies (Lowell, MA) Summer 2014

Corporate Development Intern

- Conducted analyses on the semiconductor industry and the profitability of potential end markets
- Developed reports on the financial and strategic details of potential acquisitions and competitors

Extra Curricula Activities

International Model United Nations (IMUNA) 2012 – Present

*United Nations-affiliated global education non-profit

Director General (COO) for the National High School MUN Conference 2016

- Hire and manage a staff of 97 collegiate students while communicating across eight time zones
- Oversee production of 60 thesis-quality global issue training guides for distribution to 3600 high school student attendees at the largest Model United Nations Conference in the world
- Built a substantive program based on 60 topics that focus on sustainable development
- Present progress of conference goals to the IMUNA Board of Directors

Penn State Economics Association

2012 – Present

Executive Vice President and Vice President of Education in 2014

- Oversaw 3 teams (two presentations, one print media) that produced quality presentations and publications on economic concepts, fields, and current events for the general body (60 members)
- Directed the rebuilding of the Print Education team to be more digitally oriented, social media friendly which resulted in a 100% increase in publication views
- Coordinated the Great Debate; two professor-student teams debate an economic issue in front of 2000 attendees

The Malini Club

March 2014 – Summer 2015

Co-founder, Co-executive Director, Schreyer Honors College in 2014

- Created a club that provides a platform for Schreyer scholars to champion girls' education and women empowerment globally
- Managed six directors and twelve representatives in organizing ten engagement events, including creating a Women's Garden on campus and raising \$2800 for the Malini Foundation
- Helped establish a fellowship program with the Malini Foundation that involves an immersive learning experience in Sri Lanka

Nittany Data Labs

Summer 2014 - Present

Founding Member and Co-Director

- Co-lead business development and marketing to educate and expose students to big data analytics
- Co-lead an eight-person team \$3 million cost savings project granted by Penn State's Food Services to analyze their annual purchasing of cheese and use big data analytics to improve inventory and supply chain efficiency
- Won the Penn State DataFest competition sponsored by Edumnds.com by creating a targeted advertising system
- Develop technical skills in coding languages and machine learning