THE PENNSYLVANIA STATE UNIVERSITY
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EXAMENING THE IMPACT OF POLICY CHANGES ON THE RECENT DECLINE IN
INOMCE INEQUALITY IN LATIN AMERICA

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ABSTRACT

Latin America has consistently had one of the highest rates of income inequality in the world. The disparity between the percentage of income held by the highest earning 10% of the individual countries and the lowest 20% has been a source of conflict and political unrest for the majority of the 20th century. However, recent changes to policies have brought on a new decline to income inequality in the region, which is particularly remarkable since the rest of the world has seen their own inequality grow. This paper examines the effects of these policies which include changes to spending on education, expansions of conditional cash transfer programs and increasing openness to trade and how they have contributed to the overall decline in income inequality in Latin America.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Acknowledgements

   I would like to take the time to thank all those who assisted me throughout the thesis process with special consideration to my thesis supervisor Professor Tybout. In addition I'd like to thank the Rock Ethics Institute for providing a travel grant that allowed me to travel to South America for research.

Figure 1: Map of Latin America

CHAPTER 1
Introduction

Latin America is no stranger to inequality. Since its colonization there has been a clear divide between the haves and have-nots. The region has long been regarded as one of the most unequal in the world and poverty and low standards of living have always been a concern. Current data reports that there are over 80 million people living in poverty throughout the region today, many of whom belong to minority groups such as indigenous peoples and women. Additionally while there has been a recent surge in the middle class, 40% of those people are at risk of falling back into poverty. Interesting enough however, a recent phenomenon shows that despite increases in inequality across the rest of the world, many countries in Latin America are actually experiencing the opposite. Measurements of inequality have been steadily falling and poverty is following suit.

High rates of income inequality should be of concern to nations for reasons beyond the basic ethical issue of ensure equal opportunity and rights for all human lives. A study conducted by the International Monetary Fund shows that countries with lower rates of income inequality tend to have better long term economic growth. Policies aimed at helping citizens at the bottom of the income distribution provide overall beneficial gains for societies. More people working and contributing helps a nation's economy and takes a strain off of welfare programs. Conversely nations with high rates of income inequality tend to have higher rates of political turmoil and violence, pollution, and disease.

While all of the countries in the region vary in government and social policy the largest overall contributors to the recent decline in income inequality can be linked to an increase in wages for the bottom of the income distribution and an increase in cash transfer policies. Within

this thesis I aim to explain how countries within the region have implemented policies that led to reductions in wage disparities and increases in social cash transfers programs as well as labor force participation and foreign direct investment. While each individual country has had a varied experience in the past thirty years many of the same forces seem to be at play. I also hope to create a link between the success of these policies and the demographic transition occurring within the region. I believe that many of these policies have been able to be so successful due to the lowered birthrates, increase in the working age population, and increase in the female labor participation rate. Since the largest portion of the decline can be explain by reduction in labor-income inequality I plan on first exploring why this occurred within the region. By examining changes in education policy, labor markets, and openness to trade I believe conclusions can be drawn as to why it had such an equalizing effect. I will then explore the recent expansion of cash transfer programs in the area and see how effective different programs have been at successfully targeting and implementing the transfers. Finally, I will discuss what type of demographic transition is currently occurring within Latin America and how its changing population structure is aiding it towards less income inequality and poverty.

Measurements of Inequality

Before beginning the discussion on how this decrease in inequality has occurred I would like to discuss how inequality is measured. While there are several methods for quantifying how prevalent income inequality is within a nation for the majority of my paper I will be using the Gini index. The Gini index or coefficient is considered to be the most common method of measuring income inequality. The World Bank states that,

"The Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution".

It is measured as a figure between 0 and 1, where 0 indicates a perfectly equal system and 1 completely unequal, where one person holds all of the wealth. To help provide a reference for how different Gini coefficients are around the world, the socially democratic country of Denmark has one of the lowest figures at 26.9, while the largely unequal South Africa has one of the highest figures at 65. The United States falls towards the upper middle at 41.1. The figure is based off of the area between a hypothetical line of absolute equality and the Lorenz curve, which plots the cumulative percentages of total income received against the cumulative number of recipients, starting the poorest individuals or households. The coefficient is found using reported Gross Domestic Products for nation states so it is worth noting that the figure is only as accurate as that reported data. The figure below provides a graphic representation of the Lorenz Curve.
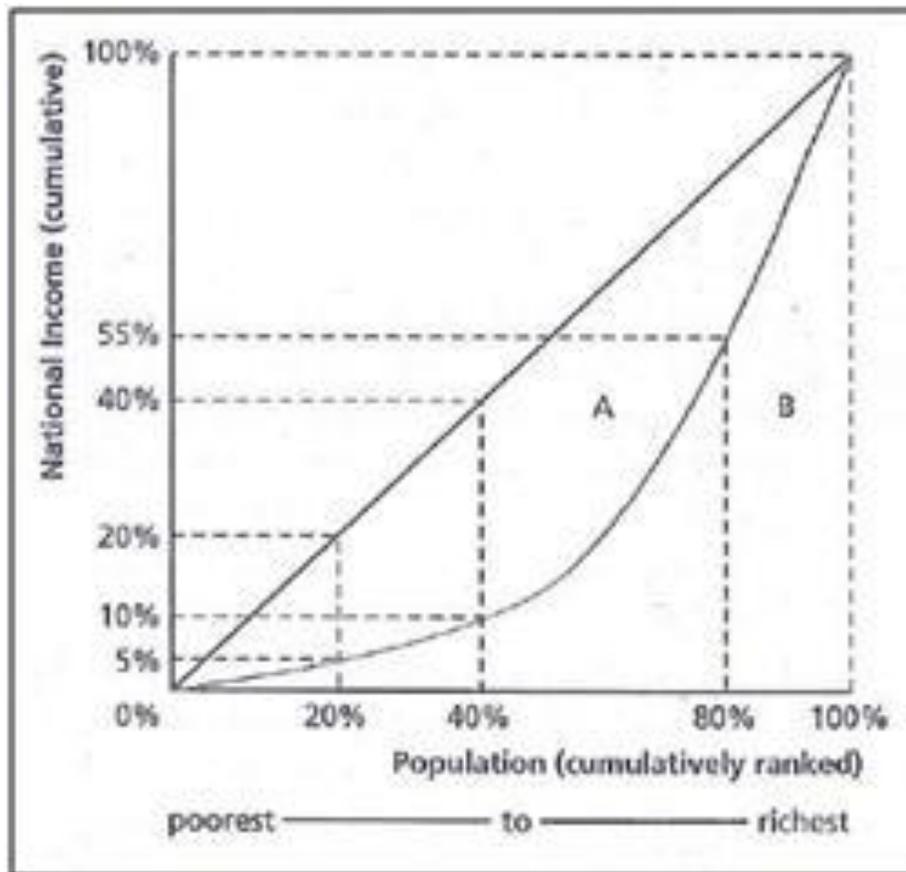
Figure 2: Lorenz Curve

Using the graph the Gini coefficient can be found using the following equation:

GINI-coefficient = Area A / (Area A + Area B)

Chapter 2 - Literature Review

Decline in Returns to Education and fall in the Skill Premium

Studies show that by the far the largest cause for the recent decline in income inequality in Latin America is the reduction in inequality in labor income. Or that is to say the difference in relatively earnings of those in the skilled labor market and those in the unskilled. Since historically racial, geographically, and gender barriers have prevented certain groups and regions of Latin America to receive educations or enter the skilled labor market this divide has been a large contributor to the high level of income inequality. However recently a spark in the earnings of the bottom 20% of the income distribution through both demand side factors, increases to the minimum wage, and more union participation, and supply side contributions including a decline in the returns to education caused by more low-labor demand from increased globalization and an oversupply of educated, working-aged adults.

Azevado, Incahust, and Sanfelice 2013 find that on average 54% of the decline in the Gini coefficient for the region can be explained by lower labor income inequality. The effect is even more prevalent in countries such as Argentina and Mexico where the decline can account from up to 60% of the reduction in inequality. This study attributes the decline to an increase in the average level of education per worker as well as a lack of available opportunities for skilled labor. In the 1990s a technology boom in the region originally caused more income inequality as the demand for skilled-labor increased. However, as time progressed and there was a surge of educated adults this lowered the returns to education. That, combined with the price and commodity booms in the 2000s, caused the demand for low-skilled labor to increase which then lead to the earnings per hour to increase.

This theory could be applied to Argentina which, during the 1990s experienced heavy modernization, privatization, and trade liberalization. During this time the wage gap increased and the demand for skilled workers increased. Additionally, the transition of many state-owned enterprises to private firms reduced the power of unions and membership fell (Lustig et al., 2011).

Conditions quickly changed in the 2000s however as the demand for skilled-labors began to be met, the devaluation of the Argentinian peso resulted in a stimulation of low-skilled, labor-intensive sectors, and a more pro-unionist government took control. The government raised the minimum wage, making the low-skilled jobs even more appealing, and promoted collective bargaining to bring more rights and benefits to laborers (Lustig et al., 2011).

Mexico also saw the wages of low-skilled labor increase as the introduction of NAFTA put an increased demand on production. Additionally, the Mexican government, which had favored funding tertiary education during the 1980s and 90s, increased social spending on primary and secondary education which expanded basic education and kept adolescents in school, opening up more available positions for working age population in the unskilled market.

Brazil additionally saw a strong increase in the minimum wage over the past decade. The country saw the real value of the minimum wage nearly double while the real value of the average wage only rose by around 25% (Arnold and Jalles, 2014). Additionally, improvements to the tax system and registration regimes made it easier for small business to legally declare employees while avoiding tedious and costly bureaucracy, effectively lowering the rate of labor market informality in urban areas from 55% in 2001 to 33% in 2013. These improvements seem to have had little effect on employment as well since the Brazilian unemployment rate has been steadily falling.

So what led to this influx of educated adults and better conditions for low-skilled laborers? In the following sections I will look at four changes to policy that occurred across Latin America beginning in the mid 1980's and continuing today. These policies include increased funding for education as a percentage of total GDP; the positive effect of conditional cash transfer programs; increased openness to globalization and trade; and finally changes to the labor force participation rate.

Increased Funding for Education as a Percentage of total GDP

Much of the underlying cause of this increase in supply of skilled workers with secondary and tertiary educations can be attributed to higher social spending on basic education. By increasing the amount of money spent per student during primary and secondary education, especially in rural areas with historically low rates of education, Latin American nations have been able to see large increases in educated youth.

Brazil is country that had become notorious for its rampant inequality. However, within the past few decades economic growth and policies aimed at improving education rates across the country have resulted in huge improvements, lowering the Gini coefficient from a world-record high 0.63 in 1980s to 0.53 in 2002 (Azevedo et al., 2013). Based off of household data from 2009 it seems that nearly half the difference in labor income for an individual can be explained by a change in the years of schooling (Ferreira de Souza in Arnold, 2014). Data shows that within the past decade enrollment for 15-17 year olds has more than doubled and 98% of children are enrolled. Students are also performing better in school and based off the results of OECD's PISA study Brazil went from being one of the lowest performing countries to one of the three fastest growing in the world, despite higher attendance rates from students coming from

unprivileged households. These improvements would have not been possible without the increased spending on education that Brazil has seen in the past two decades.

As previously mentioned Mexico also saw large improvements in their rates of education in the past three decades. After more than doubling the amount of spending on education from 2.3% of total GDP in 1990 to 5.2% in 2010 the country has seen a large increase in the education of children belonging to the families at the bottom of the income distribution. In particular the years between 1980 and 1990 saw total adult literacy in Mexico increase from 83% to 90.5% and has been steadily increasing since. Even more impressive is the improvement to adult female literacy which went from 79.8% in 1980 to 92% today.(UNESCO).

Education spending as a portion of GDP has increased across the board for Latin American countries with some countries seeing larger increases than others. Colombia in particular saw a large increase going from only 1.7% in 1980 to 4.8% in 2010. Other countries such as Peru and Chile have seen increase though they are small. Education is known to be one of the best economic equalizer so governments choosing to invest public funds is crucial. By providing more funding for more facilities that reach more of the population and creating improvements to curriculum nations can see changes that last for generations.

Interesting enough however this change in the rate of education actually saw effects that were not equalizing at first. Tulane 2011describes the phenomenon as the "paradox of progress". When returns to education are convex the relationship between the inequality of education and income inequality has an inverted U shape. At first there will be a rise in income inequality as certain members of the population are able to capitalize off a market with a demand for skill-labor, such as the one that existed in Argentina as modernization created more skilled-labor jobs. But eventually levels off and even begins to fall as the market floods with more educated

workers and not enough skilled positions. In order to maintain growth government investment in higher skilled industries would be necessary but because of global economic conditions in the 2000s it became more lucrative to focus on low-skilled production. This demand for low-skilled workers, combined with more young adults staying in school and either delaying their entry into the low-skilled labor market, or not entering it at all, resulted in better wages for unskilled workers. This then effectively aided in decreasing the difference between earnings of those with educations and those without, or the skill-premium.

The figures below represent the changes in government expenditure of education as a percentage of GDP. Figure 3 contains the countries of Argentina, Bolivia, Brazil, and Chile and an overall trend of increasing spending can be seen, especially beginning in the early 2000s. The following graph, figure Y, contains the countries of Colombia, Mexico, and Peru and a similar trend exists. Mexico in particular has seen a large increase going from around 2.4 % in the mid 1990's to above 5% in 2010. Venezuela was not represented on these graphs due to a lack of reliable data coming out of the area since the late 1990s.
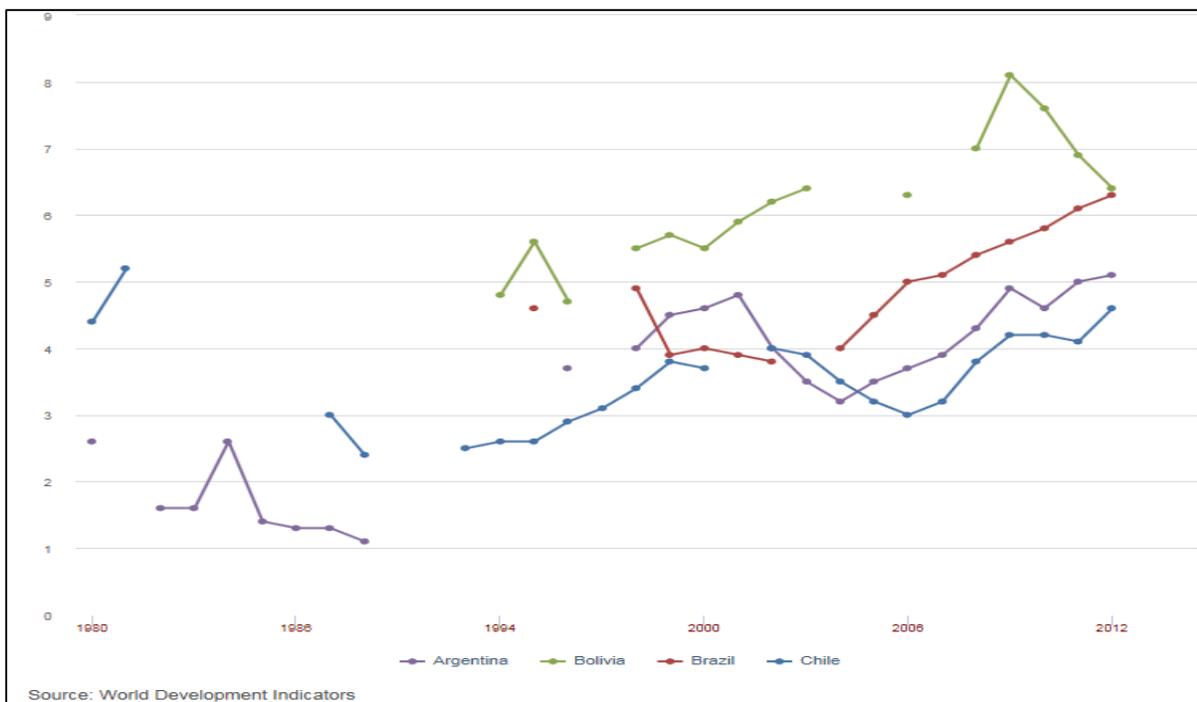
Figure 3: Government Expenditure of Education: 1980 to 2012: Argentina, Bolivia, Brazil, and Chile
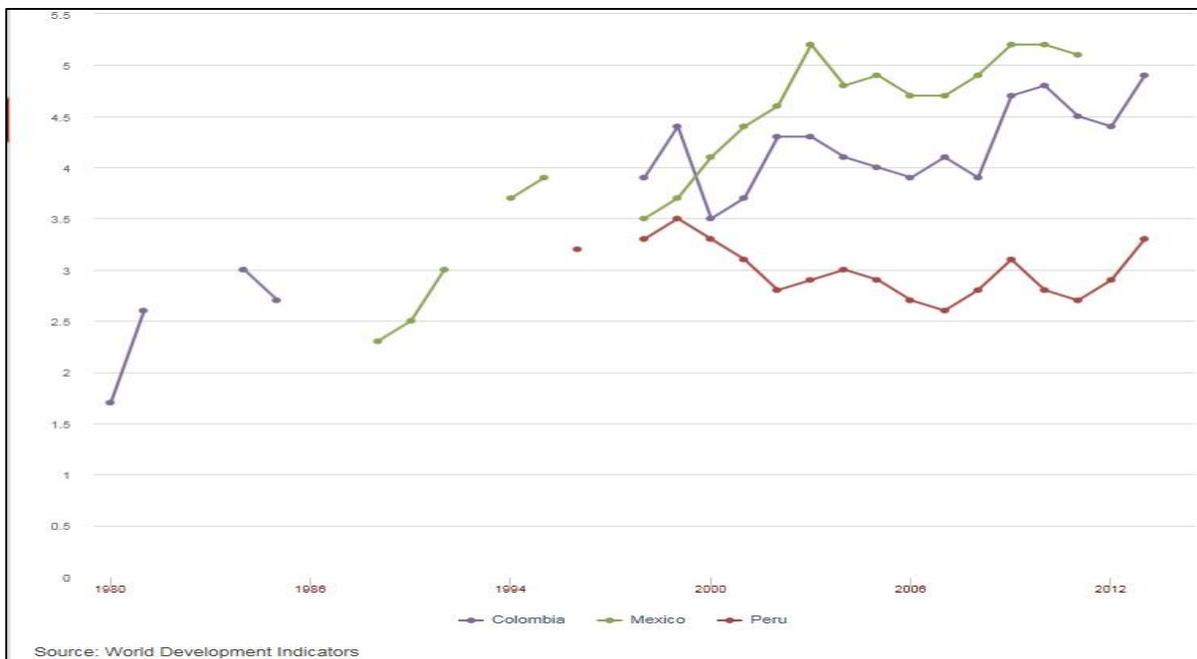

Figure 4: Government Expenditure on Education: 1980 to 2012: Colombia, Mexico, and Peru

Conditional Cash Transfer Programs

A result of the increased funding to education has been the creation or expansion of conditional cash transfer programs, or CCTs. CCTs can be identified as the second largest contributing factor to the decline in income inequality in Latin America. These programs are aimed at assisting families at the bottom end of the income distribution by providing monthly stipends to families on the condition that the money is used to help keep children in schools and provide regular health checkups. The result has led to more children in school and better school performance. Additionally more teenagers continuing with school rather than dropping out and entering to the low-skilled labor market. Data from the world bank shows that from 2000 to the end of the decade the share of income per household coming from cash transfers went from 7 percent to 20 (Lustig et al., 2013). The programs vary in size and funding from country to country. Ecuador's Bono Sol reaches 40% of the population while *Progesa/Oportunidades* in Mexico and *Bolsa Familia* in Brazil reach around 20%.

There are concerns over the risks of such large cash transfer programs. Among them include a reduced incentive to work if transfers become too large, a negative effect on the children going to school under the program, and the possibility of the money being used for other purposes. However, overall the results have shown that these programs are beneficial to students and families. Behrman, Parker and Todd (2011) found that three years of the *Progesiva* program resulted in approximately 0.3 additional years of schooling. *Progesiva* can be attributed to more than 18% of the change in pre/transfer to post/transfer Gini coefficient. Which is especially astounding when it only account for 0.36 percent of total GDP and only 4% of total redistributing spending.

  Bolsa Familia in Brazil had a similar result. Based off of household data from 2009 it seems that nearly half the difference in labor income in Brazil for an individual can be explained by a change in the years of schooling (Ferreira de Souza in Arnold and Jalles 2014). Data shows that within the past decade enrollment for 15-17 year olds has more than doubled and 98% of children are enrolled. Students are also performing better in school and based off the results of OECD's PISA study Brazil went from being one of the lowest performing countries to one of the three fastest growing in the world, despite higher attendance rates from students coming from unprivileged households. Overall, the program has been deemed a huge success and despite costing less than 1% of the GDP. The program reaches nearly 30% of all Brazilian households and 50% of households in the poorest regions in the north, helping to alleviate regional inequality (Azevedo et al., 2013).

  Lustig, Lopez-Calca, and Ortiz-Juarez 2011 find that changes in non-labor contributions to households in Peru are responsible for up to 90% of the change in the countries GINI index which went from 0.537 in 1997 to 0.4908 in 2007. During the past decade per capita social spending increased by close to 50% and the proportion of that money directly targeted at the poor increased. Peru's social cash transfer program is called Juntos and in June of 2006 more than 60,000 households benefited from it (UNICEF).

  Bolivia also saw success with the introduction of its cash transfer programs *Bono Juancito Pinto* and *Bono Juana Azurduy* in 2007. Only accounting for 0.3% of total GDP the program has reached over 1.7 million children between the ages of 6 and 19 since its implementation. The program also aims to assist mothers with young children and without access to proper healthcare. While thousands of Bolivians have benefited from these programs one significant downfall is the fact that these are not conditional on being poor. According to a study

conducted in 2013 62% of cash transfer in Bolivia go to the non-poor and another 16.8% to the moderate poor (Aracuo, et all 2013).

A study conducted by the World Bank recently discovered that by deconstruction the forces leading to a reduction in inequality the contribution of changes in transfers contributed to 21% of the overall decline in Latin America. While there is always debate over the implementation of cash-transfer programs overall they have been considered effective tools in the reduction of inequality. Increasing the amount of time minors stay in school helps reduce child-labor and keeps them from entering the unskilled labor marker. Additionally, the result has been higher levels of students continuing on to higher education and then entering the skilled-labor market which in turn has forced down the wages that rose during the period of modernization in the 1980s and 1990s(Lustig et al., 2011).

Increased Openness to Globalization and Trade

Increased rates of education can explain the supply side of the equation but the supply side had an important impact as well in the form of more jobs for both skilled and unskilled laborers. A major change in the structure of many economies in Latin America during the 20th and 21st century has been the transition into and then away from the Import Substitution Industrialization (ISI) policies implemented in the 1930's and 40s. After the Great Depression Latin American economies, who primarily exported raw materials and imported industrialized goods, were prevented from importing due to the drop in their export sales. This created an overall sense of distrust of foreign economies and a desire to decrease dependence on outside nations. This led to the creation of ISI which aimed to reduce imports by increasing domestic production, essentially attempting to create self-sufficient economies that took care of everything "in house". For countries with large populations and ample resources such as Brazil, Mexico,

and Argentina this method had somewhat positive results. It created thousands of low-skill factory jobs and helped protect Latin American nations from the volatility of foreign economies.

However, as the law of comparative advantage will tell us, specialization overall benefits nations by capitalizing off of factor endowments and utilizing trade. Many small countries such as Colombia or Peru were harmed simple because they did not have the resources or technology to effectively produce the goods they needed. ISI also created inefficiencies in markets due to a lack of incentive to reduce costs or improve products since there was so little competition. Additionally, the policies had a negative impacts on exchange rates which harmed the regions export markets (Lustig et al., 2011).

By the 1960s and 70s many nations in the region began to move away from ISI due to economic issues as well as pressure from developed nations to open their borders. Since then the region's openness to trade has increased significantly. The figure below shows the changes in openness as measured by the rate of Foreign Direct Investment as a percentage of GDP.
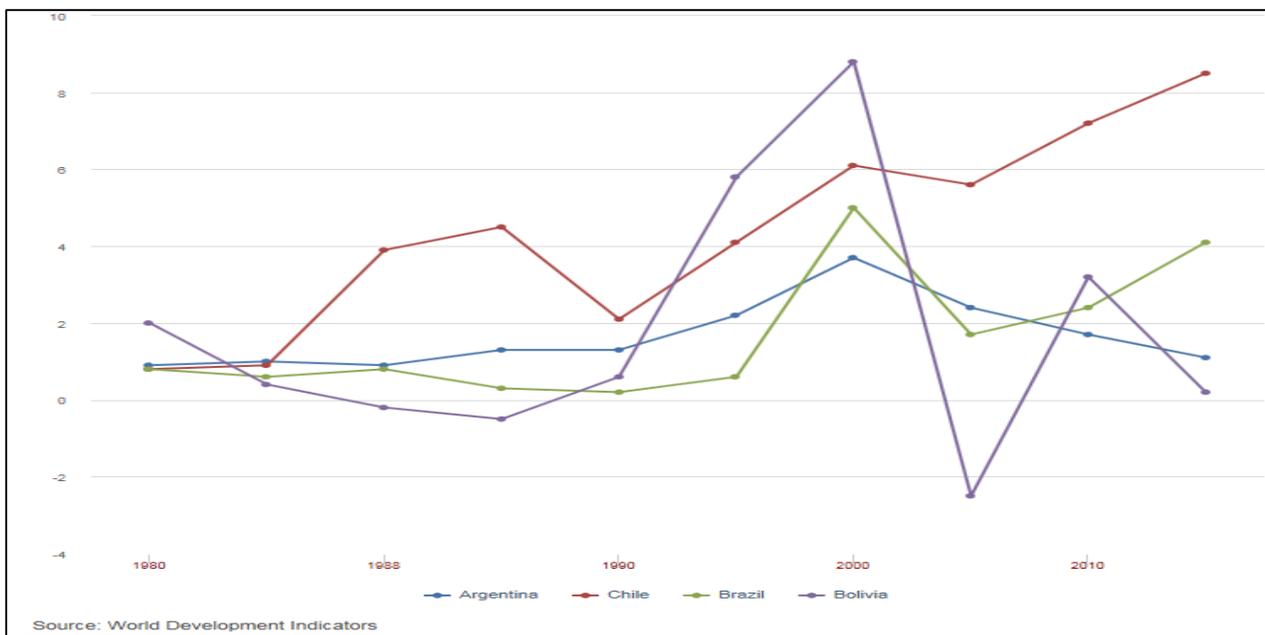
Figure 5: Foreign Direct Investment: 1980 to 2010: Argentina, Bolivia, Brazil, and Chile
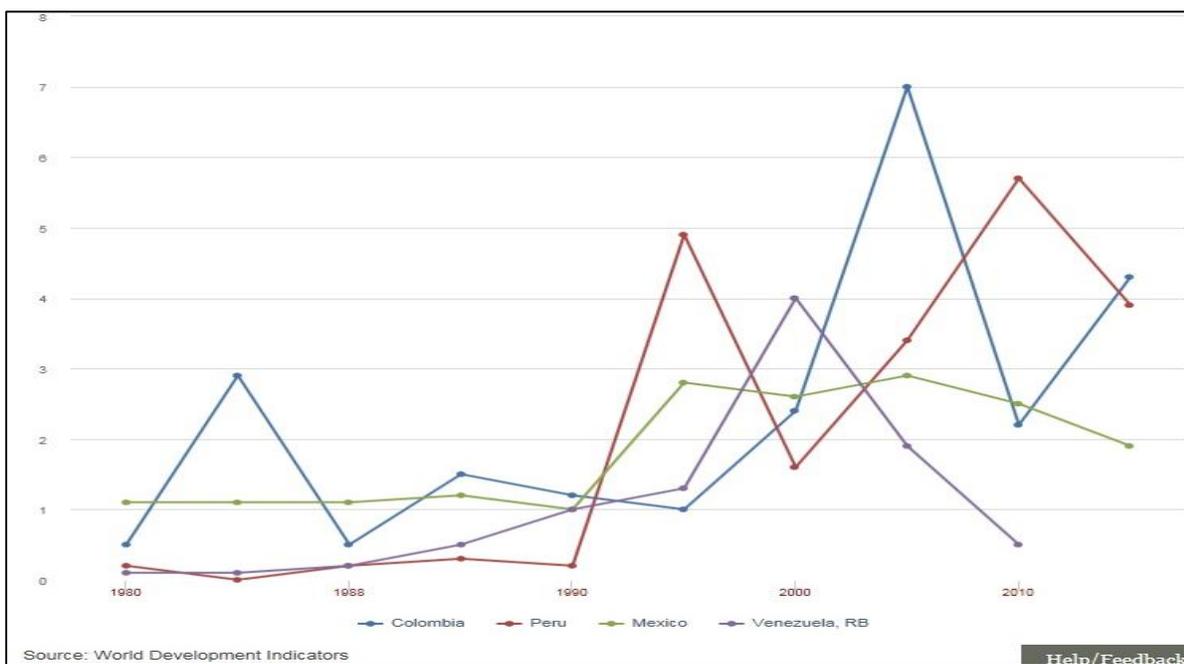
Figure 6: Foreign Direct Investment: 1980 to 2010: Colombia, Peru, Mexico, and Venezuela

Labor Force Participation and Demographic Transition

Along with a reduction in income inequality and poverty, Latin America has also been experiencing a steady decline in birthrates and an increase in working age population. This transition can be linked with improvements to income inequality in that when women receive more education and are more involved in the labor force it provides additional funds for families and keeps these women from having children prematurely. With less children per family plus more income coming in it can create a positive snowball effect where the children a family does have can have more funds allocated to them, leading to better education and healthcare per child. These families will also rely less on cash transfer programs in the future. While this type of transition typically will occur in any region that is undergoing economic development I believe that certain policies that sped up the process in Latin America.

In Brazil the average number of births for a woman (Total Fertility Rate) dropped from 4.1 in 1980 to below replacement level, or the level required to keep a constant population, at 1.8 in 2010. In Mexico the drop was also severe from 4.7 to 2.3 and Peru's total fertility rate was cut in half from 5 to 2.5 in those 25 years. For reference the TFR of the United States has remained virtually unchanged since 1980 at 2.1.

As the demographic transition continued the percentage of the population in the working age also increased. Colombia, Peru, Venezuela, and Brazil all saw their work age population increase by ten percentage points and Mexico's went from 50.9% to 64.1% from 1980 to 2010. And in tandem the percentage of GDP going towards education increased. Colombia went from allocating just 1.7% in 1980 to 4.8% in 2010. There was a similar transition for most other countries in the region.

A study by Azevedo in 2013 for the World Bank also showed that an increase in the amount of females actively participating in the labor force also increased significantly in the last decade. The ratio of male/female workers went from 1.9 in 1995 to 1.5 in 2010. The study found that many middle-aged women began to enter the workforce. An examination of the data collected by the World Bank shows that the female labor participation rate has dramatically increased from1990 to 2010. Bolivia, Brazil, Venezuela, and Chile all saw an approximate 15 percentage point increase in participation from females in the work force. Colombia and Peru were even more astounding with an over 20 percentage point increase. Higher participation by women in the labor force also leads to further reductions in the birthrate as working women have less time to spend on having children.

The region is currently experiencing demographic dividend where households and women are choosing to have less children and the working-age portion of the population grows. This is brought on by improvements in healthcare for children that result in less infant and childhood mortality. Additionally, increased education and economic independence for women will lead to less births. This has been an extremely important factor to Latin America's reduction in income inequality as well as poverty decline. With governments adopting more policies aimed at helping poorer families as well as increased spending on education there is more money for less people. Less children at home also enables women to be more active participants in the labor force resulting in more money for households to spend on their own fewer children. While this obviously will become an issue in the future when the working-age population begins to retire the region has time to adjust accordingly and enjoy the benefits of the demographic shift at the present time.
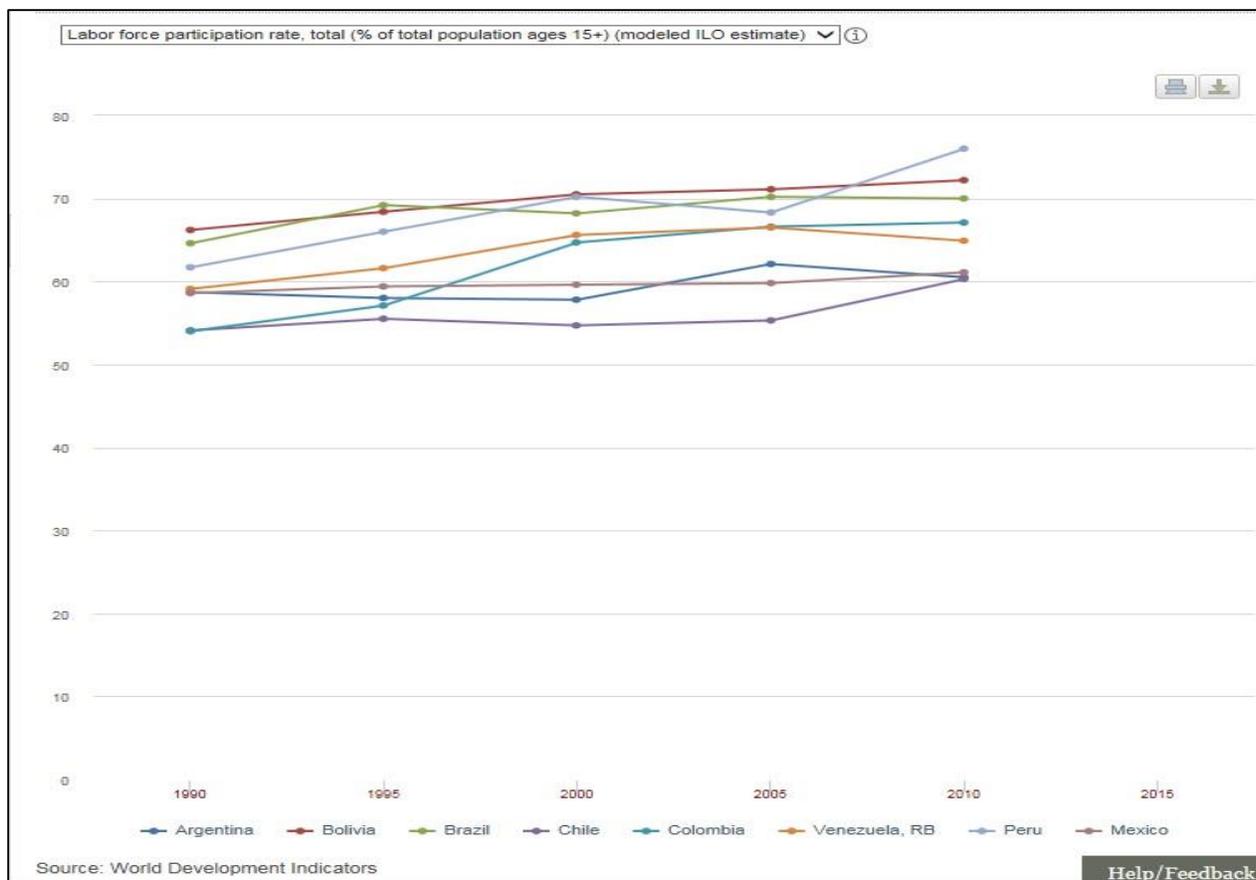
Figure 7: Labor Force Participation Rate 1990 to 2010

Figure 7 shows the overall increase in Labor Force Participation across the region. The overall

trend reveals that there has been a positive trend of increasing the rate, with most countries

seeing approximately a 5 percentage point increase since 1990.
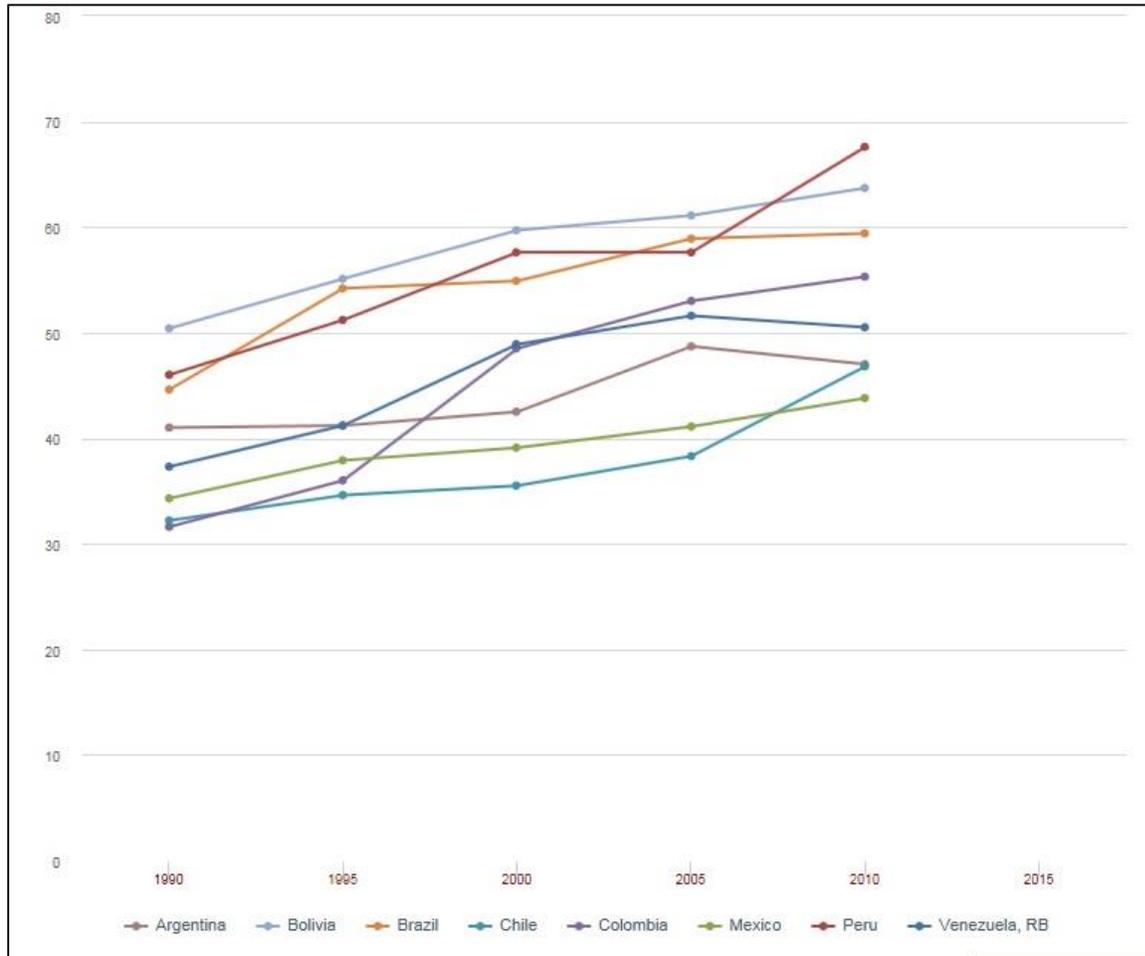
Figure 8: Female Labor Force Participation: 1990 to 2010

Source World Development Indicators

Figure 8 shows the Female Labor Force Participation rate since 1990 and reveals a much higher

increase than the overall Labor Force Participation Rate. Most countries have seen an increase of

nearly 10 percentage points. This data tells us that a large portion of the increases to the LFP rate

can be attributed to women becoming more involved in the work force.

Chapter 3 - Methodology

After reviewing the various causes to the declines in income inequality across Latin America I now hope to examine the data and determine how effective each of these changes in policy have been. I will be looking closely at changes to spending on education, changes to the labor force participation rate, increased openness to trade as measured as the rate of foreign direct investment, and finally the introduction or expansion of conditional cash transfer programs.

Data

The data used in this paper came from the World Bank, the Organization for Economic Co-operation and Development (OECD), and a harmonized database of household surveys from 14 Latin American countries compiled in the Socio-Economic Database for Latin America and the Caribbean (SEDLAC). Additional data came from the United Nations Educational, Scientific and Cultural Institute for Statistics data center and the IndexMundi which collects facts from various credible sources such as the CIA fact book. The countries looked at in this particular analysis were Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. These particular countries were chosen based on size of their economy and availability of data. While there is debate on whether or not Brazil truly is a part of Latin America due to its unique history and language barrier, geographically speaking it still be can considered part of the region. Because the analysis concerned examining the recent decline in income inequality occurring in Latin America the time periods chosen were 1980, 1990, 2000, and 2010. Due to some difficulty with

finding data for particular time periods there were additional regressions performed only using the data in 1990, 2000, and 2010.

There are a few other points to mention about the data. Since I was hoping to find data from countries where a history of untruthful reporting has been recorded some of the data may not truly reflect the economic conditions in the countries at the time. For example, Argentina has been suspected of reporting false statistics on numerous occasions. The International Monetary Fund has reported that Argentina is failing in its obligation to report reliable figures. In addition, data for many economic indicators for recent years in Venezuela is unavailable on the World Bank database. When examining other sites for the data there is some to be found but often varies depending on the source.

Causes to the Decline

As discussed in the previous section of this thesis the recent decline in income inequality in Latin America has been a major feat during a time period where nearly every other geographic zone has been experiencing the opposite. Even more so considering the area has historically been one of the most unequal regions in the world. This thesis hopes to prove that it has been a combination of several policy changes that has led to this decline. Among these policies include an expansion of conditional cash transfer programs intended to help greater numbers of poor people receive the funds necessary to keep children health and in school. In addition, an increased openness to trade and participation in the global market place has increased each countries respective rate of foreign direct investment (FDI). The third major factor will be the increased funding towards education in terms of a percentage of overall GDP. Finally, cultural changes and feminists movements

leading towards increased rights for woman have increased the number of active members in the labor force. I hope to prove that all of these factors have made a positive contribution to the decline in income inequality measured by the Gini coefficient. Equation 1 below represents the model I will use with my regression.

Eq 1.

$$Y_t = \beta_0 + \beta_1(CCT) + \beta_2(FDI/GDP) + \beta_3(Ed) + \beta_4(LFP) + \varepsilon$$

Where Y represents the Gini coefficient, CCT is equal to the presences of a national conditional cash transfer program in place. Since it is difficult to get an accurate and concrete figure to represent the amount of money being put into these programs or the amount of households using them this figure will binary, receiving a 1 if a program is in place during the time period and a 0 if no program is in place. Table 1 represents all of the current programs in place in the selected Latin American countries and when they were first implemented. While Venezuela does not have one specific program that stands out many were implemented in the early 1990s. FDI is the percentage of a nation's GDP coming from foreign direct investment and both are measured in U.S. dollars. The LFP is the labor force participation rate which is the proportion of the population fifteen years of age and older that is economically active. And finally the ε represents the error term that may account for other possible explanations or omitted variables. Because it is hypothesized that the increased spending on education, increased level of foreign direct investment, expansion of conditional cash transfer programs, and an increase to the overall labor force

participation rate has caused the national Gini coefficient to decrease throughout the past

four decades, a time-series regression analysis was performed.

Table 1: Conditional Cash Transfer Programs in Latin America

Country	Year Instated	Program
Argentina	2001	Program for Male and Female Heads of Unemployed Households
Bolivia	2006	Bono Juancito Pinto
Brazil	1996	Program a de Erradicação do Trabalho Infantil(PETI)
Chile	2002	Chile Solidario
Colombia	2001	Familias en Acción
Mexico	1997	Progresa, Oportunidades
Peru	2005	Juntos
Venezuela	1993	

Chapter 4 - Results

Using the econometrics software STATA I performed a series of regressions to determine

the effect of different policy changes on the GINI coefficient for the eight selected countries.

Utilizing a fixed effect regression with a least square dummy variable model I was able to better

understand the effect of the changes across the countries.

Table 2: STATA Output Grouped by Country

```
. xi, noomit: regress gini ed lfp fdi cct i.country, noconstant

      Source |       SS           df       MS              Number of obs   =        28
-------------+----------------------------------           F(12, 16)       =    790.96
       Model |  7.65156162        12   .637630135           Prob > F        =    0.0000
    Residual |  .012898411        16   .000806151           R-squared       =    0.9983
-------------+----------------------------------           Adj R-squared   =    0.9971
       Total |  7.66446004        28   .273730716           Root MSE        =    .02839


        gini |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ed |  -.0041429   .0073261    -0.57   0.580    -.0196736    .0113877
         lfp |   -.005652     .00382    -1.48   0.158      -.01375     .002446
         fdi |   .7007559   .3597927     1.95   0.069    -.0619706    1.463482
         cct |  -.0264695   .0155406    -1.70   0.108    -.0594141    .0064751
  _Icountry_1 |   .8249863   .2223836     3.71   0.002     .3535542    1.296418
  _Icountry_2 |   .9345882   .2629512     3.55   0.003     .3771565     1.49202
  _Icountry_3 |   .9801826   .2568082     3.82   0.002     .4357737    1.524592
  _Icountry_4 |   .8402647   .2079975     4.04   0.001     .3993298      1.2812
  _Icountry_5 |   .9371349   .2447991     3.83   0.001      .418184    1.456086
  _Icountry_6 |   .8632587   .2212331     3.90   0.001     .3942654    1.332252
  _Icountry_7 |   .9052459   .2656023     3.41   0.004     .3421943    1.468298
  _Icountry_8 |    .761663   .2254867     3.38   0.004     .2836526    1.239673
```

The output from STATA reveal interesting results. Firstly, the R-squared value of the model is relatively high which a positive finding considering that this implies the data is significant. The F-test value is also extremely low which also reinforces the significance of the data. However, the number of total observations is fairly low with only 28 due to the lack of available data, especially for years prior to 1990. While we may be able to interpret certain findings from this model much more reliable data would be needed for a more complete model.

We can next look at the coefficients on each of the variables; education spending (ed); labor force participation rate (lfp); foreign direct investment as percentage of GDP (fdi); and the existence of conditional cash transfer programs (cct). Since the values were regressed on the Gini coefficient and the hypothesis is that they helped lower the number negative numbers are the

desired result. Both education spending and the labor force participation rate had a lowering effect on Gini although it was very small. Conditional cash transfer programs had the largest lowering effect with -0.02 which is still fairly small. Foreign direct investment actually had in increasing effect on Gini. This could be evidence that the foreign influence in Latin American economies is actually doing more harm than good. Additionally, the policies aimed at helping citizens within the nation seem to be more helpful to lowering the Gini coefficient.

If we then look at the effects within each country the results were for the most part similar throughout. The countries were the largest effects were seen were in Brazil and Mexico which makes sense since they have seen the most noticeable changes in inequality within the past few decades. Additionally, they were the two countries with the most available data which most likely effected the results. On a similar note Venezuela had the least noticeable effects but was also the country with the least amount of available, and reliable data, so I do not believe this is an especially telling output.

```
. . xi, noomit: regress gini ed lfp fdi cct i.year, noconstant
note: _Iyear_1980 omitted because of collinearity
note: _Iyear_1985 omitted because of collinearity

      Source |       SS          df       MS            Number of obs  =        28
-------------+----------------------------------        F(9, 19)       =    488.89
       Model |  7.63150561       9  .847945068          Prob > F       =    0.0000
    Residual |  .032954426      19  .001734443          R-squared      =    0.9957
-------------+----------------------------------        Adj R-squared  =    0.9937
       Total |  7.66446004      28  .273730716          Root MSE       =    .04165


        gini |      Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ed |   .0068821    .0084414     0.82   0.425    -.010786     .0245502
         lfp |   .0014897    .0015139     0.98   0.337    -.001679     .0046583
         fdi |   .5280729    .4150741     1.27   0.219    -.3406872    1.396833
         cct |   .0121016    .0349749     0.35   0.733    -.0611017    .0853048
 _Iyear_1980 |          0   (omitted)
 _Iyear_1985 |          0   (omitted)
 _Iyear_1990 |     .38584    .0880062     4.38   0.000     .2016409    .5700392
 _Iyear_1995 |   .4102427    .0978841     4.19   0.000     .2053689    .6151164
 _Iyear_2000 |   .4026627    .0991124     4.06   0.001     .1952181    .6101073
 _Iyear_2005 |   .3700232    .1043246     3.55   0.002     .1516694     .588377
 _Iyear_2010 |   .3233981    .1093462     2.96   0.008     .0945339    .5522622
```

A second regression was performed to see how the effect of these policy changed over time. The years of 1980 and 1985 were omitted from the output due to an insufficient amount of data. It is interesting to see the positive increases between the periods of 1990 and 2000 and then the following decreases after the start of the new millennium to now. These changes follow the predictions in the hypothesis since the policies were implemented in the late 1980s and early 1990s and it would take a few years to see real changes occur. The recent decline since 2000s shows how these polices have had a positive influence in lowering the Gini coefficient throughout Latin America.

We additionally saw that again education spending, labor force participation, and conditional cash transfer programs all had a negative coefficient and therefore had a positive influence on lowering the Gini coefficient while foreign direct investment did not. Conditional

Cash transfer programs seemed to have the largest effect while education spending and labor force participation's effects were small. While this information is interesting the t-values for all the variables were too small to be statistically significant. I believe that it is in large part due to the small number of observations and the addition of more reliable data would result in a better analysis.

Income Shares

While the GINI index is able to tell us a great deal about a country's economic inequality a disadvantage to this method is that any change to the distribution will cause a shift regardless if that change is at the bottom or the top. In other word's any transfer of income, whether that is from rich to rich, poor to poor, or rich to poor, will affect the distribution. In order to make up for this there are other methods of measuring income inequality. One of the most common other methods is to examine the share of total income held by the top 10% of earners in a country, as well as the share of the bottom 20% of earners. This method provides the advantage of being able to see just how much the share of income has changed over time. The figures below display the changes in income share from 1980 to 2012 for both the top 10% of earners and the bottom 20% in Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, and Peru. Unfortunately Venezuela did not have enough data to be included.
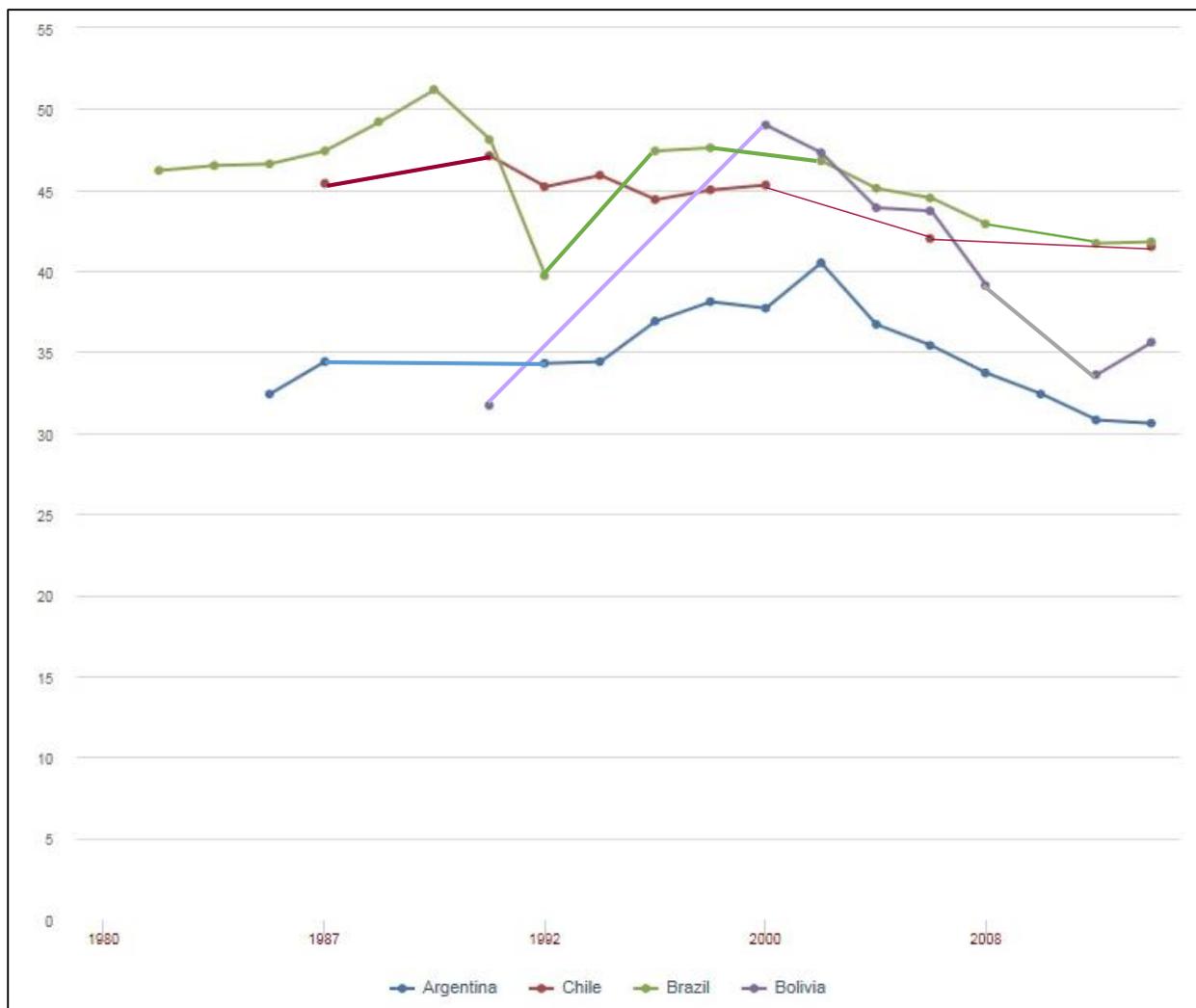
Figure 9: Percentage of Total Income Held by Top 10% of Earners: 1980 to 2010: Argentina, Brazil, Chile, and Bolivia

Source World Development Indicators

From the figure we are able to see that from the 1980s to the early 1990s the income share of the top 10% either remained steady or was increasing. In 1990 the top earners in Brazil controlled over half of total income. Bolivia saw a sharp increase as well, jumping from just above 30% in 1991 to nearly 50% by 2000. However, since the beginning of the 21st century an overall decreasing trend can be seen with all countries below the 45% mark.

Figure 10: Income Share Held by Highest 10% of Earners: 1980 to 2010: Colombia, Mexico, Peru

Source World Development Indicators

Figure 10 varies from Figure 9 in that all of these countries have experienced minor increases in the share of income. However, the increase is small and in the case of Peru is nearly non-existent. Additionally, the income share of the top earners had been increasing in all countries until the mid-2000s and has since been either decreasing or at least remaining relatively unchanged.
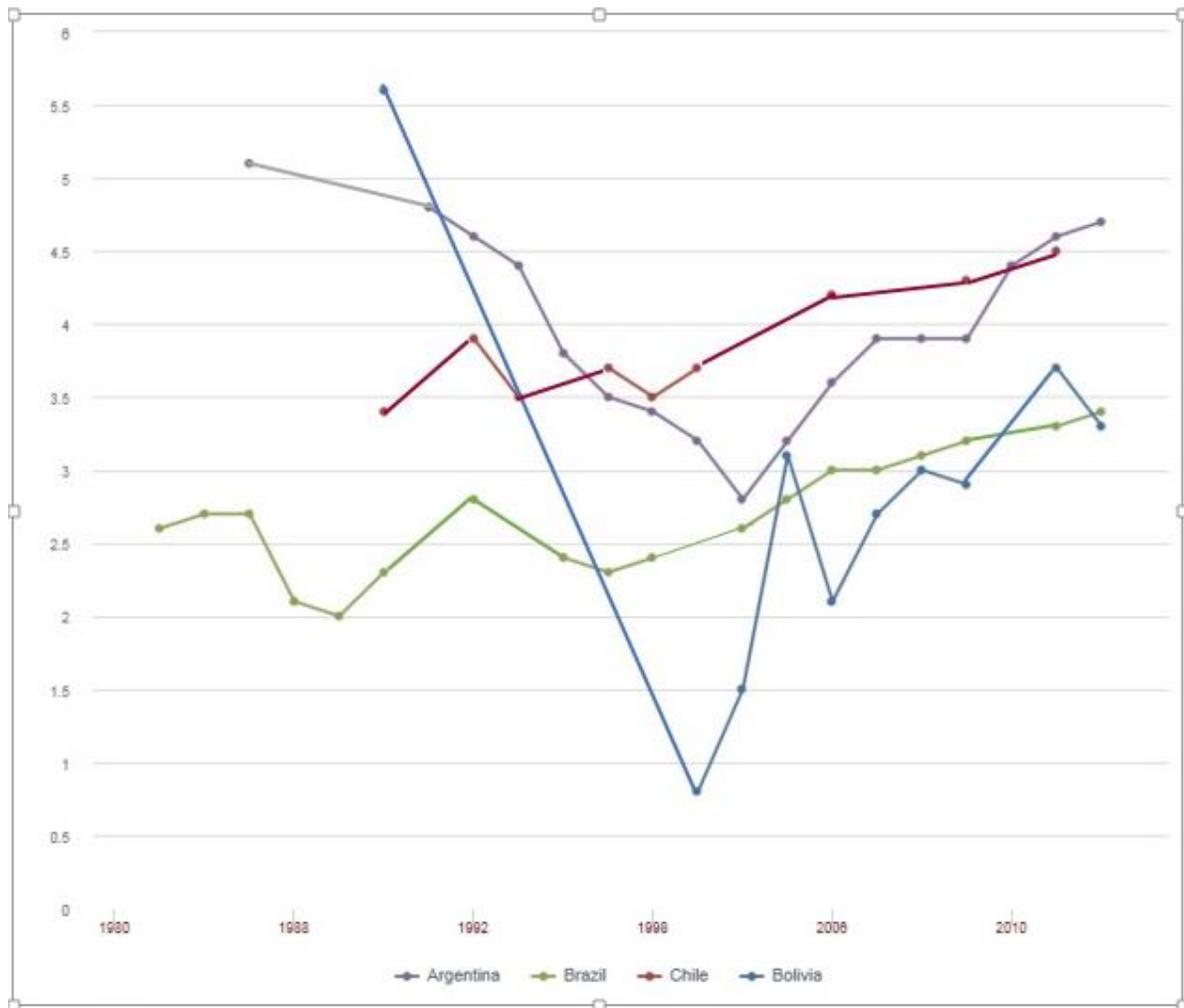
Figure 11: Income Share Held by Lowest 20%: 1980 to 2010: Argentina, Bolivia, Brazil, and Chile

Source World Development Indicators

From this figure we are able to see that both Chile and Brazil saw around a 1 percentage point increase in the income share of the bottom 20% of earners, going from 3.5% to 4.5% and 2.6% to 3.4% respectively. Argentina's line is V-shaped experiencing a large decrease between 1988 and 2000 and has since been rising slowly, but is still lower today than it was in the mid-1980s. Bolivia's line is bar far the most volatile and saw a massive decline between 1992 and

2000. It has since been slowly rising and falling and today sits at around 3.5% which is nearly 2

percentage points lower than its initial recording in 1990.

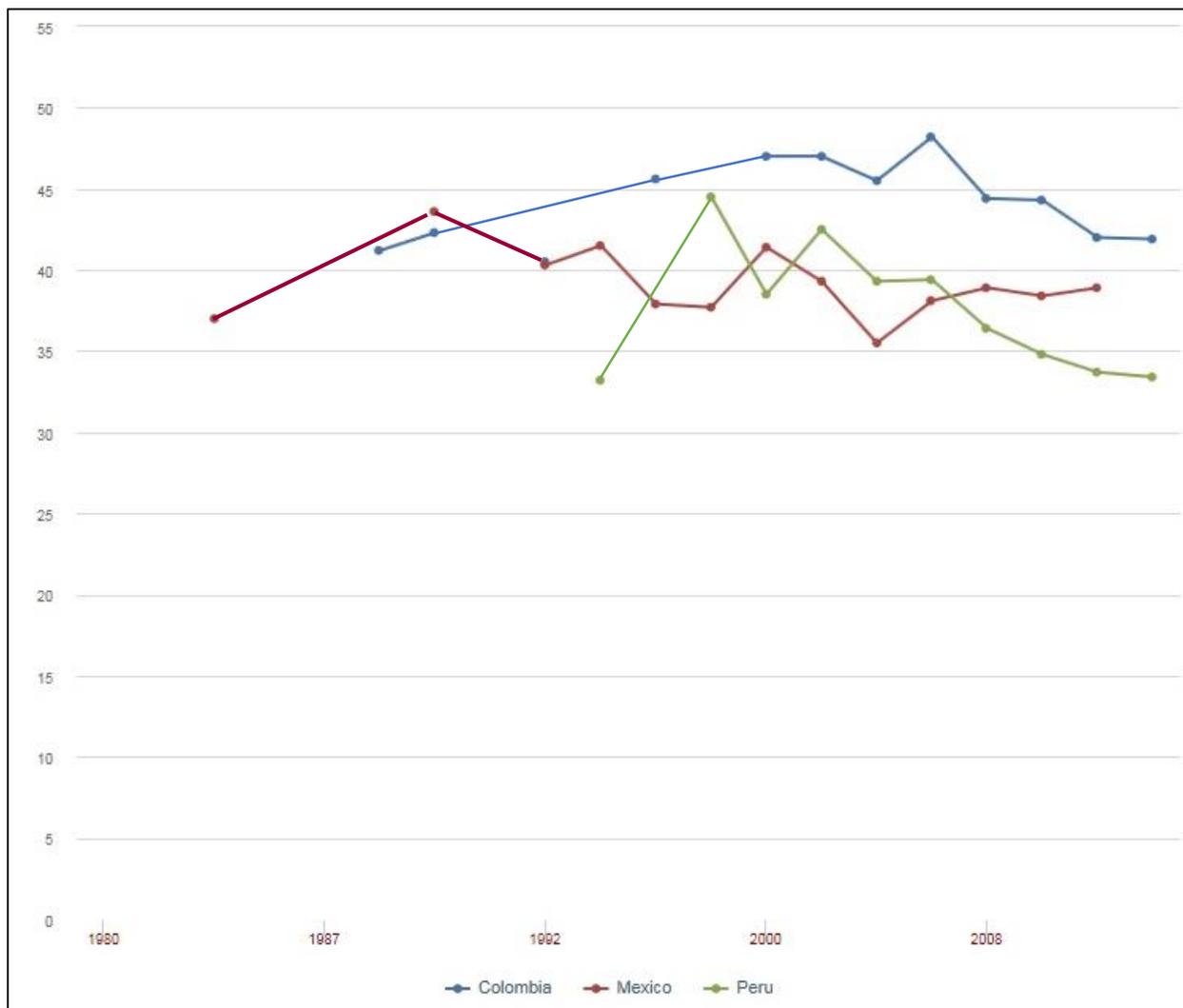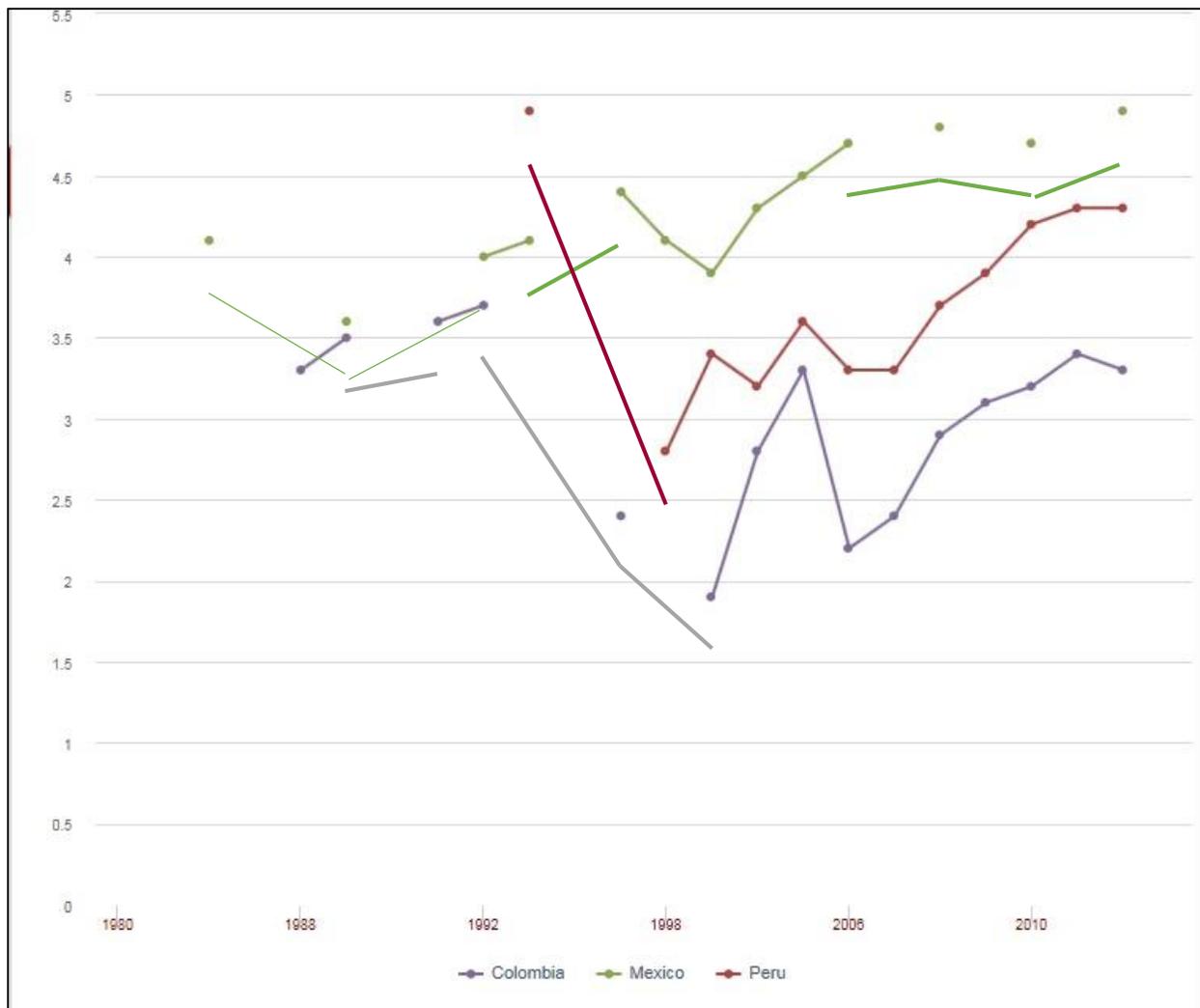*Figure 12: Income Share of the Lowest 20% of Earners: 1980 to 2010: Colombia, Mexico, Peru*

Source World Development Indicators

Figure 12 shows interesting trends for the countries of Colombia, Mexico, and Peru. The

lowest 20% of earners in Peru saw a sharp decline in share in the 1990s and have since been

gradually increasing yet are still lower today. Colombia also saw a sharp decline in the 1990s but a then sharp increase followed for the most part of the 2000s. Mexico's poor have seen an overall trend of increasing and have gone from accounting for 4.2% of total income in 1986 to 4.9% in 2012.

From the figures we can see that it is not only the Gini coefficient that is shrinking throughout Latin America but the actual share of income is improving as well. Since the 2000s the income share of the top earners has been decreasing while the share of the bottom 20% has been improving. While the improvements for the bottom of the income distribution are not as large as one may hope it shows that the policies are having a positive influence and by continuing them we can hope to see more improvements in the future. Finally, the fact that some countries saw the income share of their top earners fall so heavily while the bottom earners only rose slightly implies that these policies may be contributing most to nation's middle class and median earners.

Chapter 5 - Conclusions and Policy Implications

Despite the recent improvements to income inequality Latin America still remains one of the poorest and most unequal regions in the world. Additionally, simply because the gap between rich and poor is becoming smaller that does not necessarily mean overall economic conditions are improving. A small Gini coefficient could simply reveal that everyone in the country is the same level of poor. However, that being said if national governments continue to utilize these changes in policy that aim to increase rates of education in the country's poor, as well as increasing their openness to trade the overall effect should be positive for all citizens.

While it was interesting to see the results of the analysis I unfortunately do not believe there was sufficient data to make real claims on how effective each policy was throughout the region. It was especially difficult to find ample data from the 1980s and even 1990s for some countries so it was not always easy to see the changes that the nations underwent. However, based on the literature review as well as the data I was able to find I believe that I can draw a few significant conclusions.

To begin, spending on education will continue to be a critical aspect of improving economic conditions for the bottom share of the income distribution. Countries such as Mexico and Brazil have both seen significant improvements in the rate of education for children under 18 as well as large improvements to the amount of older adolescents remaining in school rather than entering the labor market. In terms of going forward many Latin American nations have seen large expansions in the education system which has resulted in a lack of qualified and dedicated educators as well as suitable school facilities. Governments should invest more money to updating decrepit buildings as well as training more teachers. It will also be important going forward to take steps towards ensuring that educated citizens that chose to go to foreign universities for tertiary education return to their home country after graduation and avoid a 'brain-drain'.

Conditional cash transfer programs have proven to be an effective tool for combating extreme poverty and increasing conditions for a nation's poor. Additionally, despite the fear that these programs take too much from the wealthy, these programs typically do not require a large share of nation's GDPs, typically accounting for less than 2% of overall GDP. The future of these programs will rely on better targeting where the funds go and which families receive them.

This can be done by more tightly monitoring the allocation of funds as well as fine tuning the conditions for being eligible.

Changes to the labor force participation have had a positive, though small effect on the Gini coefficient throughout Latin America. However, I believe it will become a more important factor in the coming few decades. As countries develop its typical for them to undergo a demographic transition which features women having less children and becoming more involved in the labor force. As the region continues to develop this phenomenon will continue to occur and more educated women will be able to bring more money into the home and the amount of struggling mothers will decrease, putting less strain on social cash transfer programs. It is typically the poorest segments of a nation that struggle most with having too many children and not enough income so more working women should act as an equalizer for the bottom end of the income distribution.

Finally, while many economic indicators prove that the transition for Import Industry Substitution to a more open global economy have had positive results for the economies throughout Latin America, changes to the rate of foreign direct investment seem to have the least important role in changes to the Gini coefficient. A possible explanation for this may be the fact that the introduction of more outside influence into economies tends to have positive results for the high end of the income distribution. Building more factories to increase exports helps the factory owners but has poor results for workers.

In summation the steps Latin America is taking as a region to improve the economic conditions of the nation's most poor is a progressive choice that will benefit everyone in the long run. It will be especially interesting to see if this trend of shrinking the gap between the rich and

the poor will continue in the coming years or if the region will follow suit of the rest of the world and begin to increase its income inequality once more.

Appendix A: Latin America Data collected from the World Bank Databank

country	Year	GINI	ED	LFP	GDP	Foreign Direct Investment	FDI	Working Age Popluation(%)	CCT
1	1980	0.393	2.6		$76,961,923,741.90	$678,000,000.00	0.0088	61.5	0
1	1985	0.4	1.4				0.0100	60.5	0
1	1990	0.465	1.1	58.7	$141,352,368,714.70	$1,836,000,000.00	0.0130	60.3	0
1	1995	0.489		58			0.0220	61.3	0
1	2000	0.504	4.6	57.8	$284,203,750,000.00	$10,418,314,339.10	0.0367	62.1	0
1	2005	0.493	3.5	62.1			0.0240	63	1
1	2010	0.44	4.6	60.5	$461,640,242,696.20	$7,845,718,626.40	0.0170	63.7	1
2	1980				$4,537,487,842.60	$31,000,000.00	0.0201	53.9	0
2	1985						0.0040	53.9	0
2	1990	0.486		66.2	$4,867,582,620.20	$27,200,000.00	0.0056	54.3	0
2	1995	0.55	5.6	68.4			0.0580	55.3	0
2	2000	0.619	5.5	70.5	$8,397,912,509.10	$736,350,000.00	0.0877	56.6	0
2	2005	0.51		71.1			-0.0250	58	0
2	2010	0.462	7.6	72.2	$19,649,631,308.20	$621,397,989.50	0.0317	59.4	1
3	1980	0.57			$235,024,538,983.30	$1,911,000,000.00	0.0081	57.9	0
3	1985	0.556					0.0060	59.1	0
3	1990	0.602		64.6	$461,951,782,000.00	$989,000,000.00	0.0021	60.6	0
3	1995	0.596	4.6	69.2			0.0060	63	0
3	2000	0.58	4	68.2	$657,216,179,284.00	$32,779,239,699.80	0.0499	65.3	1
3	2005	0.566	4.5	70.2			0.0170	66.6	1
3	2010	0.52	5.8	70	$2,209,433,265,120.50	$53,344,632,546.70	0.0241	67.9	1
4	1980		4.4		$27,572,307,600.00	$213,000,000.00	0.0077	60.8	0
4	1985	0.548					0.0090	63.2	0
4	1990	0.571	2.4	54.1	$31,558,927,517.20	$661,200,000.00	0.0210	64.2	0
4	1995	0.541	2.6	55.5			0.0410	64.7	0
4	2000	0.552	3.7	54.7	$79,328,640,263.80	$4,860,015,667.50	0.0613	65.7	0
4	2005	0.504	3.2	55.3			0.0560	67.5	1
4	2010	0.508	4.2	60.3	$217,538,271,334.70	$15,725,203,485.80	0.0723	68.7	1
5	1980		1.7		$33,400,712,095.00	$157,137,700.00	0.0047	55.7	0
5	1985		2.7				0.0290	58.2	0
5	1990			54	$40,274,204,595.20	$500,000,000.00	0.0124	59.5	0
5	1995			57.7			0.0100	61.3	0
5	2000	0.565	3.5	64.7	$99,886,577,575.50	$2,436,459,923.40	0.0244	63.7	0
5	2005	0.55	4	66.6			0.0700	65.9	1
5	2010	0.553	4.8	67.1	$287,018,184,637.50	$6,429,943,091.30	0.0224	67.7	1
6	1980				$194,356,825,709.20	$2,090,000,000.00	0.0108	50.9	0
6	1985						0.0110	53.3	0
6	1990	0.512	2.3	58.6	$262,709,785,592.70	$2,549,000,000.00	0.0037	56.8	0
6	1995	0.51	3.9	53.4			0.0180	59.2	0
6	2000	0.536	4.1	59.6	$683,647,980,782.40	$18,110,008,381.00	0.0265	60.7	1
6	2005	0.511	4.9	53.8			0.0290	62.2	1
6	2010	0.472	5.2	61.1	$1,049,925,441,358.00	$26,168,229,630.00	0.0249	64.1	1
7	1980				$17,655,611,231.40	$26,900,000.00	0.0015	54.1	0
7	1985						0.0000	55.9	0
7	1990			61.7	$25,710,059,622.10	$41,000,000.00	0.0016	57.5	0
7	1995	0.51		66			0.0490	59.3	0
7	2000	0.508	3.3	70.2	$50,980,861,887.20	$809,696,760.00	0.0159	60.8	0
7	2005	0.518	2.9	68.3			0.0340	62.6	0
7	2010	0.462	2.8	76	$148,522,048,128.00	$8,454,627,587.90	0.0563	64.4	1
8	1980		3.9		$67,135,122,863.90	$55,000,000.00	0.0008	55.8	0
8	1985						0.0010	57.7	0
8	1990	0.424	2.5	59.1	$47,027,508,385.00	$451,000,000.00	0.0096	58.4	0
8	1995	0.478		61.6			0.0130	59.8	0
8	2000	0.44		65.6	$117,147,614,565.60	$4,701,000,000.00	0.0401	61.5	1
8	2005	0.524		66.5			0.0190	63.5	1

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EDUCATION

The Pennsylvania State University   May 2016

Schreyer Honors College
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University of Seville   Sept
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Seville, Spain
- Lived with a Spanish host family
- All classes were taught in Spanish

RELEVANT EXPERIENCE

Penn State University Office of Global Programs, University Park, PA   Sept
2013 - Present
Department of International Student and Scholar Affairs
- Assists upwards of 50 international students daily with various affairs including obtaining social security cards, travel signatures, and drivers licenses
- Works closely with international student advisers and carries out an requests to aid in operations
- Works 15 hours a week while maintaining a full course load
- Employs strong customer service skills through interacting with international students from various backgrounds, occasionally in times when a language barrier is present
- Answers and screens calls from students and staff

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Global Student Engagement Team
- Worked with a team to create a program for first year international students that created events to help integrate international students into Penn State

RELEVANT SKILLS
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