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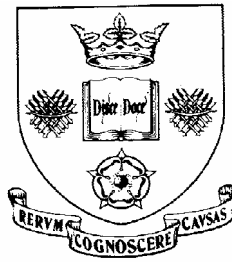
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**Gurleen Popli**

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Department of Economics  
University of Sheffield  
9 Mappin Street  
Sheffield  
S1 4DT  
United Kingdom  
[www.shef.ac.uk/economics](http://www.shef.ac.uk/economics)

# Rising Wage Inequality in Mexico: Structural Reforms or Changing Labor Market Institutions?\*

Gurleen K. Popli  
Department of Economics  
University of Sheffield  
9 Mappin Street  
Sheffield, S1 4DT, UK  
Email: g.popli@shef.ac.uk  
Tel: ++44-114-2223485  
Fax: ++44-114-2223458.

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## ABSTRACT

Over the period of the mid-1980s to the mid-1990s Mexico experienced a significant increase in wage inequality. The literature has typically attributed this rise in inequality to trade liberalization and foreign direct investment. We argue, however, that a better explanation can be found in the changing labor market institutions such as declining union power and the declining real value of the minimum wage. We offer evidence to suggest that these domestic institutional changes have indeed contributed to growing wage inequality, and show that the timing of these institutional changes better matches the trajectory of wage inequality in Mexico than does the timing of reforms.

Key Words: Wage Inequality, Structural Reforms, Labor Market Institutions, Mexico.

JEL Classifications: J31, J50

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# 1 Introduction

In this paper we explain the rise and then the decline in the wage inequality in Mexico over the last two decades from the standpoint of the labour market institutions. We put forward a hypothesis, and evidence in support of it, that it is the changes in the domestic labour market institutions, especially declining minimum wages and the declining unionization, that had a significant impact on the wage inequality.

Wage inequality in Mexico increased significantly during the 1980s and the early 1990s. Standard deviation of log wages, often used as a measure of inequality, increased by about 10% over the period 1984 to 1996; over the same period the Gini coefficient for log wages increased by about 24%. Inequality however started to decline in the mid 1990s. By year 2000, the standard deviation of log wages, compared to 1996, had declined by about 7% and the Gini coefficient had declined by 21%.<sup>1</sup>

Over the same period there were major changes in trade policy in Mexico. Following the debt crisis of 1982 protection of the domestic industries through import substitution policies was phased out and replaced by liberalization of both trade and foreign ownership of capital.<sup>2</sup> Standard trade theories suggest that as a country like Mexico, which is abundant in unskilled labour, opens itself to trade the relative returns to the unskilled workers should increase, lowering the wage inequality in the economy. Instead we observe a rise in the relative returns to the skilled workers leading to increased wage inequality.

Two reasons, in particular, have been put forward to explain the apparent contradiction between theory and empirical findings. First, prior to the trade reforms being initiated, the import substitution policies in place

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<sup>1</sup>Source: Author's calculations from *Encuesta Nacional de Ingresos y Gastos de los Hogares* (ENIGH) data.

<sup>2</sup>For details on the opening up of the Mexican economy over the last two decades refer to Lustig (1998 and 2001), and Ten Kate (1992).

protected sectors with low skilled workers. As the economy opened rents accruing to these workers stopped, causing an increase in wage gap between the skilled and the unskilled workers (Reventa, 1997; Hanson and Harrison, 1999). Another link between trade reforms and rising wage inequality is through outsourcing. According to Feenstra and Hanson (1997) and Hanson (1997, 2003) increase in foreign direct investment increased outsourcing to Mexico, mainly from the US. Most of the activities that relocated were low-skill intensive for the US, but medium to high-skill intensive for Mexico. As a result the relative demand for skilled workers increased in Mexico, raising the skill premium and widening the wage gap between the skilled and the unskilled workers (Cragg and Epelbaum, 1996).

There are, however, limitations to these arguments, both in their methodology and analysis. First, most of these studies cover the period of late 1980s or the early 1990s. This period is too short to fully analyze the impact of trade reforms. For instance looking at the period till early 1990s would fail to capture impact of NAFTA which was signed in 1994. Second, most of the studies mentioned above use macro-survey data of manufacturing plants, or the micro level data for limited number of urban areas.<sup>3</sup> To what extent the wage trends observed in the manufacturing sector or the urban sector alone can be generalized for the entire workforce remains doubtful.

Thirdly, there are other studies that point towards different reasons for the rising wage inequality in Mexico. Behram, Birdsall and Szekely (2000) and Airola and Juhn (2005), argue that trade liberalization per se did not widen the wage differentials in the region.<sup>4</sup> It is the other structural reforms – domestic financial market reforms, capital account liberalization and tax reforms – that had a dis-equalizing effect, that too only in the short run. Esquivel and Rodriguez-Lopez (2003), in their study on Mexico, find that

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<sup>3</sup>Hanson (2003) in the only exception, he uses the 1% random sample from 1990 and 2000 census data.

<sup>4</sup>Airola et al (2005) focus only on Mexico; Behram et al (2000) look at 18 Latin American countries.

for the period 1988 to 1994 trade liberalization would have led to a decrease in wage inequality as suggested by standard trade theories, but for the technological progress that accompanied it, which led to a negative impact on inequality. For the period 1994 to 2000 they find no impact of trade liberalization on wage differentials.

The most serious limitation of these studies is that the timing of trade reforms, as well as other structural reforms, and the trends in inequality do not match. It is this issue that we address directly. We argue that the timing of the changes in the minimum wages and unionization match up much better with trajectory of inequality, than do the impact of any reforms undertaken in the economy. Prior to Mexico's dramatic reductions in barriers to trade and foreign investment, the country embarked on a strategy of freeing the labor market from institutional 'rigidities' such as labor union power and minimum wages. Union density declined from 22.7% in 1984 to 14.8% in 1996, and over the same period the real value of the minimum wage decreased by about 50%.<sup>5</sup> Unions and minimum wages were on the decline precisely when inequality was rising, and when these stopped declining, so too did inequality stop rising.

One paper that discusses the issue of timing of the trade reforms, though not explicitly, is Verhoogen (2004). According to him, as the trade liberalization takes place and domestic producers face competition in the export markets, they upgrade the quality of their products. This quality upgrading requires better "*technical know-how or entrepreneurial ability*" (Verhoogen, 2004), which in turn leads to higher relative wages for the white-collar workers, and hence a higher within-industry inequality. However, this quality upgrading (or the restructuring of the production structure) took place only between 1993 and 1997, which is not the period of high inequality.

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<sup>5</sup>Source for union density figures - author's calculations from the ENIGH data. Source for minimum wage statistics - Annual Report, Banco de Mexico, 1996.

## 2 Wage Inequality and Structural Reforms

In this section, we begin by outlining the trajectory of wage inequality and the structural reforms in Mexico. We then analyze the changes in the distribution of wages and the returns to education in the context of the periodization done on the basis of reforms and inequality.

### 2.1 Trajectory of Wage Inequality

We use seven years of data, from Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH), spread over the period 1984 to 2000. These are the national household surveys that began in 1984 and continued in 1989, 1992, and every two years thereafter. The survey employs a ‘stratified sampling’ technique, so we use sample weights made available by ENIGH in the analysis below.

The sample utilized here is only of working men from the surveyed households. Men form about 65% of the labour force in Mexico. To avoid the issue of differences across gender in wages we look only at men. The earnings variable is the hourly real wage and it is computed from the reported earnings during the month before the survey and reported hours of work last week.<sup>6</sup> Use of wages is more appropriate in this analysis since they are more closely related to the market prices for skills. In the estimate of the wage no fringe benefits, tips, bonuses or commissions are included. To ensure an accurate measure of the wage, all those who are self-employed or working without pay are deleted from the sample. We also exclude from the analysis all those who hold more than one job.

Table 1 reports the measures of dispersion of log wages over the period 1984 to 2000. Wage inequality, as measured by standard deviation of log wages, Gini coefficient, and wage differential between the 90<sup>th</sup> and the 10<sup>th</sup>

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<sup>6</sup>To obtain real wages, nominal wages are deflated by the National Consumer Price Index (NCPI), which is found in the Annual Report, 1996 and 2000, published by Banco de Mexico.



percentile increased until the mid 1990s, after which it experienced a decline. While the 90-50 wage differential follows the overall trend of increasing till the mid 1990s and decreasing after that, the 50-10 wage differential follows the opposite trend of decreasing till the mid 1990s and increasing thereafter; indicating that the changes in the upper half of the wage distribution dominate the overall trends in wage inequality.

In Figure 1, we plot the change in log wages by percentiles over the period 1984-2000. We split the period into two, **1984-1996** (the period of rising inequality)<sup>7</sup>, and **1996-2000** (the period of decreasing inequality). For the period of rising inequality both the 10<sup>th</sup> and the 90<sup>th</sup> percentile wages declined, by 16% and 13% respectively. Over the next few years (1996 to 2000) both percentiles saw an uneven increase in their wages, with the top gaining 22% and the bottom only 3%. The decline in wages has been more in the middle of the distribution, where for the entire period the median worker lost 16% and the workers at the 30<sup>th</sup> and the 40<sup>th</sup> percentile saw their wages erode by almost 25%.<sup>8</sup> This decline of the middle could explain the trend in the 50-10 wage differential pointed out above.

## 2.2 Trajectory of Structural Reforms

Of all the policy changes introduced in Mexico since the early 1980s, the most discussed and analyzed are the trade reforms, which started with the signing of GATT in 1986 and were pushed further by signing of NAFTA in 1994. Along with the trade reforms, were also initiated a number of other reforms – domestic financial market reforms, capital account liberalization, tax reforms, privatization of state owned enterprises, and labour reforms.

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<sup>7</sup>Inequality started to decline in the mid 1990s, so where should we choose to split the data – 1994 or 1996? In 1994 Mexico had a currency crisis, therefore, by taking the cut off point at 1996 we make sure that second period is not only one of declining inequality but also of relative stability.

<sup>8</sup>This finding is unlike the finding for the US, where the log wage change is a (positively sloped) linear function of the percentile (Juhn et al, 1993).

To get an idea of how the reforms progressed over this period we plot the different reform indices calculated by Lora (1997, 2001), in Figure 2. All these indices are relative to the reform process in the 19 Latin American countries considered by Lora. The indices are normalized between 0 and 1, where 0 is the minimum value and 1 is the maximum value observed among all the Latin American countries during the period of study, 1985 to 2000. Five reform areas are considered: (i) trade policy, (ii) financial policy, (iii) tax policy, (iv) privatization, and (v) labour legislation. The structural reform index is a simple average of all the five reform indices. The index for capital account liberalization is obtained from the study by Morley, Machado and Pettinato (1999), which is similar to the study done by Lora, with the period of analysis being 1970 to 1995.

The structural reform index, indication of overall reform process, increased from 0.29 in 1985 to 0.51 in 1999, but most of the increase happened pre-1994, after which the index actually starts to fall. Two reform areas that saw little to no change in Mexico are, the tax policy and labour legislation. The financial reform index increases slowly till 1993, followed by a large jump in 1994, indicating a major change in policy. Privatization index reflects cumulative privatization as a proportion of the GDP for each year. For Mexico privatization has been taking place at a steady pace with noticeable jumps in the index in 1990, the year of sale of TELMEX, and 1994/95. Two areas of reform that saw significant progress are trade policy and capital account liberalization.

The trade reform index is average of two components – average levels of tariffs and dispersion of tariffs. Two cautions while interpreting this index, first, as with all the other indices it tells us when the government policies were implemented, not when the impact of these reforms was felt. Second, if protection to begin with was very high, as was the case in Mexico, then lower tariffs will not necessarily lead to higher imports. Both caveats are

noted by the authors' of the reform indices.

In Figure 3 we put the trade reform index with the figures for imports and real exchange rate. The trade reform index increased till 1989, between June 1985 and June 1988 the percentage of domestic production covered by import licences fell from 92.2 percent to 23.2 percent (see Appendix A, Table A1). After 1989 the trade reform index became stable, declining in the post 1996 period. Over the period of rising index value, we see Peso depreciating. The depreciating exchange rate implies that the decrease in import protection did not translate into higher imports.<sup>9</sup> In fact we do not see any discernible jumps in the import's series, which continue to increase at a steady rate right till 1999.<sup>10</sup> The imports seem more in tandem with the changes in the real exchange rate, Peso appreciated from 1987 to 1993, which by itself can be an incentive to increase imports, irrespective of the trade reforms.

Coming to the capital account liberalization index – one outcome of the capital account reforms would be an increase in FDI. While the Mexican government had been trying to attract foreign capital since the debt crisis of 1982, the actual regulations on foreign ownership changed only very late in the decade. In May 1989 new regulations governing foreign investment were put in place, but its only in 1993, when the new Foreign Investment Law formally replaced the 1973 law that governed the foreign direct investment in the country (Panuco-Laguette and Szekeley, 1996; Dornbusch and Werner, 1994). While the reform index has been increasing steadily from 1985 to 1995, the FDI started increasing only after 1990, with the biggest jump coming between 1993 and 1994.

In Table 2 we present a correlation matrix between the different reform indices and the measures of wage inequality. Structural reform index is

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<sup>9</sup>Ten Kate (1992) argues that the trade reforms did not begin to impact the economy until after 1988.

<sup>10</sup>With the exception of 1994-95, the period of currency crisis, when both the real exchange rate and imports fell.

positively correlated with inequality, more reforms means higher inequality. Looking at the components of the general structural reform index, we find opposing forces. While trade reforms and labour legislations have a negative relationship with the inequality, privatization and financial reforms have a positive relationship. Capital account liberalization has a very high and positive impact on inequality.

Given the pattern of structural reforms and the trajectory of wage inequality outlined above we can consider the period 1984 to 1996 as one of not only rising inequality, but also one of major reforms. After 1996 the country has seen a decline in inequality and increased relative stability.

### **2.3 Do the trajectories match?**

Now that we have both the trajectory of wage inequality and reform process we address the question: do the trajectories match? We focus the rest of our analysis on trade reforms and capital account liberalization. These were the two most important reforms for Mexico; based on evidence from Table 2 they both had opposing effect on wage inequality; further the timing of these two reforms is different. While most of the policies for the trade reforms were introduced in the period 1984 to 1989, the policies liberalizing the capital account were introduced in the period 1989 to 1996.

We split our sample into tradable and nontradable sectors of the economy. It is in the tradable sector that we would expect trade reforms to have their greatest impact; this is also the sector which received about 49% of the foreign direct investment.<sup>11</sup> The nontradable sector includes agriculture, mineral and fuel extraction, electricity and water, construction, wholesale and retail trade, transport and communication, and service industries. Many of these sectors are involved in activities that are not traded, but may be open to foreign investment. Whole sale and retail trade and

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<sup>11</sup>Source for FDI figures: Secretaría de Economía. Dirección General de Inversión Extranjera. The figures are averages over 1994 to 2004.

the service industries together received another 43% of FDI. So we split our nontradable sector into two groups - one which received FDI and another which was more or less closed to both trade and FDI.<sup>12</sup>

Tradable sector consistently forms around 22 to 24 % of the sample over the entire period. The employment shares within the nontradable sector have however changed, while the industries receiving FDI have increased their share of employment from 38.5% in 1984 to 42.2% in 2000, the share of industries not receiving FDI has decreased by an equal amount (see Table 3). The closed sector of the economy (i.e. the nontradable, no FDI sector) has the lowest mean wage, lowest average years of schooling,<sup>13</sup> and the lowest unionization rates over the entire period compared to the other two sectors of the economy. This is also the sector that saw little to no change in its inequality till 1996, and had a decrease in inequality of 3.7% after that. Over the entire period, from 1984 to 2000, both sectors that received FDI – tradable and part of nontradable – saw an increase in inequality, 12.8% and 19.3% respectively, most of this increase came before 1996.

Most of the trade reforms took place between 1984 and 1989; the inequality over this period increased, more in the tradable sector than the non-tradable sector. To isolate any effect that FDI (or lack of it) might have on wage dispersion, we compare the tradable sector with the non-tradable sector receiving FDI, the inequality increased more in the later. Most of the policies directed towards attracting FDI changed from 1989 to 1996; over this period while the closed sector of the economy saw a decrease in inequality the sector receiving FDI (both tradable and non-tradable) saw an increase in inequality.

Next we estimate returns to different levels of education to further ex-

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<sup>12</sup>Feliciano (2001) also looks at the tradable and the nontradable sector as defined by us, however her analysis does not take into account the FDI going to the nontradable sector.

<sup>13</sup>Hence lowest levels of skills, if we assume years of schooling to reflect the skill level. For details on how years of schooling are calculated refer to Appendix A, Table A2

plore the hypothesis that it is the rising rates of return to higher education, due to an increased demand for skilled labor, that accounts for rising wage dispersion. To capture the returns to education we run a weighted least squares log wage regression, where the dependent variable is the log of hourly wages and the explanatory variables are: age, age-squared, union status, nine education dummies, three regional dummies, fifteen occupation dummies, and two industry dummies. The industry dummies capture the three different sectors of interest - tradable sector, nontradable-FDI sector and nontradable-no FDI sector. We also include interactive terms of industry dummies with the education dummies to allow the rate of return to education to depend on the sector each individual is working in. The definitions of different educational, regional, and occupational categories are reported in Appendix A, Table A2.

Regression results are reported in Table 4. Before turning to the returns to education, we make a few general observations from the regression results. Returns to age (labor market experience) decreased over time, reflected by the declining magnitude of the coefficient on age. The regional dummies are significant and show a distinct pattern, the gap between the north of the country and the other regions has increased over time.<sup>14</sup>

If over the period 1984 to 1996 the reforms were increasing the inequality in the society by increasing the returns to skilled workers, then we should see the returns to workers in the closed sector and the tradable sector diverging, at least for the high skilled workers, and the gap between the returns to higher and lower education should increase. Instead what we observe is:

(1) There are no significant differences between the returns to education for workers in the closed sector and in the tradable sector of the economy, at given level of education, in any year.

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<sup>14</sup>This is consistent with the findings of Hanson (1997), where the author shows that the trade reforms in Mexico have benefited the north of the country disproportionately, at the cost of the other regions in the country.

(2) Comparing the workers in the closed sector and the nontradable sector open to FDI, once again there is no significant difference in the returns to education either in 1984 or 2000. There is a difference in 1989 and 1996 with returns to education being lower for the nontradable sector with FDI.

(3) Between 1984 and 1996 it's only the non-tradable sector, open to FDI that saw an increase in the gap between the returns to higher and lower education, while the gap actually decreased for the other two sectors. The increased gap is not a result of an increase in the returns to higher education, but is due to a decrease in the returns to lower education.

From the above analysis we can discern that the reform process cannot satisfactorily account for the changes in inequality in the period 1984-1996. Over half of the overall rise (i.e.  $0.039/0.072$ ) in wage dispersion happened in period 1984 to 1989, a period when trade reforms were implemented, but cannot account for this rise. In the latter period, dominated by increased flows of FDI, we do find inequality rising in sectors receiving these FDI's, but the mechanism is not clear. We find little evidence of returns to education changing, precisely when, according to the rising demand for skilled labor hypothesis related to trade reforms and FDI, we should see significant movements in returns to skills.

So what explains the rising inequality? We turn to this in the next section.

### **3 Changing Labor Market Institutions**

It is now widely accepted that labor market institutions – trade unions and minimum wages in particular – may account for a significant share of the growing wage inequality in the US. A series of recent articles has established the effect that trade unions (Fairris, 2003) and minimum wage policies (Cortez, 2001; Fairris et al, 2005) have on wage dispersion in Mexico.

Unions decrease wage dispersion by leveling the pay structure within

firms by bargaining a larger wage increase for low-skill workers than for high-skill workers; and by fostering equal pay for equal work across industries and regions.

The minimum wage floor does not directly affect many workers in Mexico; informal sector workers earn wages below the floor, and formal sector workers generally earn more than the floor. The role of minimum wage in Mexico goes beyond that of setting a lower bound on the wages in the formal sector of the economy. Minimum wages serve as a norm for wage setting more generally throughout the Mexican economy. There is anecdotal and empirical evidence to suggest that wages in the mid-to-lower tail of the wage distribution across occupations are commonly set at multiples of the minimum wage (Fairris et al, 2005; Maloney and Nunez, 2001). The stabilization programs followed in the country in the late 1980s, to quell the inflationary pressures, further strengthened the links between wage levels, wage changes and the minimum wage.

An important channel through which minimum wages influence wages is unions. Changes agreed to in the minimum wage agreements become the benchmark, if not the rule, for collective bargaining outcomes in the union sector. Wages of the union and the formal sector workers then can be expected to follow more closely the changes in the minimum wage. Findings of Fairris et al (2005) suggests that, in fact, wage changes in both the union and the non-union sector are linked with the changes in the minimum wage.

What are the trajectories of union density and the value of the minimum wage over the period of concern to us in this paper? From 1984 to 1996 the real value of the minimum wage in Mexico declined by about 54% (declining by about 30% between 1985 and 1989; 35% between 1989 and 1996) and only about 2% after that till 1999 (Appendix A, Table A1). This decline in minimum wage affects the wages throughout the economy. Especially it holds down the wages in the mid-to-lower tail of the distribution, allowing



the wages in the upper tail to increase with inflation, leading to a widening gap and inequality. This could also explain the decreasing returns and the decreasing average wages for the low skilled workers.

Over the period of rising wage inequality (1984 to 1996) we see a decline in the unionization rates in Mexico, as shown in Table 5. Over this period unionization declined by almost 8 percentage points, with most of the decline happening after 1989. The unionization rates for the manufacturing industries (tradable sector) went down from 30% in 1984 to 19% in 1996, compared to the 20% and 13% respectively for the non-tradable sector as a whole. Although the decline in union density was the biggest for the tradable sector it remained the most unionized sector of the economy right till 2000.<sup>15</sup>

The inequality in wages of the union workers increased by 31%, compared to 7% for the nonunion workers, from 1984 to 1996. Although inequality in the union sector is rising faster than that in the nonunion sector, the actual level of inequality for the nonunion workers is higher, as hypothesized. So what we have is an increase in nonunion workers, for whom the inequality in wages is higher, and the workers that remain in the union sector are seeing a rapid increase in their wage inequality due to declining bargaining power.

### 3.1 Accounting for Inequality

To get some idea about how much the different factors contribute to inequality we do a simple decomposition, proposed by Gary Fields (2003). Consider the wage regression,

$$\log w_{it} = \sum_{j=1}^{J+2} a_{jt} Z_{jit}, \quad (1)$$

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<sup>15</sup>For detailed analysis of changing union density in Mexico refer to Fairris and Levine (2004).

where  $a_t = [\alpha_t \ \beta_{1t} \ \beta_{2t} \ \dots \ \beta_{Jt} \ 1]$  and  $Z'_{it} = [1 \ X_{1it} \ X_{2it} \ \dots \ X_{Jit} \ \varepsilon_{it}]$ .  $w_{it}$  is the wage of the  $i^{th}$  individual in the  $t^{th}$  time period,  $a_t$  is a vector of coefficients,  $Z_{it}$  is a vector of explanatory variables (including the residual term). For the wage regression of the form given in equation (1) and using the variance of log wages as a measure of inequality, Fields shows that the share of the variance of log wages that is attributable to the  $j^{th}$  explanatory variable can be written as:

$$s_j = \frac{a_j \sigma(Z_j) Cor.(Z_j, \log w)}{\sigma(\log w)}, \quad (2)$$

such that  $\sum_{j=1}^{J+2} s_j = 100\%$ , and  $\sum_{j=1}^{J+1} s_j = R^2$  of the regression in (1).  $s_j$  is called the ‘relative factor inequality weight’.  $\sigma(\cdot)$  is the standard deviation of the variable, and  $Cor.(Z_j, \log w)$  is the correlation between the explanatory variables and log wages.

For explanatory variables that enter the wage regression in a simple way (for example the dummy for union) interpretation of  $s_j$  is straightforward. For categorical variables (like education) and variables that enter the wage regression in a nonlinear way (age and age square), we define a generic factor, say ‘education’ and ‘experience’.  $s_j$ ’s for the entire set of education dummies are then summed together to get the overall importance of ‘education’; for ‘experience’ we sum the weights for age and age squared. Treatment of interactive terms however is difficult, one cannot classify them in any single ‘generic’ factor.

The change in inequality over time can be written as:

$$\sigma^2(\log w_2) - \sigma^2(\log w_1) = \sum_j [s_{j2} \sigma^2(\log w_2) - s_{j1} \sigma^2(\log w_1)], \quad (3)$$

where 1 and 2 represent two time periods. The contribution of the  $j^{th}$  factor

to the change in inequality can be written as:

$$\pi_j = \frac{s_2\sigma^2(\log w_2) - s_{j1}\sigma^2(\log w_1)}{\sigma^2(\log w_2) - \sigma^2(\log w_1)}, \quad (4)$$

such that  $\sum_j \pi_j = 100\%$ .

Focusing only at the period of rising inequality, we calculate the share of each factor in explaining the level of inequality in any given year and how the factor contributed to the change in inequality over time. Results are reported in Table 6. For all three years, after residuals the two most important variables accounting for inequality are education and occupation. Variable of interest, unions, accounts for 3.7% of the inequality in 1984, with it's share declining to only 1.6% by 1996.

As expected 'education' has a significant role in explaining the changes in inequality.<sup>16</sup> For the period 1984 to 1989, 64.8% of the increase in inequality can be attributed to changes in education, this declined to 60.8% for the period 1989 to 1996.<sup>17</sup> While it has been known in the literature that changing returns to education are important in explaining the rise in inequality in Mexico, the exact magnitude of the contribution was not known.

For the first sub period (1984 to 1989) unions have an equalizing impact, of the magnitude of 32.2%. For the period when union density declined the most (1989 to 1996) unions contributed 18.2% to the rise in inequality. Although unions have a small share in explaining the level of inequality in any given year, they do account in a big way for the changes in inequality.

We have classified workers into three broad industrial categories. To-

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<sup>16</sup>This will capture both the changes in the returns to education and the changes in the composition of different education groups.

<sup>17</sup>The contribution of each factor to the change in inequality can be further broken down into price effect and quantity effect. With price effect capturing the changes in returns to different explanatory variables and the quantity effect capturing the changes in the levels of the explanatory variables. For all the explanatory variables considered here, almost all their contribution comes from the price effect. Detailed results are not presented here, but are available from the author.

gether ‘industry’ accounts for 13.5% of the change in inequality over the period 1984 to 1989, and has an equalizing effect for the 1989 to 1996 period. Taking a closer look at the components of the generic factor ‘industry’ for the period 1984 to 1989, it’s the changes in the nontradable sector with FDI that contributed to the rise in inequality (22%); the changes in tradable sector actually had an equalizing effect (-8.3%).

## 4 Conclusion

In this paper we took a close look at the changing inequality in Mexico over the decades of the 1980s and the 1990s. Our findings suggest that over different periods different factors were at play. For the period of 1984 to 1989, contrary to the arguments in the literature trade reforms did not have much impact. Its the declining value of the real minimum wages which explains the rise in inequality, it could have lead to the widening gap between the skilled and the unskilled workers, as a result ‘education’ stands out as the biggest contributor to the rise in inequality. For 1989 to 1996 the changes are explained by increased flow of FDI (which in turn are attributed to capital account liberalization) and the continued changes in the labor market institutions, with unions explaining about 18% of the increase in inequality.

Part of the explanation for the declining wage inequality since the mid 1990s comes from stabilization of the minimum wage and unions. Over the late 1990s, the real value of the minimum wage stabilized, declining by about 2%. The unionization rates also stabilized, and inequality in wages for both the union and the nonunion workers decreased.

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**Table 1**  
**Log real hourly wage (in Pesos) – measures of inequality**

	<b>1984</b>	<b>1989</b>	<b>1992</b>	<b>1994</b>	<b>1996</b>	<b>1998</b>	<b>2000</b>
Std. Dev	0.748	0.787	0.800	0.843	0.821	0.839	0.815
Gini	0.110	0.115	0.119	0.124	0.136	0.134	0.126
90-10 <sup>a</sup>	1.803	1.823	1.832	2.079	1.846	2.053	2.021
90-50	0.905	0.993	1.022	1.386	1.153	1.226	1.145
50-10	0.899	0.829	0.811	0.693	0.693	0.827	0.875

Data source: Authors calculations from ENIGH. Sample is full time, wage earners, men only (for details on data selection refer to main text, section 2.1). Sample weights have been used for all the calculations.

<sup>a</sup> This refers to the wage differential between the 90<sup>th</sup> and the 10<sup>th</sup> percentile. 90-50 and 50-10 are similarly defined.



**Table 2**  
**Correlation between wage inequality and the reform indices**

	Structural reform index	Trade reforms	Financial reforms	Tax Policy	Privatisation	Labour legislation	Capital account liberalisation
Std. Dev.	0.895**	-0.41	0.889**	0.339	0.637	-0.961*	0.955
Gini	0.597	-0.830***	0.68	-0.174	0.782	-0.547	0.998**
Structural reform index		0.670*	0.927*	0.788*	0.926*	-0.932*	0.962*
Trade reforms			0.433	0.738*	0.470***	-0.577**	0.833*
Financial reforms				0.565**	0.835*	-0.873*	0.879*
Tax Policy					0.690*	-0.817*	0.850*
Privatisation						-0.856*	0.893*
Labour legislation							-0.940*

The reform indices (with the exception of capital account liberalization) are from Lora (2001). Capital account liberalization reform index is from Morley, Machado and Pettinato (1999). Standard deviation and Gini coefficient of log real hourly wages are from authors' calculations from the ENIGH data. \* indicates significant at 1% level, \*\* significant at 5% level and \*\*\* indicates significance at 10% level.

**Table 3**  
**Characteristics of workers by sector**

	% Employed in each sector			Mean log hourly real wage			Mean years of schooling			Unionisation rate		
	Tradable	Nontradable		Tradable	Nontradable		Tradable	Nontradable		Tradable	Nontradable	
		FDI	No FDI		FDI	No FDI		FDI	No FDI		FDI	No FDI
<b>1984</b>	23.76	38.45	37.80	3.887 (0.673)	3.917 (0.683)	3.476 (0.780)	7.148 (3.768)	8.242 (4.187)	4.932 (3.862)	30.29	23.41	17.10
<b>1989</b>	21.31	39.91	38.78	3.874 (0.731)	3.887 (0.749)	3.486 (0.794)	8.195 (3.770)	8.747 (4.319)	5.400 (3.907)	24.91	22.52	14.58
<b>1992</b>	24.97	41.77	33.26	3.883 (0.726)	3.936 (0.801)	3.507 (0.784)	7.830 (3.784)	8.828 (4.113)	5.683 (3.814)	30.04	20.04	10.63
<b>1994</b>	23.02	41.3	35.69	3.863 (0.727)	4.057 (0.893)	3.579 (0.777)	7.820 (3.646)	9.152 (4.427)	5.706 (3.959)	20.57	18.32	8.70
<b>1996</b>	24.95	43.83	31.22	3.550 (0.764)	3.622 (0.827)	3.180 (0.784)	8.359 (3.646)	9.300 (4.197)	8.048 (4.231)	19.27	17.04	8.05
<b>1998</b>	22.78	45.68	31.54	3.617 (0.743)	3.650 (0.874)	3.503 (0.839)	8.258 (3.703)	9.293 (4.079)	5.931 (3.849)	19.6	16.62	7.57
<b>2000</b>	24.61	42.20	33.19	3.814 (0.759)	3.866 (0.815)	3.348 (0.751)	8.771 (3.316)	10.088 (4.260)	5.955 (3.885)	19.96	16.58	5.71

Source: Authors' calculations from the ENIGH data. Tradable sector is defined as the manufacturing industries (including maquiladores), these are assumed to be open to both trade and FDI. Nontradable sectors are those industries, not open to traded activities. Nontradable not open to FDI would include mineral and fuel extraction, electricity and water, construction, and transport and communication. Nontradable open to FDI would include wholesale and retail trade, and service industries. Standard deviations are given in the ( ) brackets.

**Table 4**  
**Wage Regressions, Dependent Variable: Log real hourly wage<sup>a</sup>**

<b>Independent Variables</b>	<b>1984</b>	<b>1989</b>	<b>1996</b>	<b>2000</b>
Age	0.072*	0.061*	0.061*	0.045*
Age Square	-0.001*	-0.001*	-0.001*	0.000*
Union	0.228*	0.034***	0.164*	0.148*
Rcentre	0.122*	0.142*	0.199*	0.275*
Rnorth	0.155*	0.204*	0.291*	0.386*
Rcap	0.227*	0.135*	0.341*	0.369*
Primary incomplete	0.237*	0.209*	0.124*	0.130*
Primary complete	0.476*	0.297*	0.262*	0.221*
Junior high incomplete	0.489*	0.363*	0.364*	0.200*
Junior high complete	0.445*	0.456*	0.434*	0.253*
High school incomplete	0.571*	0.680*	0.624*	0.424*
High school complete	0.793*	0.738*	0.712*	0.496*
Some college	0.624*	0.772*	0.955*	0.108
College complete	0.821*	1.243*	1.228*	0.820*
More than college	1.317*	1.547*	0.846**	1.181*
Tradable (T)	0.153	0.008	0.076	-0.172
Nontradable with FDI (NTF)	0.044	0.253*	0.121***	-0.081
Primary incomplete*T	-0.155	-0.036	-0.012	0.107
Primary complete*T	-0.139	0.011	-0.017	0.137
Junior high incomplete*T	-0.136	0.083	-0.115	0.009
Junior high complete*T	-0.050	-0.081	-0.060	0.162
High school incomplete*T	0.029	-0.206	-0.188	0.076
High school complete*T	-0.078	0.041	-0.258**	0.156
Some college*T	-0.014	0.017	-0.026	1.064*
College complete*T	-0.179	-0.002	0.085	0.624*
More than college*T	0.135	Dropped <sup>b</sup>	0.597	0.130
Primary incomplete*NTF	-0.020	-0.263*	-0.119	-0.159***
Primary complete*NTF	-0.167	-0.297*	-0.077	-0.047
Junior high incomplete*NTF	-0.051	-0.240*	-0.106	-0.087
Junior high complete*NTF	0.060	-0.306*	-0.150**	0.046
High school incomplete*NTF	-0.135	-0.441*	-0.216**	-0.091*
High school complete*NTF	-0.234	-0.333*	-0.172**	-0.142
Some college*NTF	0.050	-0.262*	-0.221**	0.446
College complete*NTF	0.040	-0.548*	-0.405*	0.083
More than college*NTF	-0.011	-0.517*	0.370	0.160
Occupation Dummies	Jointly significant in all regressions			
Constant	2.164*	2.212*	1.869*	2.637*
N (sample size)	2586	7225	8106	5881
R <sup>2</sup>	0.531	0.428	0.539	0.588

Source: Authors' calculations from the ENIGH data.

<sup>a</sup> The regression is weighted by the sample weights. \* indicates significance at 1% level, \*\* indicates significance at 5% and \*\*\* indicates significance at 10% levels.

<sup>b</sup> No observations for this category.

**Table 5**  
**Characteristics of workers by union membership**

	Union Density (%)	Mean log hourly real wage		Std. Dev. of log hourly real wage	
		Union	Nonunion	Union	Nonunion
<b>1984</b>	22.66	4.418	3.625	0.508	0.766
<b>1989</b>	19.95	3.967	3.669	0.662	0.805
<b>1992</b>	19.41	4.091	3.705	0.679	0.810
<b>1994</b>	15.41	4.179	3.780	0.656	0.858
<b>1996</b>	14.79	3.909	3.389	0.666	0.822
<b>1998</b>	14.44	4.032	3.413	0.708	0.827
<b>2000</b>	13.81	4.138	3.608	0.815	0.653

Source: Authors' calculations from the ENIGH data.

**Table 6**  
**Contribution of each explanatory variable to the level of, and change in wage inequality**

Explanatory Variable	Relative factor inequality weight, $s_j$			Contribution of the factor to change in inequality, $\pi_j$	
	1984	1989	1996	1984-1989	1989-1996
<b>Age</b>	0.116	0.083	0.088	-0.218	0.145
<b>Union</b>	0.037	0.003	0.016	-0.322	0.182
<b>Region</b>	0.018	0.011	0.029	-0.056	0.249
<b>Industry</b>	0.014	0.026	0.015	0.135	-0.129
<b>Education</b>	0.143	0.192	0.223	0.648	0.605
<b>Education*Industry</b>	-0.007	-0.050	-0.030	-0.447	0.212
<b>Occupation</b>	0.209	0.162	0.199	-0.271	0.655
<b>Residual</b>	0.469	0.572	0.461	1.530	-0.918

Source: Authors' calculations from the ENIGH data.  $s_j$  is calculated based on equation (2) in the paper;  $\pi_j$  is calculated based on equation (4) in the paper. For definitions of the explanatory variables refer to Table A2, Appendix A.

**Appendix A**

**Table A1**

**Indicators of Trade Reforms, Liberalization and Macroeconomic Performance in Mexico**

<b>Year</b>	<b>Domestic Product covered by Import Licenses<sup>1</sup></b>	<b>Import Licenses: Controlled Items (% of Imports)<sup>2</sup></b>	<b>Real Exchange Rate Annual Change % (Base 1980)<sup>3</sup></b>	<b>Foreign Direct Investment (Billions of US Dollars)<sup>4</sup></b>	<b>Gross Domestic Product (Real Annual Growth Rate %)<sup>5</sup></b>	<b>Real Minimum Wage (1985=100)<sup>6</sup></b>
<b>1984</b>			4.16		3.6	
<b>1985</b>	92.2%		0.62		2.5	100
<b>1986</b>	46.9%		-27.26	2.4	-3.7	92.6
<b>1987</b>	35.8%		-6.37	2.6	1.9	86.1
<b>1988</b>	23.2%		22.65	2.9	1.2	75.2
<b>1989</b>	22.1%	18.4	13.3	3.2	3.3	70.3
<b>1990</b>	19.0%	13.6	5.07	2.6	4.5	63.8
<b>1991</b>		8.9	9.78	4.8	4.2	61
<b>1992</b>		10.5	15.92	4.4	3.6	58.2
<b>1993</b>		21.6	7.52	4.4	2.0	57.3
<b>1994</b>		10.6	-3.36	11.0	4.5	57.3
<b>1995</b>		7.2	-39.72	9.5	-6.2	50.2
<b>1996</b>		6.8	-3.19	9.2	5.2	46
<b>1997</b>		8.2	12.18	12.8	6.7	45.6
<b>1998</b>		8.5	-1.20/p	11.3	4.8	45.8
<b>1999</b>			1.46	11.6/p	3.7	45.3

<sup>1</sup> Average share of output in manufacturing subject to import licensing, as a percentage of total domestic manufacturing output. *Source:* Lustig, 2001.

<sup>2</sup> Controlled items, in the imports subject to licences, weighted by value of imports. *Source:* Table 49, The Mexican Economy 1997 and 1999, Banco de Mexico.

<sup>3</sup> *Source:* Table 32, The Mexican Economy 1999, Banco de Mexico. Negative change indicates depreciation.

<sup>4</sup> *Source:* Table 50, The Mexican Economy 1996, Banco de Mexico and Table 56, The Mexican Economy 1999, Banco de Mexico.

<sup>5</sup> *Source:* Table 7, The Mexican Economy 1996 and 1999, Banco de Mexico

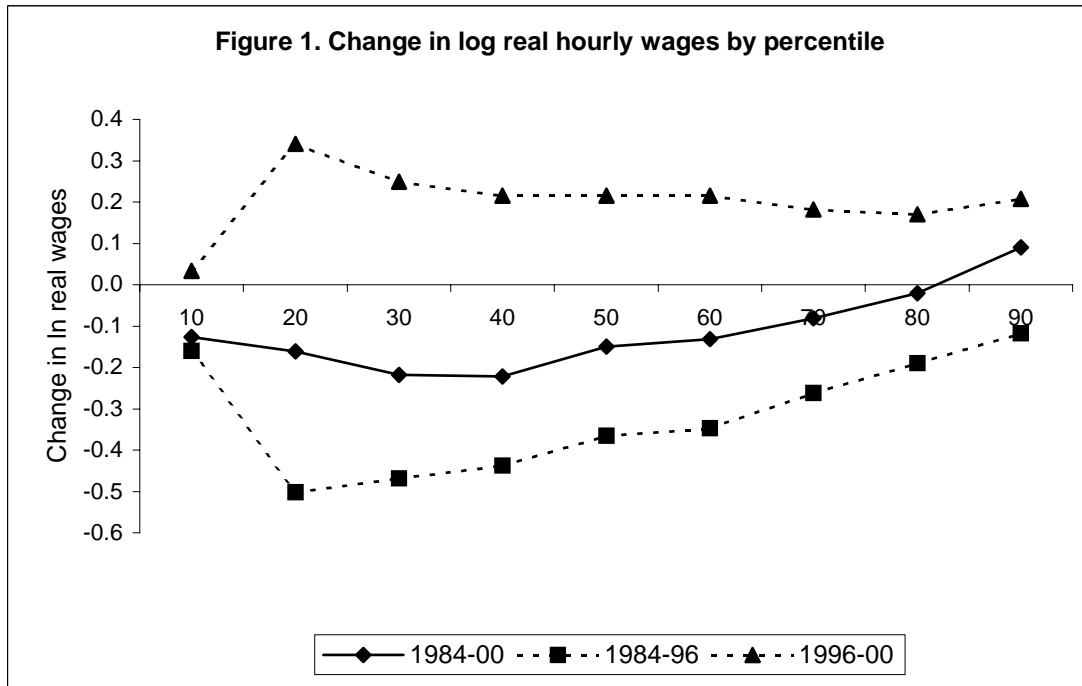
<sup>6</sup> *Source:* Table 20, The Mexican Economy 1996 and 1999, Banco de Mexico.

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**Table A2**  
**Definition of Education, Regional Occupational and Industrial dummies**

<b>Variable</b>	<b>Definition</b>
<b>Education Dummies* (years of schooling)</b>	
	No formal education (this is the base and has 0 years of schooling)
	Primary incomplete (3)
	Primary complete (6)
	Junior high incomplete (7.5)
	Junior high complete (9)
	High school incomplete (10.5)
	High school complete (12)
	Some college (14)
	College complete (16)
	More than college (We assume that 2 years for everyone who reports more than college)
<b>Regional Dummies</b>	
Base	<b>Southern states:</b> Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, Yucatan
Rcentre	<b>Central states:</b> Aquascalientes, Colima, Jalisco, Guanajuato, Hidalgo, Mexico, Michoacan, Morelos, Puebla, Queretaro, Tlaxcala
Rnorth	<b>Northern states:</b> Baja California, Baja California Sur, Chihuahua, Coahuila, Durango, Nayarit, Nuevo Leon, San Luis Potosi, Sinaloa, Sonora, Tamaulipas, Zacatecas
Rcap	Federal District
<b>Industrial Dummies</b>	
Nontradable, No FDI	(Base category) Agriculture, hunting, forestry, fishery etc.; Mineral and fuel extraction, electricity and water; construction; and transport and communication.
Nontradable, FDI	Wholesale and retail trade, and service industries.
Tradable	Manufacturing industries (including maquiladores)
<b>Occupational Dummies</b>	
Base	Professionals
Occ1	Technicians
Occ2	Educational workers
Occ3	Workers in arts, entertainment and sports
Occ4	Senior directors, administrators in public and private enterprises
Occ6	Agricultural workers
Occ10	Supervisors – industrial production
Occ11	Workers, operators – industrial production
Occ12	Less-skilled workers – industrial production
Occ13	Administrative workers – industrial production
Occ14	Salespersons
Occ15	Vendors, peddlers – with no business representation
Occ16	Personal service workers – Establishments
Occ17	Personal service workers – Domestic
Occ18	Transport workers
Occ19	Police and armed forces

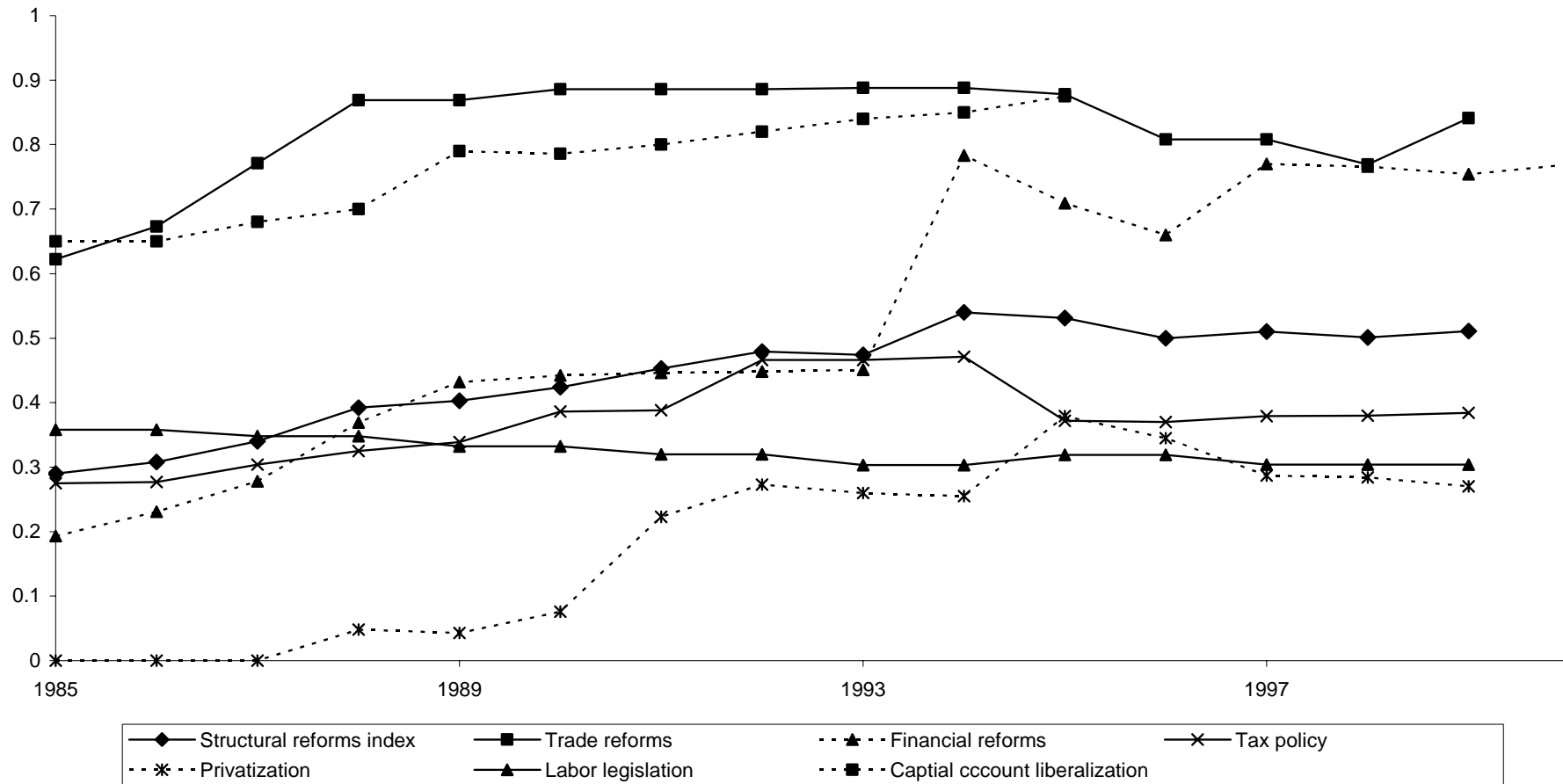
\* For the years before 1996 ENIGH reports whether or not an individual completed a certain level of schooling, not the actual years spent in any particular level of schooling. For the completed levels of schooling we take the years that would take to complete the level without repetition. For the incomplete levels of schooling it is assumed that the individual attended half of the school cycle. These are the standard assumptions made in the literature, in the absence of data on actual years of schooling (Binder and Woodruff, 2002), however they do have limitations (Behram and Deolalikar, 1991). From 1996 onwards ENIGH started reporting the actual years in school for those with less than 12 years of schooling. We compare our approximation for 1996, 1998 and 2000 with the actual years; results are similar. To keep consistency with earlier years we use the approximation for later years as well.



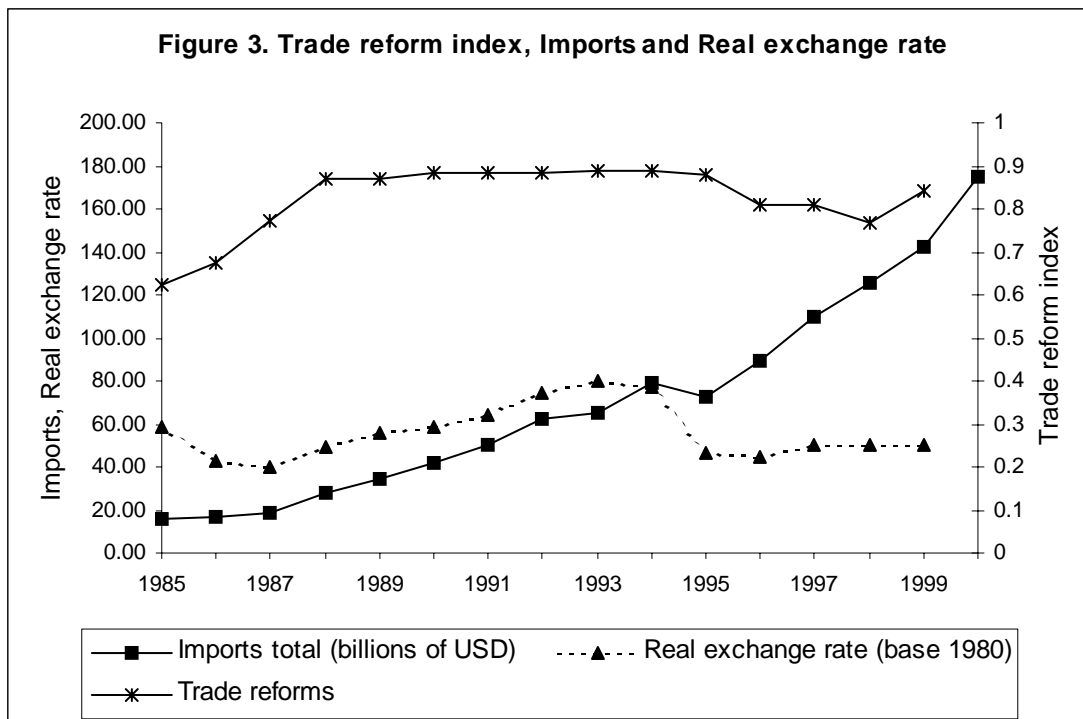
Source: Authors calculations from the ENIGH data.



Figure 2. Reform Indices



Structural reform index is average of trade reforms, financial reforms, tax policy, privatization and labour legislation. Source: Capital account liberalization index is from Morley et al (1999); the other indices are from Lora (2001).



Source: Trade reform index is from Lora (2001); Real exchange rate is from *The Mexican Economy 1999*, Banco de Mexico; figures for imports are from Secretaria de Economia.