Factors driving changes in income distribution in post-reform Mexico

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Abstract

After 1984 and following economic liberalisation, income inequality in Mexico has increased. Some of the main factors that have contributed to this trend are the relative expansion of the average income in the service sector in relation to the agricultural and manufacturing sectors, which is consistent with arguments such as the rise of services and the reduction of rents in the traded sector, the increase in skill premium, which is in keeping with the skill enhancing trade hypothesis, the fall in unionisation rates and capital concentration. On the other hand, between 1998 and 2002, inequality fell gradually and some of the factors driving this trend are the decrease in returns to skill and union premium, the stabilisation of unionisation rates and a faster movement of low income individuals to higher income activities. This trend is consistent with arguments suggesting temporary adverse effects and cycles in the evolution of income inequality over the longer-run. Households re-composition and transfer income are factors that mitigate inequality, whereas deterioration of the agricultural sector and capital concentration are persistent sources of income dispersion. Econometric analysis with aggregated data finds that the fall in unionization rates increases inequality and international investment channelled into labour-intensive production has distributional effects. In addition, after a certain level of education its expansion decreases inequality, and decentralised government expenditure benefits income distribution. The study also finds that the relationship between growth and inequality became negative by the late 1980s

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1. Introduction

In Mexico, the debt crisis of 1982 signalled the end of the import-substitution industrialisation model (ISI) and the predominance of protectionist policies. Over the subsequent years a number of structural reforms and market-oriented policies were undertaken. In 1985 the government eliminated some import licences and reduced the number of tariff categories. In 1987 the elimination of import licences was extended, the degree of tariff dispersion was reduced, and a stabilisation programme was put in place. Between 1988 and 1990 the government liberalised the financial system, reformed the FDI regime, eliminated some restrictions to portfolio investment, and opened the stock market and the money market to foreign investors; in addition, the external debt was renegotiated. The privatisation process initiated in 1982 and was intensified during the late 1980s and early 1990s. Negotiations on the North America Free Trade Agreement (NAFTA) commenced in 1990 and it became effective in 1994.

The evolution of income distribution in Mexico, during the era of market liberalism, has been documented in several studies from different perspectives. Most of the discussion concentrates on the labour market and wage dispersion (Hanson and Harrison, 1999; Feliciano, 2001; Cortez, 2001; Ros and Bouillon 2002). The literature has also explored inequality at the household level (Panuco-Laguette and Szekely, 1996) or issues related to capital concentration (Tanski and French, 2001). The general consensus seems to be that income inequality has increased during the period of market openness. Moreover, Ortega-Diaz (2001) showed that as the Mexican economy has become more open, the relationship between growth and inequality has changed from being a negative relationship to being a positive one. All these studies focus on specific aspects, but they do not provide a broader picture involving different issues that can affect income distribution simultaneously. In addition, the literature concentrates on the period of rising inequality; however, there is some evidence that since the late 1990s inequality has levelled and even decreased slightly, but this change has been analysed in only a few studies (Airola and Juhn, 2005).

This paper offers a broader analysis than previous studies since it is aimed at exploring the pattern of overall income distribution during the period of market openness until recent years, besides testing different arguments. We conduct the assessment of inequality at the level of individuals, households and labour, applying both descriptive and parametric methods using micro-level data. The data source, the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH), is a household income and expenditure survey produced by the Mexican government's statistical office, Instituto Nacional de Estadística,

Geografía e Informática (INEGI). It has been carried out in 1984, 1989 and subsequently every two years since 1992 in randomly selected households. The dimension of each ENIGH under different concepts is presented in Table A.1 in Appendix A.

We also explore capital concentration using corporate data; the source is Expansión (various years). In addition, by using econometric analysis with aggregated data we explore the effect of economic and socio-political variables on distribution and the relationship between economic growth and inequality. The period of analysis is from 1984 to 2002; this timeframe allows us to examine the sub-period of rising inequality and the later sub-period in which inequality reverses.

We find that income inequality worsens after liberalisation, mainly because of an increase in skill premium, an expansion of the income gap between the service and the agricultural sectors, and the fall in unionisation rates, in addition to capital concentration. On the other hand, there is evidence that inequality decreases after 1998 and, potentially, the factors driving this trend are the decrease in returns to skill and union premium, the stabilisation of unionisation rates and a faster movement of low income individuals to higher income activities. Along the whole period, transfer income and the re-composition of households are factors that improve income distribution, whereas capital concentration and the deterioration of the agricultural sector are persistent sources of inequality. By using econometric analysis with aggregated data, we explore the effect of proxies of market openness and find that the fall in unionisation rates increases inequality, whereas employment in labour-intensive production benefits distribution. In addition, the analysis of proxies of socio-political variables indicates that after a certain level of years of schooling the expansion of education reduces inequality, and decentralised government expenditure improves income distribution.

The Mexican case is particularly interesting for the following reasons. Firstly, this country has long been known for its unequal distribution of income.[1] Secondly, in a few years Mexico moved from protectionism to market liberalism; moreover, it has signed a number of free trade agreements and was the first developing country to implement one (NAFTA) with two developed countries. Finally, the era of market openness in Mexico has now lasted for more than two decades. Therefore the Mexican case offers a good time-span for assessing whether market-oriented polices can reduce high levels of inequality or produce a different effect.

[1] From a sample of 49 countries including different definitions of Gini coefficients over time, Li et al. (1998) show that the Mexican average Gini, 54.59, is the second highest of the sample.

The paper is organised as follows: Section two gives a discussion of theoretical issues supporting distributional effects under conditions of market openness and also discusses contesting arguments. Section three explores individual income distribution and wage inequality through a descriptive approach. The analysis is extended in section four by using parametric methods. Section five explores additional forms of income distribution, at the level of households and at the level of capital concentration. Econometric analysis with aggregated data is provided in section six. Finally concluding remarks are provided in section seven.

2. Theoretical debate and complementary arguments

2.1. Standard theory

Since the 1980s a number of developing countries, especially in the Meso-south American subcontinent, have adopted an economic model that places special emphasis on market forces. The set of policies involved in this development paradigm can be summarised as deregulation, privatisation, liberalisation of markets, and macroeconomic discipline. This prescription is intended to create preconditions for the expansion of trade and flow of investment across countries and finds theoretical support in familiar neoclassical theory (Jones, 1988, pp. 30-3; Corden, 1993), which claims that trade, investment and the market mechanism in general boost growth and facilitate development.

Proponents of the model maintain that improvements in income distribution can be achieved for two main reasons. Firstly, emphasis on outward-looking growth fosters exports, employment and output, and thus provides additional resources for redistribution. Secondly, economic liberalisation facilitates the operation of market forces and the price mechanism, which allows resources to be allocated more efficiently.

The basis for tracing distributional effects of market liberalism in developing countries is the Stolper-Samuelson theorem (SST) (FitzGerald, 1996, p.32; Litwin, 1998, p. 3). Within this two-factor (capital and labour) neoclassical model, liberalisation of foreign trade increases demand for the abundant factor, as exports and imports adjust according to the orthodox principle of comparative advantages, and redirects demand away from the scarce factor. This mechanism increases the return of the factor which is relatively most used in the export sector and which is also more abundant -this factor is conventionally assumed to be low-wage, unskilled labour in developing countries- and leads toward factor price equalisation; by the same token income distribution improves.

2.2. Contesting arguments

The skill-enhancing trade hypothesis. According to this proposition, increasing openness in developing countries can accelerate inflow of foreign technology due to a rise in imports and FDI. Robbins (1996) finds that the skill gap tends to widen in a sample of developing countries and shows that there is a high correlation between increasing demand for skill and imports of technology. He calls this effect "skill-enhancing trade hypothesis (SETH)" and argues that trade liberalisation may sometimes widen wage dispersion instead of compressing relative wages, as more openness permits or encourages the acceleration of imported physical capital stock.

In this sense, Arbache et al. (2004, pp. 76-77) argue that the new inflowing technology can be skill-biased because it is designed through relatively skill-intensive methods in more industrialised countries and because its implementation and operation involves new procedures and techniques. As a result, technological change can increase demand for skilled workers. Moreover, they point out that the reduction in demand for skilled labour predicted by orthodox theory can be surpassed by this process depending on the magnitude of the shift. New technology is not only considered skill-biased in developing countries but also in developed economies (Berman et al. 1998).

The rise of services. An alternative argument undermining neoclassical theory is the idea that the service sector, which has traditionally been considered a sector with higher wages than some of the conventional economic activities in developing countries, is likely to expand faster than other sectors under conditions of economic liberalisation and can also be considered skill-biased. This is because the globalisation and internationalisation of the economy brings with it increasing demand for financial, communication, IT, transport and business services among others. These activities clearly require workers relatively more qualified, on average, than workers in some of traditional economic activities in developing countries, such as primary production and labour-intensive manufacturing. Gordon and Gupta (2003) show that factors playing an important role in accelerating services growth are high income elasticity of demand, increased input usage of services by other sectors, and deregulation and economic reforms.

Sinha (2005) shows that although employment in the service sector in India during the 1990s remained steady, its share of GDP rose substantially. She also stresses that the pattern and composition of growth acceleration of services creates further inequality between rural and urban areas, and between the skilled and the unskilled.

Reduction of rents in the traded sector. Arbache et al. (2004) hold that the reduction or elimination of trade barriers and tariffs turns protected markets into more contestable ones, which induces lower prices and therefore a reduction of producer rents; if rents are shared with employees it is expected that wages fall after liberalisation. They show that contrary to the predictions of the SST, wages fell substantially in the traded sector after trade liberalisation in Brazil, consistent with the reduced rents argument, as industries faced greater competition.

2.3. Further discussion

Labour flexibility, capital concentration and imbalance in capital-labour relations. Barret (2001) emphasises that in the orthodox model applied in developing countries, it is only by limiting union power and by placing high priority on labour market flexibility that the economy's international competitiveness and sustained economic growth will be achieved. On the other hand, he contends that this strategy creates imbalance between capital and labour and thus is incompatible with a commitment to equity. For Barret, labour market flexibility and restricted union power are an insufficient basis for competitiveness, equity and growth, and therefore may be counterproductive as these policies allow capital to put the entire burden of adjustment on labour, which limits wage expansion (especially in low income sectors) and the growth of the domestic market.

Privatisation of state-owned firms and liberalisation of FDI encourage a surge of mergers and acquisitions across borders that tend to create dominant positions and oligopolistic markets. This pattern decreases market power of small and medium-sized enterprises (SMEs) and leads toward capital concentration[2] and deterioration of the domestic industry. Moreover, the race to attract new inward investment and/or to retain multinational enterprises, and the ability of MNCs to organise production trans-nationally and to shift production to reap the benefits of low wages, increase corporate power relative to the power of labour, putting downward pressure on wages and working conditions. In this sense, balance of power between multinational capital and social actors, under conditions of market liberalism, may shift in favour of the former.[3]

[2] For an elaboration of the expansion and challenges of cross-border mergers and acquisitions see UNCTD *World Investment Report: Cross-Border Merger and Acquisition and Development* (New York: United Nations Publication, 2000), pp. 15-28

[3] For a discussion about the balance of power among labour and capital see David Held, et al, *Global Transformations: Politics, Economics and Culture* (Cambridge: Polity Press, 1999), pp. 278-280

Temporary adverse effects. Some authors have analysed the view that when a country begins to adjust to a more competitive environment serious dislocations are encountered as the economy adapts to the shifting patterns of employment and resources. Thus, income dispersion may widen and absolute poverty increase in the short-run. However, this effect is considered to be temporary because as the period of adjustment continues, individuals adapt and markets react, boosting investment in the traded sector and generating greater employment. In addition, growth provides additional resources for poverty alleviation and redistribution. Eventually, there may be a decrease in unemployment and income gap, and inequality begins to decrease in the long-run (Jacobsen and Giles 1998, 419-20; FitzGerald 1996, 32). Even leading globalisers have stressed that in the short-run, structural reforms may increase unemployment and worsen inequality; however, as long as these policies are consistent with sustainable economic growth they can reduce poverty and improve equity over the longer-term (Camdessus 1998, xiv-xv).

From a more theoretical approach Pissarides (1997) illustrates that the rising gap between skilled and unskilled wages observed in developing countries, that have adopted market oriented policies, can be explained by increasing trade that acts as a means for the transfer of technology across countries. The difference to the skill-enhancing hypothesis is that either the new technology or the importation and assimilation process can be skill-biased and give a temporary and relative advantage to skilled labour that leads to higher relative wages only during the period of transition towards a higher level of technology. He also argues that the response of relative supply of skilled and unskilled labour to trade openness can also explain a temporary increase of wage differentials. In addition, Goldin and Katz (1998) hold that within firms, demand for skill rises when new technologies are introduced, but it declines once the other workers learn to use the new equipment; hence, this process can follow a technological cycle.

Beyond the original economic norms. Higgot (2000) argues that the orthodoxy that dominated the political economy during the 1980s and mid-1990s, often referred to as the Washington Consensus[4] or first generation reforms (Ortiz 2003), has shown limitations reflected in the increasing perception that liberalisation brings with it inequality and a range of events such as financial crises that have hit emerging markets since 1995 and subsequent forms of resistance to globalisation. He also stresses that these limitations have

[4] John Williamson (1990) is given credits for first labelling as "Washington Consensus" the package of policies that multilateral institutions endorsed in trade and loan negotiations during the 1980s. This package of policies insisted on unregulated markets and a reduced role of the governments in economic activity.

been recognised by the major international financial institutions and they have responded by promoting a stronger governance dimension and by inducing support for a set of socio-political norms. This new agenda, usually referred to as the Post Washington Consensus (PWC) or second generation reforms, has added factors such as civil society, safety nets, institution building, social and human capital formation, transparency, and the re-empowerment of the state to the original economic prescription.

In relevant literature, the assessment of the PWC seems to be diverse. On the one hand, it is considered an attempt to socialise and humanise the early economic elements and to legitimise economic liberalisation, and it is also associated with a genuine recognition of the importance of tackling issues of fairness and inequality (Edwards, 1999). On the other hand, it has been contended that its form of collective action and incorporation does not solve the problem of under-representation of developing countries, nor their agenda for greater fairness and redistribution (Higgot, 2000). Furthermore, global distribution of wealth takes a secondary role in this new development paradigm as it accepts capital accumulation and underestimates global polarisation (Weber, 2001).

From the discussion reviewed above there are relevant questions to be tackled. In this context, it is important to test basic neoclassical predictions by exploring whether unskilled, low-income individuals are likely to increase relative income; alternatively whether relative return to factors is likely to rise in the traded sector or in traditional low income sectors, such as primary production and labour-intensive manufacturing. On the other hand, it is important to test whether opposite arguments hold, in other words, whether relative returns to skill increase, or whether relative returns to factors decrease in the traded sector and rise in the service sector. It is also of interest to examine further issues that are likely to emerge under conditions of market liberalisation, such as variations in capital concentration and in the labour market, and to explore how these variations can affect income distribution. Moreover, if adverse effects in income are likely to arise, it is important to explore whether these effects are temporary. Finally, it is of interest to examine the effects of both economic and socio-political norms on inequality.

3. Individual income distribution

The data source is ENIGH by INEGI, as outlined earlier. We use data from five periods 1984, 1989, 1994, 1998 and 2002. Initially, the selected sample comprises individuals reporting monetary income, aged between 16 and 65 inclusive, and there are no restrictions for the number of hours employed in the corresponding economic activity.

In a first stage the analysis involves the main source of income only and is not restricted to labour earnings. In other words, individuals whose main source of income comes from entrepreneurial and financial activities, property rents and transfers are also included in the sample. The hourly income is computed as monthly income in the respondent's main economic activity, divided by weekly hours employed in the corresponding economic activity multiplied by 4.33. The hourly income is deflected by the consumer price index based in 2002 pesos in order to obtain real hourly income.

Between 1984 and 1998 the Gini coefficient for individuals increased from 0.512 to 0.632 and then dropped to 0.560 between 1998 and 2002. The procedure to calculate the Gini coefficient using the Yao (1999) methodology is presented in Appendix B.1. To understand the forces driving this pattern we present a decomposition of income by educational levels, economic sectors and deciles, and conduct a comparative analysis between the period of increasing inequality and the latter one. Due to the importance of unionisation in Mexico before the early 1980s and the significant transformation that has been experienced over the last twenty years or so, we also explore labour union changes and therefore restrict the data-set to labour income sources for this particular case. In addition, a parametric analysis is conducted using labour income data.

3.1. Returns to education

We present the average real hourly income for three different levels of education, primary secondary and tertiary.[5] From column 1 in Table 1 we observe that the average hourly income for both primary and secondary education tends to decline along the whole period. As for tertiary education, this indicator has a substantial increase between 1984 and 1994 but then shows a sharp fall over the last two periods. It is worth noting that the percentage change between 1984 and 2002 is negative for the three educational levels but it decreases less in the tertiary level, as illustrated in column 2.

Income dispersion between groups. In order to explore how these changes on average income of educational levels have affected income dispersion between skilled and unskilled individuals, Table 1 presents the ratio of average hourly income in column 3. We observe that marginal returns to tertiary education in relation to primary and

[5] The classification is conducted under the following criteria. Primary level comprises individuals with some elementary or completed elementary education. In Mexico, the first nine years of the educational system are considered elementary education. Secondary level includes individuals with some education after the basic level but with no university education. The tertiary level comprises individuals with university education, completed or incomplete, also includes individuals with one or more years of postgraduate education.

secondary levels increased between 1984 and 1998 and declined between 1998 and 2002, but remained above their original levels. On the other hand, although returns to secondary education fluctuated, they actually decreased slightly in relation to the first period. Therefore, only income premium paid to high skilled individuals has expanded, although there is evidence that this trend has reversed over the last few years.

Table 1 also reports share of the three education categories under two different considerations. Column 4 presents labour share weighted by hours[6] and column 5 displays income bill share of individuals. The bottom panel makes comparisons between the rising inequality period, and the later period, by exploring annualised changes in shares and average hourly income for both primary and tertiary educational categories. Adopting Autor et al. (1998) assumptions,[7] and following Airola and Juhn (2005), we interpret changes in income bill share as relative demand shifts.

As for the first period, the simultaneous increase in relative income and relative supply of individuals with tertiary education suggests that demand for highly educated individuals also increased. In fact, labour share increased at an annual pace of 2.57 percent, whereas income bill share expanded at an annual rate of 4.38 percent. Although highly skilled labour supply increased over the first period, its expansion was not enough to meet the larger increase of demand;[8] this fact explains the rise in income of this educational category.[9] On the other hand, changes in labour share and income bill share of the least educated group show that relative unskilled labour demand decreased faster than relative supply. Not surprisingly, average income of this category fell at an annual pace of 2.26 percent.

[6] We also calculated the educational distribution weighted by individuals, and it was found that it does not differ substantial from that weighted by hours.

[7] Autor et al (1998) show that under the assumption that the elasticity of substitution between skilled and unskilled workers equals 1 and the production function is Cobb-Douglas, relative demand shifts can be represented by changes in wage bill share.

[8] By conducting an international comparison Cortez (2001) shows that Mexico's performance in terms of educational expansion is poor, as the reduction in the percentage of low-education workers is slow and the increase in the percentage of workers with higher education is small compared to countries like South Korea and Sweden.

[9] Although the average hourly income of the highly educated group rose between 1984 and 1998, the annualised change was relatively low, 0.43 percent; however, between 1984 and 1994 the rate was higher, 1.47. This can be explained because supply of skilled individuals fell between 1989 and 1994 and then continued to increase in the later periods. Nevertheless, the analysis considers periods before and after 1998, because the rest of the changes in the trend of supply and demand of skilled and unskilled individuals, and changes in individual income Gini, appear to be stronger around this year.

Table 1. Average real hourly income (2002 pesos) per level of education

	(1) Income	(2) Income variation % 02 vs 84	(3) Ratio of income	Shares (4) Hours weighted	Shares (5) Income bill
2002					
Primary	16.76	-27.50	1.62 *	69.04	47.19
Secondary	27.08	-30.85	2.18 **	17.43	19.54
Tertiary	59.09	-6.27	3.53 ***	13.53	33.27
1998					
Primary	16.82		1.76 *	72.99	49.75
Secondary	29.57		2.26 **	16.42	18.54
Tertiary	66.92		3.98 ***	10.60	31.71
1994					
Primary	20.77		1.68 *	75.49	51.31
Secondary	34.97		2.09 **	14.31	17.70
Tertiary	73.01		3.52 ***	10.19	30.99
1989					
Primary	22.91		1.42 *	73.07	55.29
Secondary	32.65		1.90 **	15.01	17.38
Tertiary	61.92		2.70 ***	11.92	27.33
1984					
Primary	23.12		1.69 *	82.38	68.21
Secondary	39.16		1.61 **	10.23	14.71
Tertiary	63.04		2.73 ***	7.39	17.08

Changes in average hourly income and share of educational levels
(annualised log change x 100)

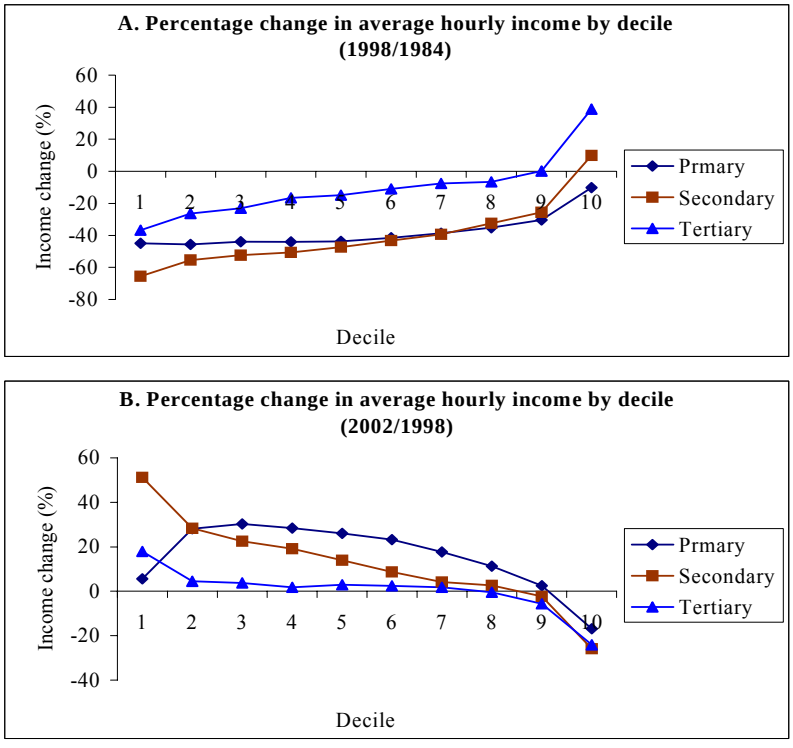
	1984-1998	1998-2002
Primary		
Average income	-2.26	-0.09
Hours	-0.86	-1.39
Income bill	-2.25	-1.32
Tertiary		
Average income	0.43	-3.11
Hours	2.57	6.09
Income bill	4.38	1.20

Notes: * Comparison between secondary and primary education
** Comparison between tertiary and secondary education
*** Comparison between tertiary and primary education

During the second period, income bill share of the most educated individuals continued to increase but slowed to the rate of 1.20 percent per year, and labour share continued its expansion and even accelerated to the pace of 6.09 percent. Consequently, income of the tertiary education category decreased at an annual pace of approximately 3.11 percent. Finally, changes in income bill share and labour share of the primary education category continued to decrease, but the former slowed to the rate of 1.32 percent and the latter accelerated to the pace of 1.39 percent; as a result, average income of the least educated group continued to fall but at a negligible annualised rate of 0.09 percent.

Inequality within educational categories. Inequality within levels of education also increased in all categories between 1984 and 1998 and then fell (see Table A.2 in Appendix A). One interpretation of the increase in within-group inequality in the U.S is the rise in returns to unobserved skills or ability (Juhn, et al. 1993). Furthermore, Szekely (1998) argues that domestic reforms in Mexico, such as privatisation and others, created an environment of change rewarding ability and entrepreneurship. So as to explore this possibility and following the Airola and Juhn (2005) approach, Figure 1 shows changes in income by decile for every group over the rising inequality period and the subsequent one.

Figure 1. Income changes within educational groups



From Figure 1A we observe that between 1984 and 1998 increasing inequality within groups can be explained by different changes in income across deciles, as the upper deciles tend to lose less income than the lower deciles in every group. Furthermore, only the top deciles within the secondary and tertiary groups increased real income. Assuming that individuals located in the upper deciles are likely to possess more unobserved skills than those in the lower deciles it is possible to infer that returns to unobserved skills grew during the rising inequality period. In contrast, Figure 1B illustrates that over the later period, average income tends to decrease more in the upper deciles for every group. This fact suggests that demand for unobserved skills fell and helps to explain the decrease of within-group inequality.

Intra- and inter- group components of Gini. We decompose Gini coefficient into inequality within and between educational groups using the Yao (1999) methodology. The procedure is presented in Appendix B.2. In 1984 intra- and inter-group inequality accounted for 54.67 percent and 45.33 percent of Gini respectively. Over the subsequent periods the contribution of inter-group inequality surpassed the intra-group contribution, in 2002 the intra- and inter-group components accounted for 36.19 percent and 63.81 percent of Gini respectively. This fact suggests that skill premium has increased its contribution to inequality during the period and has a stronger effect than returns to unobserved abilities.

3.2. Decomposition of income by economic sectors

In this section, income is decomposed into three main economic sectors – agriculture, manufacturing, and services. Initially, column 4 in Table 2 illustrates changes in the sectoral composition of employment by reporting labour shares weighted by hours. It can be observed that the share of agriculture declined throughout the period and the decrease is more severe between 1998 and 2002. The manufacturing sector remained more or less steady. In contrast, the share of the service sector increased and the largest variation is registered during the latest period too.

Average real hourly income per sector is presented in column 1 and the percentage change throughout the period is displayed in column 2. We observe that individual income fell 8.72 percent in the service sector whereas it fell 25.17 and 32.89 percent in the manufacturing and agricultural sectors respectively.

Column 3 presents ratios of average hourly income. This indicator shows that income dispersion between the service and the other two sectors expanded between 1984 and 1998; however, during the last period the income gap with respect to the manufacturing sector fell, whereas it continued to increase in relation to the agricultural sector. Column 5 illustrates that income bill share of the service sector rose along the whole period. It remained relatively steady in the manufacturing sector after a decrease between 1984 and 1989; in contrast, income bill share of the agricultural sectors fell permanently. Finally, column 6 shows that individuals in the service sector have higher educational attainment and their skill upgrading is faster than in the other two sectors. In contrast, individuals in the agricultural sector have the lowest educational attainment and their skill upgrading is the slowest; in fact, their educational achievement declined during the last period.

Table 2. Average real hourly income (2002 pesos) and educational attainment per sector

				Shares		
	(1) Income	(2) Income variation % 02 vs 84	(3) Ratio of income	(4) Hours weighted	(5) Income bill	(6) Years of Education
2002						
Agriculture	14.61	-32.89	1.91 *	13.82	7.56	3.85
Manufacturing	20.94	-25.17	1.33 **	18.01	16.29	7.83
Services	27.90	-8.72		68.17	76.15	8.94
1998						
Agriculture	16.75		1.71 *	19.77	12.05	4.41
Manufacturing	19.46		1.47 **	17.68	16.76	7.58
Services	28.62			62.55	71.19	8.36
1994						
Agriculture	19.46		1.75 *	22.11	13.57	3.52
Manufacturing	24.69		1.38 **	17.18	16.14	7.20
Services	34.05			60.71	70.28	8.00
1989						
Agriculture	19.59		1.71 *	20.49	13.13	3.54
Manufacturing	25.91		1.30 **	18.29	16.86	7.61
Services	33.57			61.21	70.01	8.30
1984						
Agriculture	21.78		1.40 *	22.73	16.76	2.94
Manufacturing	27.98		1.09 **	17.99	18.90	6.69
Services	30.57			59.28	64.34	7.13

Notes: * Comparison between the service sector and the agricultural sector

** Comparison between the service sector and the manufacturing sector.

Using income bill shares of individuals by sector and education category we find that in the service sector skill demand increased permanently, whereas demand for unskilled individuals fell in relative terms. Relative demand for unskilled labour was expected to increase in the manufacturing and agricultural sectors, but it fell gradually in the former - although seems to stabilise in the latest periods- and substantially in the latter. From these two sectors, relative skill demand seems to remain steady throughout the period (Table A.3 in Appendix A).

3.3. Decomposition of income by deciles

When the overall income is decomposed into deciles, it can be noted that the bottom nine deciles lost income share between 1984 and 1998, but they reversed the trend during the later period. On the other hand, the top decile shows an opposite pattern; this is an initial increase in income share during the early periods and a subsequent decrease between 1998 and 2002. Over the entire period the bottom eight deciles lost income share and the lower the income level, the higher tends to be the loss, whereas the winners are the top two deciles (Table A.4 in Appendix A). In terms of variations in average real hourly income, all the deciles present negative changes over the whole period; however, the lower deciles tend to lose more (Table A.5 in Appendix A). In this sense, the ratios of the tenth decile to the first decile in terms of income share and average hourly wage increased until 1998, and they actually doubled, as they passed from 32 to 64. By 2002 these ratios had dropped to 47; nevertheless, they remained higher than their levels in 1984 and 1989 (Table A.6 in Appendix A).

As for education, we find that the lower the income level of individuals the fewer the years of schooling received in every period. Furthermore, throughout the period the speed of skill upgrading is the lowest in the first quintile whereas it is the highest in the fifth quintile, which results in increasing inequality of education. We also find that between 1998 and 2002 human capital increased faster in the last fourth quintiles compare to previous periods. Only the first quintile showed a decrease (Table A.7 in Appendix A). In terms of employment composition, in every quintile the service sector employment share increased throughout the period, but the lowest expansion occurred in the first quintile and the largest occurred in the last one. It is worth noting that over the last period, 1998-2002, the increase in the service sector employment share speeded up in the first and second quintiles, and the increase in the manufacturing sector speeded up in the first quintile (Table A.8 in Appendix A).

General comments. From the descriptive analysis provided above, changes in inequality can be explained as follows: Between 1984 and 1998 both employment and skill demand increased in relative terms in the service sector. In contrast, relative employment and demand for unskilled individuals did not increase in the manufacturing and agricultural sectors, as predicted by standard theory; this fact can explain the increasing income gap between the service sector and the other two sectors, and can be consistent with the *rise of services argument*. Moreover, in this period demand for skill increased faster than supply, whereas relative demand for unskilled individuals dropped; this fact can explain the upturn in skill premium and is consistent with the *SETH*. Hence, the increase of relative income in the service sector and the expansion of the skill premium can contribute to explain the growth of overall inequality between 1984 and 1998. Furthermore, we show that to a lesser extent the increase in returns to unobservable skills also explains income dispersion.

In this context, we can also observe that the rise of income dispersion across income levels is the result of the expansion of educational inequality that has favoured the upper classes. That is to say, individuals with higher income levels have consolidated higher educational levels on average and have therefore reaped the benefit of increasing skill premium. Moreover, the increase of the relative income in the service sector has mainly favoured individuals in the highest income levels, as they have registered the fastest shift towards this sector, and have consolidated the highest proportion of employment in services. In contrast, those with the lowest income levels have experienced the slowest movements towards services, and continue to constitute the lowest proportion of employment in this sector. However, it is important to explore if, allowing for education, the expansion of relative income in the service sector persists.

Between 1998 and 2002 the increase in overall skill demand slowed down and educational attainment, on average, increased faster, although the increase does not necessarily occur among individuals with relative low income and low educational achievement. As a result, skill premium declined and this fact seems to be the main reason explaining the decrease in inequality in this period.[10] Other possible reasons are a decrease

[10] Between 1998 and 2002 both employment and skill demand continued to increase in relative terms in the service sector, whereas relative employment had negligible improvements and relative demand for unskilled individuals fell slightly in the manufacturing sector. Bearing this in mind, we should expect further income dispersion between these two sectors; nevertheless the income gap dropped; hence, the most plausible reason for this drop is a reduction of skill premium. Relative income in the agricultural sector continued to fall due to further decrease in relative employment and a fall in years of education in this period; thus, the deterioration of this sector seems to be a persistent cause of inequality.

of returns to unobservable skills, and the fact that individuals in the first and second quintiles react and accelerate movements towards the manufacturing sector and specially towards the service sector. However, as noted before, it is important to explore whether employment in the service sector can offer a marginal benefit in average income, once education is controlled for.

3.4. Labour income, unionisation and wage inequality

Over a prolonged time period, labour unions played an important role in defining working conditions for a substantial number of workers. They bargained for higher wages, job stability and better social benefits. However, since early 1980s and throughout the 1990s a number of changes have constrained the scope for action of labour unions (Cortez 2001). For example, the privatisation process of state-owned firms contributed to the weakening and dissolution of an important number of them. Moreover, increasing domestic and international competition, due to deregulation and market openness, has driven firms to reduce labour costs by hiring temporary and part-time workers, subcontracting stages of production, lessening conditions to fire workers, and adopting overall labour flexibility. This section assesses the impact of this transformation on wage inequality and therefore restricts the data-set to labour income sources.

From column 1 in Table 3 we observe that on average unionised workers earn a higher wage rate than non-unionised ones. Furthermore, column 2 shows that although the wage rate of unionised workers oscillated over time, by the end of the period it had decreased just 2.64 % in relation to its original level. In contrast, the wage rate of the non-unionised workers fell 16.05 % between 1984 and 2002, but there is some evidence that it increased slightly during the last period. As a result, the ratio of average hourly union wages to non-union wages expanded between 1984 and 1998 and then stabilised, as illustrated in column 3. Column 4 shows that on average unionised workers have higher educational attainment and their skill upgrading is faster than non-unionised workers. Column 5 reveals that wage inequality, as expressed by the Gini coefficient, is higher among non-unionised workers, but wage inequality within unionised workers grew faster overtime. In keeping with the overall pattern of income dispersion, wage inequality reversed between 1998 and 2002 within both groups. Finally, column 6 illustrates that the unionisation rate dropped between 1984 and 1998, but it levelled and even increased slightly during the last period.

Table 3. Average real hourly wage (2002 pesos), educational attainment and inequality per unionised and non-unionised workers.

	(1) Wage	(2) Wage Variation % 02 vs 84	(3) Ratio of wage*	(4) Years of education	(5) Gini	(6) Unionisation rate %
2002						
Non-union	18.17	-16.05		8.0	0.444	83.57
Union	33.34	-2.64	1.84	11.6	0.409	16.43
1998						
Non-union	17.08			7.7	0.500	84.49
Union	31.85		1.86	10.7	0.433	15.51
1994						
Non-union	20.55			7.0	0.506	81.78
Union	34.27		1.67	10.0	0.424	18.22
1989						
Non-union	21.52			7.3	0.468	75.06
Union	31.31		1.46	9.6	0.391	24.94
1984						
Non-union	21.64			6.2	0.424	75.60
Union	34.24		1.58	8.8	0.303	24.40

Notes: * Union vs non-union

By exploring the composition of unionised employment by sectors, we find that throughout the period the proportion of union workers employed in services increased from 69.74 to 75.58 percent whereas those employed in manufacturing and agriculture dropped from 27.83 to 23.58 percent and from 2.43 to 0.85 percent respectively (Table A.9 in Appendix A).

Although the unionisation rate has fallen, labour unions have tended to favour workers with higher educational attainment, and have tended to concentrate within the service sector over the last two decades. This pattern can help to explain the expansion of the rate of return to unionisation as the wage rate of union workers has benefited from the increase in skill premium and from a relative increase of wages in the service sector, if any. In contrast, relative educational attainment of non-union workers has decreased and low

wage agricultural workers have nearly lost access to labour unions in recent years. [11] It is also important to explore whether relative union wages increase once education is controlled for.

The fact that a large number of workers moved away from unions and entered a non-union sector characterised by diverse and flexible wages and higher Gini coefficient also represents a source of inequality. In short, the increase in the wage gap between union and non-union workers and the fall in the unionisation rate contribute to explain labour inequality and therefore the increase of overall individual inequality. Moreover, the drop of intra-group Ginis and the slight upturn of unionisation rates during the last period can contribute to explaining the decline of the individual Gini between 1998 and 2002.

4. Econometric analysis with disaggregate data (labour income)

This section uses labour income data and applies standard Mincerian earning functions, in which the log of real monthly wages are regressed on personal characteristics and different variables in order to analyse the effect of the skill premium, returns to labour by sector, and returns to unionisation on wage dispersion. So as to explore the effects of economic liberalisation over different stages in time, the analysis follows a before-after (liberalisation) approach as in Arbache et al. (2004), and also splits the sample in different periods.[12] A (0,1) dummy variable is created; it takes a value of 1 for the post-liberalisation period, which is defined as after 1984. In addition, the impact of liberalisation is explored separately for the different sectors, and we also focus on the wage gap between union and non-union workers and returns to education pre- and post-liberalisation by applying the corresponding interactions.

4.1. Returns to labour by sectors

Column 1 of Table 4A shows an OLS regression which decomposes the log wage between sectors (agriculture and manufacture *vs* services) and distinguishes trade regime. On average, workers in the agricultural and manufacturing sector were paid 50.80 percent

[11] Bensusán (1999) provides an additional argument to explain the rise in union wages, as he holds that some workers who have remained unionised have constituted more representative and efficient labour unions.
[12] The Mincerian earning functions and the before-after methodology were used by Arbache et al. (2004) to study wage dispersion in Brazil. However, the application of these methods for the case of Mexico, supplemented with additional methods used in this paper, represent an innovative approach that derives additional findings in the study of income inequality in this country.

less and 6.37 percent more[13] respectively than those in the service sector before liberalisation (the transformed coefficients are presented in Table A.10A in Appendix A). However, as anticipated in columns 1 and 2 of Table 2, in the post-liberalisation period average wages in agriculture and manufacturing fell more than those in services.[14] In agriculture average wages dropped 21.31 percent and in manufacturing they dropped 27.22, whereas they fell 14.06 percent in services.[15]

Once age, gender, education attainment and unionisation are controlled for in column 2, we observe that higher human capital and higher unionisation rates in the service sector contribute to increase average wages compared to those in the other sectors. By comparing columns 1 and 2 we notice that before liberalisation the wage gap between the agricultural and service sectors changes from -50.80 percent to -42.61 percent and between the manufacturing and service sectors it changes from 6.37 percent to 11.02 percent. Moreover, after liberalisation the drop of average wages in the service sector is larger and the fall of average wages in the manufacturing sector is more moderate. Nevertheless, column 2 illustrates that average wages in services increase in relative terms, as the wage gap of agriculture widens slightly from -42.61 percent to -44.10 percent and the wage gap of manufacturing decreases from 11.02 percent to 4.89 percent, between the pre- and post liberalisation periods.[16] This result is consistent with the *rise of services argument*.

We also observe that there is an inverted U-shaped age-earning profile with a peak at around 45 years, women earn 29.14 percent less than men with similar age and education, union workers earn 32.80 percent more than equivalent non-union workers, and returns to education increase with higher education level. This wage equation explains 37 percent of total variation in earnings between workers.

Using the before and after methodology the post-liberalisation period is disaggregated in four sub-periods in order to examine any differential effect of liberalisation over time, results are presented from column 3 to column 6 in Table 4B. The sharpest fall in wages in the immediate post-liberalisation period occurs in the manufacturing sector and the most

[13] Figures computed as (exp(β) -1)*100 where β is the coefficient on the corresponding sector dummy variable.

[14] Although Table 2 comprises all sources of income, in 2002 labour income accounted for 60 percent of total income; hence, this table can be representative of the pattern followed by this income source over time. Moreover, we construct Table 2 using labour income only and also observe that relative wages in agriculture and manufacturing fell more than in services.

[15] The Change in average wages after liberalisation is computed as (exp(β1-β2)-1)*100, where β1 and β2 are the coefficients of the corresponding sector post- and pre- liberalisation respectively.

[16] In the post-liberalisation period the wage gap of Agriculture and manufacturing in relation to services is computed as (exp(β1- β2)-1)*100, where β1 is the coefficient of the corresponding sector and β2 is the coefficient of the service sector post-liberalisation.

moderate occurs in the agricultural sector. Over the subsequent periods wages continue to fall, there is some recovery in the manufacturing and service sectors between 1998 and 2002, but wages do not return to their pre-liberalisation levels in any of these two sectors. In the agricultural sector the fall is permanent (See the transformed coefficients in Table A.10B in Appendix A).

Table 4. Performance of sectors (labour income)

	(1)		(2)	
Table 4A	Pre-lib	Post-lib	Pre-lib	Post-lib
Services		-0.152		-0.223
Agriculture	-0.709	-0.949	-0.555	-0.805
Manufacture	0.062	-0.256	0.105	-0.175
Age			0.079	
Age^2			-0.001	
Female			-0.344	
Union			0.284	
Secondary education			0.433	
Tertiary education			0.931	
Constant	8.215		6.571	
Observations	57,832		57,832	
R^2	0.10		0.37	

	(3) 84,89		(4) 84,94		(5) 84,98		(6) 84,02	
Table 4B	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib
Services		-0.113		-0.091		-0.375		-0.275
Agriculture	-0.593	-0.683	-0.536	-0.694	-0.523	-0.877	-0.552	-0.962
Manufacture	0.103	-0.059	0.117	-0.085	0.109	-0.308	0.099	-0.222
Age	0.083		0.083		0.084		0.080	
Age^2	-0.001		-0.001		-0.001		-0.001	
Female	-0.324		-0.345		-0.340		-0.328	
Union	0.185		0.263		0.350		0.326	
Secondary education	0.420		0.503		0.473		0.394	
Tertiary education	0.770		1.045		0.988		0.868	
Constant	6.538		6.469		6.461		6.567	
Observations	16,137		17,108		15,311		22,281	
R^2	0.33		0.41		0.40		0.38	

Notes: Results corrected for heteroskedasticity, all coefficients are significant at the 1% level

4.2. Skill premium

Table 5 focuses on the returns to education pre- and post-liberalisation. The first column illustrates the results obtained from the whole sample and the last four columns

show the results obtained once the post-liberalisation period is disaggregated over time. Three main findings emerge from this analysis. Firstly, average income tends to be lower in every level in the post-liberalisation periods and this is consistent with decreasing real wages as noted previously. Furthermore, as anticipated in columns 1 and 2 of Table 1, average wages for the primary and secondary levels fall relative to the tertiary level. In the post-liberalisation period workers with primary and secondary education are paid 21.78 percent and 26.09 percent less respectively, whereas workers at the highest educational level are paid 8.58 percent less[17] (the transformed coefficients are presented in Table A.11 in Appendix A).

Table 5. Returns to education (labour income)

	(1)		(2) 84,89		(3) 84,94		(4) 84,98		(5) 84,02	
	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib
Age	0.079		0.083		0.083		0.084		0.080	
Age^2	-0.001		-0.001		-0.001		-0.001		-0.001	
Female	-0.345		-0.325		-0.348		-0.344		-0.330	
Union	0.283		0.184		0.261		0.348		0.321	
Primary education		-0.246		-0.098		-0.160		-0.407		-0.308
Secondary education	0.486	0.184	0.508	0.295	0.494	0.347	0.483	0.066	0.455	0.077
Tertiary education	0.784	0.695	0.800	0.663	0.786	0.928	0.782	0.643	0.760	0.580
Agriculture	-0.580		-0.576		-0.585		-0.509		-0.655	
Manufacture	0.053		0.068		0.038		0.081		0.064	
Constant	6.592		6.526		6.523		6.486		6.590	
Observations	57,832		16,137		17,108		15,311		22,281	
R^2	0.37		0.33		0.41		0.40		0.38	

Notes: Results corrected for heteroskedasticity, all coefficients are significant at the 1% level

Secondly, the marginal returns to education –comparing each education level with those below- tend to be greater along the post-liberalisation periods only for high skill workers or those with tertiary education, but not for those with secondary education. The point estimate of the marginal return to tertiary level rises from 119.10 percent to 156.06 percent and from 34.74 percent to 66.65 percent in relation to the primary and secondary levels respectively, between the pre- and post-liberalisation periods.[18] This finding

[17] Fall post-liberalisation is computed as $(\exp(\beta 1-\beta 2)-1)*100$, where $\beta 1$ and $\beta 2$ are the coefficients of the corresponding educational level post- and pre- liberalisation respectively.

[18] Marginal returns to education comparing two levels of education can be obtained as $(\exp(\beta_{upper} - \beta_{lower})-1)*100$, where β_{upper} and β_{lower} are the coefficients on the education level dummy variable for the upper and lower level respectively for a specific period (Table A.11 in Appendix A).

confirms the trend observed in column 3 of Table 1[19] and is in keeping with the *skill-enhancing trade hypothesis*.[20] Finally, the marginal returns to tertiary education peak by 1994 and then decline, but remain higher than in the pre-liberalisation period (see the transformed coefficients in Table A.11 in Appendix A).

4.3. Unionisation

We now explore wage dispersion between union and non-union workers. Column 1 of Table 6A distinguishes unionisation and trade regime. It indicates that, on average, union workers were paid 82.63 percent more than non-union workers before liberalisation, and over the post-liberalisation period average wages paid to union workers decreased 11.80 percent and those paid to non-union workers fell 15.93 percent, which represents an increase of union wages in relation to non-union wages (the transformed coefficients are shown in Table A.12A in Appendix A).

Age, gender, sectors and educational attainment are controlled for in column 2. A comparison between columns 1 and 2 confirms that average wages paid to union workers are higher, but reveals that much of this is due to the higher human capital among these workers, as suggested in column 4 of Table 3. In fact, the wage gap shrank from 82.63 percent to 39.29 percent before liberalisation. Moreover, the relative increase of union wages post-liberalisation seems to be the result of faster skill upgrading, as non-union wages fell by less than union ones. Accordingly, column 2 reveals that the wage gap of union workers in relation to non-union ones decreased from 39.29 percent to 32.16 percent between the pre- and post-liberalisation periods.

Once the post-liberalisation period is disaggregated over time from column 3 to column 6 in Table 6B, we can infer that the wage gap of union workers in relation to non-union ones dropped in the immediate pos-liberalisation period, then increased and peaked around 1998, and was even higher in this period than its original level; however, after 1998 the wage gap decreased and returned to its pre-liberalisation level (see the transformed coefficients in Table A.12B in Appendix A).

[19] Although Table 1 is constructed from all income sources it shows a good approximation of the trend in labour income as this income source represents 60 percent of total income, as noted in footnote 14.
[20] Note that the hypothesis applies to tertiary education in particular. This finding is similar to that obtained by Arbache et al. (2004) as they conclude that the SETH applies to college-educated labour only.

Table 6. Unionisation and wages (labour income)

Table 6A	(1) Pre-lib	(1) Post-lib	(2) Pre-lib	(2) Post-lib	
Non-Union		-0.174		-0.226	
Union	0.602	0.477	0.331	0.053	*
Age			0.079		
Age^2			-0.001		
Female			-0.345		
Agriculture			-0.579		
Manufacture			0.052		
Secondary education			0.432		
Tertiary education			0.932		
Constant		7.965		6.573	
Observations		57,832		57,832	
R^2		0.08		0.37	

Table 6B	(3) 84,89 Pre-lib	(3) 84,89 Post-lib	(4) 84,94 Pre-lib	(4) 84,94 Post-lib	(5) 84,98 Pre-lib	(5) 84,98 Post-lib	(6) 84,02 Pre-lib	(6) 84,02 Post-lib	
Non-Union		-0.068		-0.110		-0.387		-0.304	
Union	0.340	0.062	0.309	0.134	0.331	-0.026	0.326	0.020	*
Age	0.084		0.083		0.084		0.080		
Age^2	-0.001		-0.001		-0.001		-0.001		
Female	-0.325		-0.345		-0.340		-0.328		
Agriculture	-0.575		-0.587		-0.509		-0.654		
Manufacture	0.066		0.036	^	0.079		0.062		
Secondary education	0.417		0.502		0.472		0.395		
Tertiary education	0.772		1.048		0.987		0.871		
Constant	6.501		6.478		6.470		6.589		
Observations	16,137		17,108		15,311		22,281		
R^2	0.33		0.41		0.40		0.38		

Notes: Results corrected for heteroskedasticity, all coefficients are significant at the 1% level unless otherwise indicated, * significant at 5%, ^ insignificantly different from zero at conventional levels

We also use the data-set comprising all income sources in the analysis of educational levels and sectors, and find that the general conclusions are similar to those using labour income only.

5. Additional forms of income distribution

5.1. Per capita household income distribution (all income sources)

Initially, a simple comparison between households and individuals in terms of income and Ginis is presented in Table 7. From the first panel we observe that household Gini is lower than individual Gini and the last column reveals that the former grew slower than

the latter throughout the period. Moreover, the rise of household Gini started to reverse slightly after 1994, whereas individual Gini started to drop after 1998. The second panel shows that real hourly individual income declined 12.43 percent, whereas real monthly household income fell 1.43 percent over the whole period. It is worth noting that household income increased 18.09 percent when it is expressed in per capita terms.

An important reason for mitigation of inequality and income fall among households is presented in the bottom panel. We observe that the average number of members per household dropped 16.53 percent, whereas the number of income receivers increased 30.85 percent. As a result, the proportion of income receivers per household increased, from 31.66 percent to 49.63 percent between 1984 and 2002. Although the upper quintiles have kept a higher proportion of income receivers over time, the lower quintiles have increased the proportion faster and therefore the percentage of income receivers tends to converge across income levels. This families' reaction counteracts the increase in inequality and the general trend of declining real income; this in fact raises per capita household income.

Table 7. Average real monthly income (2002 pesos), Gini and composition of income receivers per household and individuals

						Change %
	1984	1989	1994	1998	2002	02/84
(1) Gini						
Household Gini	0.485	0.530	0.553	0.549	0.515	6.19
Individual Gini	0.512	0.551	0.587	0.632	0.560	9.38
(2) Income						
Monthly income per household	6,441	7,146	6,928	5,859	6,348	-1.43
Monthly income per member	1,270	1,437	1,469	1,331	1,499	18.09
Hourly individual income	28.03	29.30	29.02	24.40	24.55	-12.43
(3) Household composition						
Household members	5.07	4.97	4.72	4.40	4.23	-16.53
Receivers per household	1.61	1.68	1.86	2.00	2.10	30.85
Receivers per household %	31.66	33.86	39.52	45.51	49.63	56.78
Receivers per quintile %						
1st	23.03	22.71	29.82	37.90	46.50	101.94
2nd	27.21	29.30	33.93	41.59	44.50	63.53
3rt	31.41	35.12	40.13	45.53	47.81	52.21
4th	36.95	42.27	46.78	52.11	54.31	46.96
5th	47.84	47.59	54.98	56.42	59.26	23.88

Table 8 presents the decomposition of the household Gini coefficient by three main income sources -labour, transfers, and business and finance (B & F)- applying the Yao (1999) method. The procedure is illustrated in Appendix B.3. The first panel reveals that the transfer income is the most equally distributed and its Gini has fallen markedly, as recorded in column 6. In contrast, the Gini of B & F income is the largest and has expanded sharply over time. As a result, the second and third panel illustrate that the contribution of transfer income to total income is larger and has increased faster over time (column 7) than its contribution to the overall Gini, whereas the contribution of B & F income to total income is lower and has decreased more than its contribution to the overall Gini. As for labour income, its income share has increased slightly more than its Gini share.

Table 8. Decomposition of household Gini by income source

						Change	
	(1)1984	(2)1989	(3)1994	(4)1998	(5)2002	(6) % 02/84	(7) Diff 02-84
(1) Gini							
Business & finance	0.515	0.624	0.612	0.616	0.601	16.79	
Labour	0.471	0.476	0.547	0.526	0.496	5.47	
Transfer	0.448	0.481	0.384	0.452	0.378	-15.61	
Total	0.485	0.530	0.553	0.549	0.515	6.19	
(2) Contribution to income							
Business & finance	35.73	35.98	32.20	33.89	29.40		-6.32
Labour	56.63	56.70	59.53	56.14	60.00		3.36
Transfer	7.64	7.32	8.28	9.97	10.60		2.96
(3) Contribution to Gini							
Business & finance	37.94	42.38	35.37	38.03	34.34		-3.60
Labour	55.00	50.97	58.52	53.77	57.87		2.87
Transfer	7.07	6.64	6.10	8.20	7.79		0.73
(4) Gini variation % (income source vs overall)							
Business & finance	6.18	17.79	10.64	12.21	16.78		
Labour	-2.89	-10.10	-1.00	-4.22	-3.55		
Transfer	-7.46	-9.21	-30.52	-17.76	-26.46		
(5) Contribution ratio (gini/income)							
Business & finance	1.062	1.178	1.099	1.122	1.168	9.98	
Labour	0.971	0.899	0.983	0.958	0.965	-0.68	
Transfer	0.925	0.908	0.737	0.822	0.735	-20.53	

Consequently, transfer income, which is mainly composed of remittance from emigrant workers and social government expenditure, helps to reduce household inequality for the following reasons: Firstly, its Gini is reasonably smaller than the overall Gini and the gap has expanded over time (panel 4). Secondly, although the smallest income source out of the three categories, it has increased gradually. In this context and to a lesser extent, labour income helps to reduce household Gini too. On the other hand, B & F income drives inequality up as its Gini is higher than the overall household Gini and the gap has tended to increase over time (panel 4).

The last panel summarises the impact of every income category on the overall household income inequality by displaying the ratio of Gini share to income share. If the ratio is greater than one, it means that the corresponding income source can increase inequality, otherwise it helps to decrease the household Gini coefficient. We observe that the contribution ratio of the B & F income is greater than one and has increased over time (column 6), which suggests that this income source is a driving force of household inequality. Labour income is relatively neutral. Finally, the contribution ratio of transfer income is the lowest and has decreased sharply along the period, which indicates that transfer income is an important factor to reduce the household Gini coefficient.

5.2. Capital concentration

We now discuss the trends in the ratios of sales and assets of the top twenty five companies (including transnational corporations and excluding the state-owned oil company) as a percentage of GDP, and the ratio of employment to total employment, as in Tanski and French (2001). The information on firms is taken from Expansión (various years).

Between 1984 and 1989, both the sales and assets ratios decreased, and the employment ratio remained steady. Between 1989 and 2002 the sales and assets ratios practically tripled as they increased from 2.04 to 6.04 percent and from 3.31 to 9.89 percent respectively, and the upturn of the employment ratio was more moderate, from 3.32 to 6.15, which is less than double. Accordingly, these figures indicate evidence of capital concentration since the late 1980s (Figure A.1 in Appendix A).

Between 1988 and 1990, the financial system and the FDI regime were reformed and the stock market and the money market were opened to foreign investors with the elimination of restrictions to portfolio investment. These reforms led to a broad expansion of capital inflows since the early 1990s. It is interesting to note that the new regulatory

framework permitted the formation of financial groups and their consolidation with industrial groups. The privatisation process commenced in 1982 and was intensified during the late 1980s and early 1990s with the desincorporation of airlines, banks and the telecom company among other corporations. Privatisation was characterised by selectivity and concentration. In this respect, Tanski and French point out that ninety six companies that had been privatised by 1991 were sold to seventeen individuals and enterprises. Moreover, most of the companies sold were acquired by large domestic or transnational corporations.

Consequently, one explanation of increasing concentration of sales and assets in the top companies since the late 1980s is that the economic transformation described above has encouraged the surge of mergers and acquisitions and the formation of big conglomerates over the 1990s. This trend tends to create dominant positions and oligopolistic markets, decreases market power of small and medium-sized enterprises, and eventually leads to capital concentration.

6. Econometric analysis with aggregated data

6.1. Effect of economic and socio-political variables on income distribution

In this section, the analysis is carried out using a balanced panel consisting of 160 observations across the 32 states of Mexico over the five periods used earlier. The dependent variable is the individual Gini coefficient.[21] The set of explanatory variables is described as follows:

Employment in offshore plants (*maquiladoras*) is incorporated into the equation in order to test the effect of employment created by foreign investment in labour-intensive production; the source is INEGIa (various years). It has been argued that privatisation, deregulation, and market openness have driven a fall in the proportion of union workers and rising labour flexibility. In this context, we use unionisation rates as a proxy of market liberalism. Two variables are aimed at representing the set of socio-political norms incorporated in the new agenda of the PWC. Educational attainment is a proxy of human capital formation, and per capita government expenditure proxies the re-empowerment of

[21] Previous panel data studies across states in Mexico have applied different indicators for the endogenous variable on inequality. For instance, Ortega-Diaz (2001) uses Gini coefficients obtained from a municipality data base (SIMBAD) and not from household income surveys. Rodríguez-Oreggia and Costa-i-Font (2002) use per capita GDP deviations from the richest state (Mexico City). However, the former is not constructed from a representative sample covering all the population, and the latter is an index to analyse income disparities between states and catch up of regions. In this respect, the Gini coefficient constructed from household income surveys can be a more representative measure of inequality for this panel data study.

the state; for the latter the source is INEGIb (various years). Both variables play a central role in this policy prescription and are considered crucial to address the socioeconomic dislocation that might emerge due to economic liberalisation.

Table 9 displays the outcome of four different estimation procedures, pooled regression (OLS), fixed-effects model (FEM), random-effects model (REM) and the system generalised method of moments (sys-GMM) proposed by Blundell and Bond (1998). The REM is more appropriate than the FEM and the OLS regression, as the Breusch and Pagan Lagrange Multiplier test (1980) (LM) suggests that there are individual effects[22] and the Hausman test (1978) emphasises that these effects are uncorrelated with other variables in the equation[23]. However, the error term in the model does not satisfy white noise assumptions, that is to say the error term is assumed to be independently and identically distributed with zero mean, constant variance σ^2, and serially uncorrelated, which is denoted as $u_{it} \sim$I.I.D.$(0, \sigma^2)$, as it shows evidence of first- and second-order serial autocorrelation (column 3). In order to solve this problem, we estimate a dynamic model using the sys-GMM procedure that applies instruments to control for likely endogeneity of the lagged dependent variable, reflected in the correlation between this variable and the error term.[24]

Treating the results from the sys-GMM estimation as valid we observe that inequality increases as the proportion of union workers drops. A 0.45 points downturn in the unionisation rate leads to a long-run increase of 10 points in the Gini coefficient (-1.391/(1-0.389)*0.0045). Hence, economic liberalisation has caused a proportional reduction of union workers and this trend leads to rising income inequality. Employment

[22] The LM test is based on the OLS residuals. Under the null hypothesis: $\alpha_i = \alpha$, that is, the classical regression model with a single constant term is appropriate, is distributed as a χ^2 with one degree of freedom (Greene 2000, 572-3). The result of the test is to reject the null hypothesis as the LM test statistic is 51.08, with a negligible *P* value (column 1), which exceeds the 5 percent critical value of χ^2 with one degree of freedom, 3.84.

[23] The null hypothesis underlying the Hausman test is that the regressors and the unobservable individual specific random error are uncorrelated. If the test statistic, based on an asymptotic χ^2 distribution, rejects the null hypothesis, then the random-effects estimators are biased and the fixed-effects model is preferred. The value of the Hausman test statistic is 6.21 with *P* value of 0.184 (column 3); hence, the key assumption of the REM, 'the unobservable individual specific error ε_i is not correlated to any explanatory variable', is not violated.

[24] The method assumes that the disturbances u_{it} are not serially correlated. If this were the case, there should be evidence of first-order serial correlation in differenced residuals (u_{it} - u_{it-1}) and no evidence of second-order serial correlation in the differenced residuals (Doornik et al. 2002, 5-8). The tests of serial correlation in the first-differenced residuals are reported in column 4 and are in both cases consistent with the maintained assumption of no serial correlation in u_{it}. In order to assess the validity of the instruments, a Sargan test of overidentified restrictions, proposed by Arellano and Bond (1991), is also reported in column 4. Under the null hypothesis that the instruments are not correlated with the error process, the Sargan test is asymptotically distributed as a chi-square with as many degrees of freedom as overidentifying restrictions. In this case, the test is unable to reject the validity of the instruments.

in offshore plants drives the Gini coefficient down. 3,600 new jobs in this industry reduces the Gini by ten points (-1.61E-06/(1-0.389)*3,600).

Table 9. The effects of selected variables on income distribution: cross federal state analysis

	(1) OLS		(2) FEM		(3) REM		(4) sys-GMM	
$Gini_{t-1}$							0.389	*
Unionisation	-8.8E-02		2.3E-01	**	1.5E-01		-1.391	*
Schooling	-1.4E-02	*	-3.0E-02	*	-2.5E-02	*	3.7E-02	
offshore emp	-6.1E-08		-5.5E-07	*	-2.2E-07	**	-1.6E-06	**
LocExpen per	5.3E-06	*	5.1E-06		5.4E-06	**	-2.8E-05	**
Constant	0.579	*	0.527	*	0.610	*	0.478	*
Adjustment coefficient							0.611	
Obs	160		160		160		128	
Countries	32		32		32		32	
BP LM test	[0.000]							
Hausman test					[0.184]			
Sargan test							[0.586]	
AR(1) test	[0.098]		[0.091]		[0.029]		[0.053]	
AR(2) test	[0.528]		[0.018]		[0.085]		[0.599]	

Notes: Dependent variable: Gini coefficient, *P* values in parenthesis,

* Significant at 5%; **Significant at 10%

As for the socio-economic variables, we find that expenditure at the level of the states and municipalities reduces inequality. An increase of $230 (2002 pesos) in per capita local expenditure drops the Gini coefficient by 10 points (-2.75E-05/(1-0.389)*230). On the other hand, the effect of federal expenditure is not statistically significant (results not reported). Thus, decentralised expenditure can be more effective to improve income distribution.[25] Educational achievement is not statistically significant. However, we find that this variable and the Gini coefficient follow a quadratic relationship in which inequality increases with education and then declines, the reversal occurs around 6.7 years of schooling on average (results not reported).[26] By using a panel of countries, De

[25] Through a panel study across local states in Mexico, Rodríguez-Oreggia and Costa-i-Font (2002) found that overall public investment increases inequality between regions. However, their study uses a different index of inequality (per capita GDP deviations from the richest state), covers the period 1993-1998, and does not separate local and federal public investment.

[26] We regress Gini coefficient on schooling, its square and a lagged dependent variable. The estimation procedure used is sys-GMM as conventional panel data methods suffer from serial autocorrelation. The

Gregorio and Lee (2002) show that at low levels of education, its expansion causes an increase in educational dispersion and therefore an increase in inequality too, whereas for higher levels the relationship is reversed.

6.2. The relationship between economic growth and inequality.

In Mexico during the 1950s, 1960s and 1970s the ISI model, which was based on protectionist policies and state intervention in the economy, became dominant. After the debt crisis in 1982, there started a period of structural adjustment and transition towards market-oriented policies. From a neoclassical view, we can assume that the relationship between per capita GDP and a measure of inequality follows an inverted-U curve over time, in which inequality increases with economic growth and then declines, with the turning point located somewhere in the 1980s. This is because from a standard theory perspective market distortions and government intervention are usually deemed inefficient and inequitable (Kanbur 2000, 795), whereas market liberalism is expected to boost economic growth and to facilitate income distribution.

In order to test this view, Figure 2 shows the performance of growth and distribution between 1970 and 1998. Within this range of years it is possible to analysis two periods with different polices. Figure 2A, illustrates that since the early 1980s the rate of growth of GDP per capita in 1995 US dollars, has been unsteady and low on average, compared to previous years; the GDP per capita is obtained from World Bank (2002). Figure 2B presents a compilation of household Gini coefficients from the World Income Inequality Database, version 2.0a (UNU/WIDER 2005) and my own calculations, as well as the estimated household income inequality (EHII) by Galbraith and Kum (2003). Over the 1970s and early 1980s the Gini shows a sharp decrease in inequality and the EHII is relatively stable. Both indicators increase in the subsequent years and they seem to level off by the mid-1990s.

Figure 2C displays the relationship between per capita GDP and EHII. At first glance it seems to follow an ordinary-U curve rather that an inverted one. In order to confirm any systematic relationship, we conduct linear, quadratic and cubic regressions in levels and logs specifications. The results indicate that the quadratic regressions perform better than the linear ones, as the value of the Akaike information criteria (AIC) and the Schwarz

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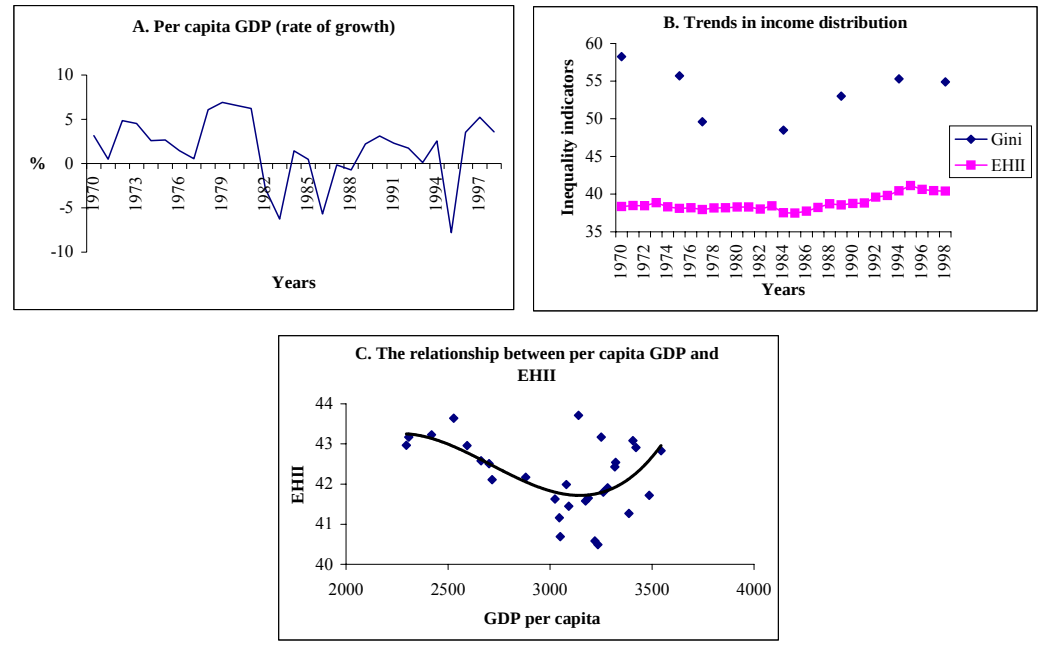
Wald test for excluding the square of schooling indicates that the restricted regression is not valid. The turning point is obtained through estimated parameters taking the first partial derivative of the dependent variable with respect to Y and setting it equal to zero.

information criteria (SIC) is lower in these equations than in the linear regressions;[27] moreover, the Lagrange Multiplier (LM) test for adding variables rejects the restricted regressions.[28] The quadratic functions confirm that the relationship between per capita GDP and EHII tends to follow a U-shaped curve, as the sign of the coefficients on the quadratic explanatory terms is positive.

Figure 2. Trends in per capita GDP, inequality and their relationship



We also observe that Figure 2C displays an early flat part, but the majority of the curve is U shaped. In this respect, the third-degree polynomial in logs has the lowest AIC and SIC values, while the LM test rejects the restricted regression. Using the same data-set Angeles-Castro (2006) dates an early local maximum between 1971 and 1972, and a subsequent local minimum between 1989 and 1990. In this context, inequality decreased with economic growth during the last years of the ISI model and during the transition

[27] The AIC is a measure of the goodness of fit of an estimated statistical model. The AIC methodology finds the model that best explains the data with a minimum of parameters. It imposes a penalty for adding regressors to the model. In comparing two or more competing equations, regardless the number of regressors, the equation with the lowest value of AIC is preferred. Like AIC, the lower the value of SIC the better the model..

[28] If we compare a linear function with a quadratic function, the former is a restricted version of the later. Following the chi-square distribution with df equal to the number of restrictions imposed in the restricted regression, the null hypothesis of the LM test is "the restricted equation is adequate".

period towards an open economy; on the other hand, income distribution worsened over the consolidation period of market-oriented policies.[29]

7. Concluding remarks

Due to market-oriented reforms in Mexico since the mid-1980s, and on the basis of the SST we might expect a rise in the relative return to low-income, unskilled labour, or an increase in individual income in activities such as agriculture and labour-intensive manufacturing, and therefore a reduction of income inequality. However, in the post-liberalisation period skill premium and income differential between low and high income individuals expanded, and relative income in agriculture and manufacturing dropped. Furthermore, overall individual inequality increased, although there is some evidence that has tended to decline after 1998. To some extent, these trends undermine orthodox theory and provide room for contesting arguments.

The analysis finds various factors driving inequality between 1984 and 1998. We summarise this factors and how they correspond with contesting arguments as follows: An important reason for income dispersion is the fact that marginal returns to education increased, which is consistent with the *SETH*; the possible explanation of this trend is that demand for skill increased markedly, and faster than supply, whereas relative demand for unskilled individuals fell at a faster rate than supply. Note, however, that the hypothesis applies to tertiary education in particular. To a lesser extent, increase in returns to unobserved skills can also explain income dispersion.

In the service sector relative income increased, even after controlling for education and other personal characteristics, whereas relative employment and demand for skill also increased. This pattern contributes to explain income dispersion, since the wage gap between the service and the agricultural sectors expanded. In this sense, the evidence corresponds with the *rise of service* argument.

Following the Arbache et al. (2004) industry classification, we can consider the agricultural and the manufacturing sectors as the traded industry and the service sector as the non-traded industry. Controlling for education, age and gender (and unionisation when only labour income is considered), we observe that, in general, income in the traded sector

[29] By conducting a panel study across local states Ortega-Diaz (2001) found that as the Mexican economy becomes more open the relationship between income inequality and economic growth has changed towards a positively related one, which is in keeping with our results. However, she argues that the positive relationship is presented since the NAFTA period, in other words, since 1994. It should be added that she applies a Gini coefficient constructed from a municipality data base (SIMBAD) and not the EHII indicator.

fell following liberalisation, and this is consistent with the view that market-oriented reforms increased the degree of competition and therefore reduced rents. Income also dropped in the non-traded industry, indicating either a degree of spill-over, or the effect of other reforms such as privatisation or deregulation.[30] However, the relevant finding is that income in the traded sector fell in relative terms, which is another reason of income dispersion.

The analysis of union premium indicates that changes in the wage gap between union and non-union workers can not contribute to explain an increase in income dispersion, as the gap decreases in the post-liberalisation period once we allow for education and other personal characteristics. Nevertheless, the fact that a large number of workers moved away from unions and entered a non-union sector, characterised by diverse and flexible wages and higher Gini coefficient, represents a source of inequality (Cortez 2001, 1915).

Restricted access of agricultural workers to unions, relative income fall in the agricultural sector, and faster income fall in the bottom deciles indicate that low income sectors have fallen into a disadvantaged position; in addition, lower unionisation rates and decreasing wages reflect less bargaining power of labour. On the other hand, a substantial relative income increase in the top decile and evidence of capital concentration suggest that balance of power has shifted in favour of the wealthiest. This trend widens income dispersion and is consistent with the argument of *imbalance in capital-labour relations*.

The rise in income Gini coefficient reversed between 1998 and 2002 and so did the income gap between upper and lower deciles. The factors that can explain this variation are summarised as follows. The upturn in skill premium started to reverse around 1994. The main reason for this is that the increase in supply of skilled individuals accelerated, whereas the increase in skill demand slowed down; on the other hand, demand for unskilled individuals continued to fall but at a lower pace, and the fall in supply speeded up in relative terms. We also find that during the last period, returns to unobserved skills reversed. Moreover, individuals in the lower income levels reacted and accelerated movements towards higher income sectors. Finally, around 1998 the wage gap between union and non-union workers peaked and fell afterwards and the fall in the unionisation rate stopped and reversed slightly.

The evidence is in keeping with the argument of *temporary adverse effects* to the extent that over the longer-term, individuals react by achieving higher educational

[30] Arbache et al. (2004) reached similar conclusions for the case of Brazil

attainment or increasing movements toward higher income activities; in addition, transition and adjustment in institutional factors such as unions seem to come to an end, or at least changes are less marked; and finally, the increase in relative skill demand slows down. On the other hand, adverse effects do not stop in other areas; for instance the agricultural sector.

The panel data analysis confirms that lower unionisation rates are associated with higher inequality and it can be argued that market openness increases inequality if we consider unionisation rates as a proxy of market liberalism. Inflows of foreign investment can improve income distribution when it is channelled into labour-intensive manufacturing industries, and to some extent this finding is in keeping with orthodox assumptions. Socio-political norms can reduce inequality, which is consistent with the *PWC*. In this sense, human capital formation, represented by years of schooling, can reduce inequality; however, this is likely to happen at higher average levels of education. For this study, the turning point is at 6.7 years of schooling. The re-empowerment of the state, represented by per capita government expenditure, improves distribution, although this is likely to happen through decentralised expenditure, in other words, through local government expenditure.

The time series analysis shows that as the Mexican economy became more open, the relationship between growth and inequality changed from being a negative relationship towards being a positive one. Indeed, inequality started to worsen with growth since 1989 and the trend expanded up to 1998, which is the period of consolidation of market-oriented strategies. This patter undermines orthodox predictions. Nevertheless, it is worth extending the analysis over time as there is evidence that Ginis have fallen after 1998 and economic growth has increased in recent years, and therefore we might expect a cyclical pattern and further support for the *temporary adverse effects* argument.

From the study we can identify two main adverse factors that persist over time and these are capital accumulation since the late 1980s and deterioration of the agricultural sector. On the other hand, we identify two more factors that mitigate or reduce inequality; they are transfer income and the re-composition of households.

The study reveals that reactions of individuals such as shifting towards higher income sectors, achieving more years of schooling, or recomposing their households can help to reduce inequality. However, the results suggest that solutions for income inequality mainly rely on government action. Some of the main policies implied are as follows: Firstly, to increase expenditure in the form of transfers and to increase decentralised

public investment; secondly, to take strategic action to develop the agricultural sector, although we suggest that this does not need to involve subsidies; finally, to facilitate access to education, especially to the vulnerable and those at low income levels. Furthermore, the evidence implies that the boost of employment in unskilled, labour-intensive activities, combined with the reduction of supply of unskilled individuals by increasing educational levels can encourage factor price equalisation. However, heavy reliance on low-wage employment is not a desirable long-term solution as it does not encourage domestic markets and sustained growth; in this context, gradual and strategic industrialisation can be a complementary strategy.

Finally, capital concentration can be reduced and redistribution encouraged by a policy of implementing progressive taxation at the highest income levels and by a policy of increasing the corporate and capital tax burden. However, the latter policy might discourage inflow of international investments; in this sense, supranational mechanisms to tax international capital might be required in order to avoid unfavourable positions and to implement redistributive mechanisms across borders.

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Appendix A.

Table A.1. Dimension of ENIGH

Number	1984	1989	1992	1994	1996	1998	2000	2002
Households	4,735	11,531	10,530	12,815	14,042	10,952	10,108	17,167
Individuals	23,985	57,289	50,862	60,353	64,916	48,110	42,535	72,602
Household members (avg)	5.07	4.97	4.83	4.71	4.62	4.39	4.21	4.23
Wage-earners	4,605	12,496	10,888	13,551	15,167	11,701	10,852	18,999

Table A.2. Gini coefficient within educational groups

Group	1984	1989	1994	1998	2002
Primary	0.492	0.532	0.548	0.583	0.502
Secondary	0.419	0.471	0.489	0.585	0.485
Tertiary	0.457	0.509	0.486	0.566	0.501

Table A.3. Income bill share per sector and level of education

	1984	1989	1994	1998	2002
Agriculture					
Primary	15.63	11.98	12.30	10.66	6.52
secondary	0.64	0.42	0.65	0.77	0.43
Tertiary	0.49	0.73	0.62	0.62	0.61
Manufacturing					
Primary	12.82	10.00	9.47	9.20	9.16
secondary	2.28	3.07	2.90	3.00	3.53
Tertiary	3.79	3.79	3.78	4.57	3.61
Services					
Primary	39.76	33.31	29.97	29.88	31.51
secondary	11.78	13.89	14.22	14.77	15.58
Tertiary	12.80	22.81	26.10	26.53	29.06

Table A.4. Income share per decile (percentage)

						Changes in income share %		
Decile	(1)1984	(2)1989	(3)1994	(4)1998	(5)2002	(6)98/84	(7)02/98	(8)02/84
1st	1.29	1.18	0.90	0.83	0.98	-35.80	18.65	-23.83
2nd	2.62	2.42	2.04	1.70	2.30	-34.97	34.70	-12.40
3rd	3.67	3.23	2.85	2.45	3.22	-33.40	31.64	-12.33
4th	4.73	4.05	3.63	3.15	4.08	-33.45	29.65	-13.72
5th	5.70	4.99	4.50	3.95	4.99	-30.70	26.32	-12.45
6th	6.86	6.16	5.59	5.02	6.05	-26.80	20.64	-11.70
7th	8.37	7.76	7.16	6.55	7.53	-21.73	15.02	-9.97
8th	10.65	10.16	9.76	9.03	9.93	-15.14	9.93	-6.71
9th	14.69	14.89	15.51	14.13	14.98	-3.82	6.06	2.01
10th	41.44	45.17	48.07	53.20	45.94	28.39	-13.66	10.85

Table A.5. Average real hourly income (2002 pesos) per decile

						Changes in average income %		
Decile	(1)1984	(2)1989	(3)1994	(4)1998	(5)2002	(6)98/84	(7)02/98	(8)02/84
1st	3.61	3.46	2.60	2.02	2.41	-44.15	19.38	-33.33
2nd	7.35	7.09	5.91	4.16	5.63	-43.42	35.53	-23.32
3rd	10.30	9.48	8.27	5.97	7.90	-42.06	32.44	-23.26
4th	13.25	11.86	10.53	7.67	10.01	-42.11	30.45	-24.48
5th	15.98	14.61	13.05	9.63	12.24	-39.71	27.10	-23.37
6th	19.22	18.06	16.22	12.24	14.86	-36.32	21.38	-22.71
7th	23.46	22.74	20.78	15.97	18.49	-31.90	15.72	-21.20
8th	29.85	29.77	28.32	22.04	24.38	-26.17	10.60	-18.34
9th	41.18	43.63	45.01	34.46	36.77	-16.32	6.71	-10.70
10th	115.99	132.11	139.36	130.08	113.01	12.14	-13.12	-2.57

Table A.6. Ratio of the tenth to the first decile

Ratio	1984	1989	1994	1998	2002
Income share	32.20	38.30	53.67	64.39	46.86
Average hourly wage	32.14	38.23	53.61	64.54	46.97

Table A.7. Educational attainment per quintile

						Average annual change in schooling years		
Quintile	(1)1984	(2)1989	(3)1994	(4)1998	(5)2002	(6)98-84	(7)02-98	(8)02-84
1st	3.50	4.43	4.07	5.13	4.90	0.12	-0.06	0.08
2nd	4.75	6.01	5.53	6.03	6.60	0.09	0.14	0.10
3rd	5.70	7.24	6.36	6.95	7.59	0.09	0.16	0.10
4th	7.20	8.29	7.58	8.19	8.78	0.07	0.15	0.09
5th	9.14	9.95	10.30	10.46	11.77	0.09	0.33	0.15

Table A.8. Employment composition per quintile

(hours weighted per economic sector, percentage)

						Change in sector share %		
	(1)1984	(2)1989	(3)1994	(4)1998	(5)2002	(6)98/84	(7)02/98	(8)02/84
1st								
Agriculture	44.64	43.69	44.33	42.14	35.63	-5.61	-15.44	-20.19
Manufacturing	9.53	12.14	11.07	10.80	13.18	13.37	22.00	38.32
Services	45.83	44.17	44.60	47.06	51.19	2.68	8.78	11.70
2nd								
Agriculture	27.27	20.54	24.56	22.88	14.53	-16.09	-36.49	-46.71
Manufacturing	16.74	22.41	19.42	18.60	19.53	11.08	5.02	16.66
Services	55.99	57.05	56.02	58.52	65.93	4.53	12.67	17.77
3rd								
Agriculture	14.91	13.97	15.23	13.48	7.60	-9.56	-43.66	-49.05
Manufacturing	25.13	21.03	21.95	22.32	24.18	-11.17	8.35	-3.75
Services	59.96	64.99	62.82	64.19	68.22	7.06	6.27	13.77
4th								
Agriculture	11.85	9.84	12.13	7.81	4.41	-34.06	-43.55	-62.77
Manufacturing	20.36	19.31	17.95	21.47	19.10	5.48	-11.08	-6.20
Services	67.79	70.85	69.93	70.71	76.49	4.30	8.17	12.83
5th								
Agriculture	11.93	10.64	10.89	9.13	5.07	-23.47	-44.49	-57.51
Manufacturing	18.68	16.51	14.03	14.91	12.99	-20.15	-12.92	-30.47
Services	69.39	72.85	75.08	75.95	81.94	9.46	7.89	18.09

Table A.9. Composition of unionised and non-unionised employment per economic sector (hours weighted)

	1984	1989	1994	1998	2002
Union					
Agriculture	2.43	4.57	1.23	0.52	0.85
Manufacturing	27.83	23.65	26.21	27.08	23.58
Services	69.74	71.77	72.56	72.40	75.58
Non-union					
Agriculture	19.69	18.98	19.83	16.16	11.94
Manufacturing	19.48	20.16	17.95	20.23	19.30
Services	60.83	60.87	62.21	63.61	68.76
Overall					
Agriculture	15.70	15.57	16.77	13.97	10.29
Manufacturing	21.41	21.03	19.31	21.19	19.94
Services	62.89	63.40	63.92	64.84	69.77

Tables A.10. Performance of sectors (labour income), transformed parameters in percentages

	(1)		(2)	
Table A.10A	Pre-lib	Post-lib	Pre-lib	Post-lib
Services		-14.06		-19.98
Agriculture	-50.80	-61.28	-42.61	-55.27
Manufacture	6.37	-22.59	11.02	-16.07
Age-earnings profile peak			45	
Female			-29.14	
Union			32.80	
Secondary education			54.12	
Tertiary education			153.82	
Fall post-liberalisation				
Services		-14.06		-19.98
Agriculture		-21.31		-22.06
Manufacture		-27.22		-24.40
Wage gap relative to service				
Agriculture	-50.80	-54.95	-42.61	-44.10
Manufacture	6.37	-9.92	11.02	4.89

	(3) 84,89		(4) 84,94		(5) 84,98		(6) 84,02	
Table A.10B	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib
Services		-10.71		-8.73		-31.30		-24.02
Agriculture	-44.73	-49.47	-41.52	-50.07	-40.70	-58.40	-42.44	-61.80
Manufacture	10.89	-5.74	12.36	-8.14	11.52	-26.49	10.41	-19.90
Age-earnings profile peak	45		46		45		45	
Female	-27.68		-29.15		-28.79		-27.96	
Union	20.29		30.12		41.84		38.58	
Secondary education	52.25		65.30		60.43		48.31	
Tertiary education	115.92		184.22		168.60		138.22	
Fall post-liberalisation								
Services		-10.71		-8.73		-31.30		-24.02
Agriculture		-8.58		-14.62		-29.85		-33.64
Manufacture		-14.99		-18.25		-34.09		-27.45
Wage gap relative to service								
Agriculture	-44.73	-43.41	-41.52	-45.29	-40.70	-39.45	-42.44	-49.73
Manufacture	10.89	5.57	12.36	0.65	11.52	6.99	10.41	5.43

Notes: Figures computed as (exp(β) -1)*100, where β is the corresponding coefficient.

After liberalisation the wage gap of the agricultural and manufacturing sectors relative to the service sector is computed as (exp(β1- β2)-1)*100, where β1 is the coefficient of the corresponding sector and β2 is the coefficient of the service sector post-liberalisation.

Fall post-liberalisation is computed as (exp(β3-β4)-1)*100, where β3 and β4 are the coefficients of the corresponding sector post- and pre- liberalisation respectively.

Age-earnings profile peak in number of years.

Table A.11. Skill premium (labour income), transformed parameters in percentages

	(1)		(2) 84,89		(3) 84,94		(4) 84,98		(5) 84,02	
	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib
Fall post-liberalisation by level of education										
Primary		-21.78		-9.30		-14.80		-33.41		-26.48
Secondary		-26.09		-19.21		-13.69		-34.12		-31.46
Tertiary		-8.58		-12.80		15.24		-13.06		-16.45
Marginal returns to education										
Secondary vs primary	62.60	53.64	66.21	48.06	63.93	66.07	62.12	60.40	57.62	46.95
Tertiary vs secondary	34.74	66.65	33.85	44.46	33.89	78.76	34.89	78.01	35.66	65.36
Tertiary vs primary	119.10	156.06	122.47	113.90	119.48	196.85	118.68	185.53	113.83	143.01

Notes: Fall post-liberalisation is computed as (exp($\beta 1$-$\beta 2$)-1)*100, where $\beta 1$ and $\beta 2$ are the coefficients of the corresponding educational level post- and pre- liberalisation respectively.

Marginal returns to education comparing two levels of education can be obtained as (exp(β_{upper} - β_{lower})-1)*100, where β_{upper} and β_{lower} are the coefficients on the educational level dummy variable for the upper and lower level respectively for a specific period.

Table A.12. Unionisation and wages (labour income), transformed parameters in percentages

	(1)		(2)	
Table A.12A	Pre-lib	Post-lib	Pre-lib	Post-lib
Non-Union		-15.93		-20.25
Union	82.63	61.08	39.29	5.40
Fall post-liberalisation				
Non-Union		-15.93		-20.25
Union		-11.80		-24.33
Wage gap				
Union vs non-union	82.63	91.60	39.29	32.16

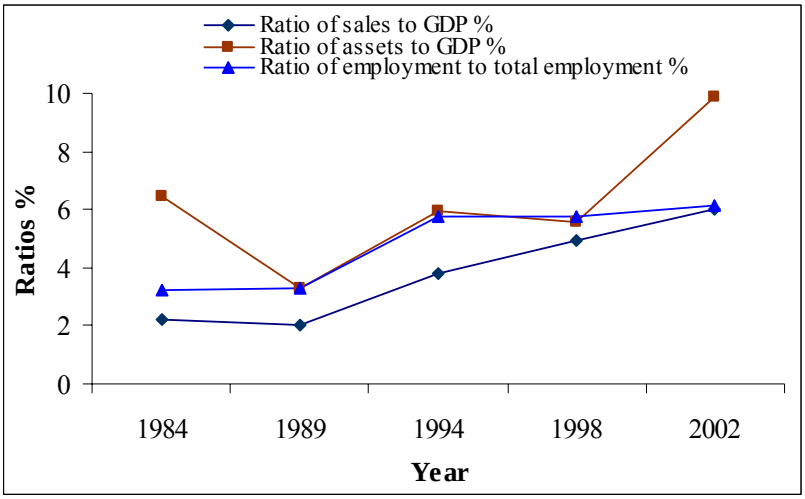
	(3) 84,89		(4) 84,94		(5) 84,98		(6) 84,02	
Table A.12B	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib	Pre-lib	Post-lib
Non-Union		-6.57		-10.41		-32.09		-26.23
Union	40.48	6.38	36.18	14.30	39.17	-2.53	38.57	1.97
Fall post-liberalisation								
Non-Union		-6.57		-10.41		-32.09		-26.23
Union		-24.27		-16.07		-29.96		-26.41
Wage gap								
Union vs non-union	40.48	13.87	36.18	27.57	39.17	43.53	38.57	38.24

Notes: Figures computed as (exp(β) -1)*100, where β is the corresponding coefficient.

Wage advantage of union workers is computed as (exp($\beta 1$-$\beta 2$)-1)*100, where $\beta 1$ and $\beta 2$ are the union and non-union coefficients respectively for a specific period

Fall post-liberalisation is computed as (exp($\beta 3$-$\beta 4$)-1)*100, where $\beta 3$ and $\beta 4$ are the coefficients of the corresponding union status post- and pre- liberalisation respectively

Figure A.1. Selected ratios of the top twenty five conglomerates



Appendix B

Calculation of the Gini coefficient and its decomposition by population class and income source using the Yao (1999) methodology

Yao (1999) presents a simple and exact formula and develops a systematic procedure for deriving and decomposing Gini coefficients by population class and income source in a spreadsheet. The same procedures can be translated into a more sophisticated computer package to increase computational efficiency.

B.1. A formula for the Gini coefficient. The Gini coefficient of the whole population can be defined by Equation (1).

$$G = 1 - \sum_{i=1}^{n} p_i \left(2 \sum_{k=1}^{i} w_i - w_i \right) \qquad (1)$$

Let w_i, m_i and p_i represent, respectively, the income share, per capita mean income and relative population frequency of the ith group (i = 1,2,…,n). Before Equation (1) is used, p_i and w_i must be so arranged that they strictly follow the ascending order of per capita income (m_i). Although the m_is do not enter Equation (1), the order of w_i and p_i are determined by m_i. In addition, w_i is calculated from m_i and p_i with the relationship $w_i = p_i m_i / u$, where u is average per capita income of the total population.

B.2. Decomposition of the Gini coefficient by population class. Let G denote the Gini coefficient for the entire population. It can be decomposed into three components as shown in Equation (2).

$$G = G_A + G_B + G_0 \tag{2}$$

Where G_A is the intra-class component, G_B is the inter-class component and G_0 is the overlapped component. The decomposition procedure to derive the four elements in Equation (2) is described by the following four steps.

Step 1: Use Equation (1) to derive G

Step 2: G_B can be derived from Equation (3), which looks similar to Equation (1).

$$G_B = 1 - \sum_{I=1}^{S} p_I \left(2\sum_{K=1}^{I} w_K - w_I \right) \tag{3}$$

Where S denotes the number of population classes, p_I and w_I the population and income share of the I^{th} class ($I = 1,2,\ldots,S$) in the population. To derive G_B, all the elements in Equation (3) must be sorted in ascending order of class mean incomes m_I, such that $m_1 \leq m_2 \leq \ldots \leq m_S$.

Step 3: G_A can be derived from Equation (4).

$$G_A = \sum_{I=1}^{S} w_I p_I G_I \tag{4}$$

As defined above, w_i and p_i are respectively the income and population shares of class I in the total population. G_I is the Gini coefficient for the I^{th} sub-population. There are S Gini coefficients for S classes. The Equation for G_I focuses on a particular sub-population.

Step 4: $G_0 = G - G_A - G_B$ (5)

Equation (2) distinguishes the net contribution of the inequality between subpopulations G_B, issued from the non-overlap part between the distributions, and the transvariation between subpopulations G_0, derived from the overlap part between the distributions. Nevertheless, Equation (2) can be reduced to two elements as follows:

$$G = G_A + G_{GB} \tag{6}$$

where G_{GB} is the sum of G_B plus G_0 and is the gross contribution of the inequalities between subpopulations (Mussard 2003). In section 3.1 we only present two elements of the Gini coefficient, the intra-class component G_A and the gross contribution of the inequalities between subpopulation G_{GB}, as in Equation (6).

B.3. Decomposition of the Gini coefficient by income source. If per capita income of the I^{th} household or group, m_i (i = 1,2,…,n), is divided into F income sources, G in Equation (1) can be decomposed into F components. Let G_f be the Gini coefficient of source income f (f = 1,2,…,F), C_f the concentration ratio of source f, u_f and u respectively the means of source income f and total income, $w_f = u_f/u$ the share of source income f in total income, then G_f or C_f can be defined by Equation (7) with different ordering criteria:

$$C_f = 1 - \sum_{i=1}^{n} p_i (2 \sum_{k=i}^{i} w_{fk} - w_{fi}) \tag{7}$$

where p_i is the population share of the i^{th} household in total population, $w_{fi} = p_i m_{fi}/u_f$ is the income share of the i^{th} household in total source income f. In Equation (7) p_is and w_is must be sorted in ascending order of per capita total income m_i, such that $m_1 \leq m_2 \leq \ldots \leq m_n$, in order to derive C_f. To calculate the Gini coefficients of per capita source incomes, denoted by G_f for all f, all the elements in Equation (7) have to be sorted in ascending order of per capita factor incomes, denoted by m_{fi}. With C_fs, G can be decomposed into its source components in Equation (8).

$$G = \sum_{f=1}^{F} w_f C_f \tag{8}$$

Where F is the number of factor incomes and w_f the share of source f in total income. In other words, the Gini coefficient that measures total income inequality is the weighted average of the concentration coefficients of all source incomes. As mentioned earlier, both G_f and C_f are calculated with the same formula and elements. If the ordering of m_{fi} (per capita source income) is exactly the same as that of m_i (per capita total income) then $C_f = G_f$.