Inequality in Mexico

Labour markets and fiscal redistribution 1989–2014

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Abstract: Income inequality in Mexico increased between 1989 and 1994; between 1994 and 2006, inequality declined; and, between 2006 and 2014, inequality was again on the rise. We apply decomposition techniques to analyse the proximate determinants of labour income inequality and fiscal incidence analysis to estimate the first-order effects of taxes and social spending on the distribution of income. The key component that underlies the 'rise-decline-rise again' pattern was the evolution of returns to skills. In addition, while changes in fiscal policy in the 1990s were progressive and pro-poor, the redistributive effect has declined significantly since 2010, as transfers have become less progressive and net indirect taxes have increased.

Keywords: labour income, inequality, top incomes, poverty, fiscal redistribution, Mexico
JEL classification: D30, H39, I30, J20, J31, O54

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1   Introduction

Mexico is an upper middle-income country with a Gini coefficient hovering around 0.5, which places it in the group of high inequality countries. Since the mid-1980s, Mexico has opened up to international trade and, with the rise of computers and digitalization, has experienced changes in production technology. In addition, its labour force has become considerably more educated: the proportion of individuals with primary levels of education or less declined from 67 per cent in 1990 to 33 per cent in 2015 and the share of individuals with a college education more than doubled between 1990 and 2015, when it reached around 15 per cent. The last thirty years have also been marked by a significant increase in social spending and a retooling of social programmes. All these changes have affected the demand and supply of labour and the extent to which the state has engaged in fiscal redistribution. What has been the evolution of income inequality during this momentous period? To what extent have market forces and fiscal policy contributed to the observed trends?

After discussing the evolution of income inequality and its components, in this paper we focus on two main drivers of overall inequality: labour markets and fiscal redistribution. In particular, we apply state-of-the-art decomposition techniques to analyse the proximate determinants of labour income inequality, and we apply fiscal incidence analysis to estimate the first-order effects of changes in social spending and taxation on the distribution of income and poverty. This paper can be viewed as a sequel to Esquivel et al. (2010) and Campos-Vazquez et al. (2014). The former studied the dynamics of income inequality in Mexico up until 2006 and the latter until 2010.

Using results from Mexico's National Survey on Households' Income and Expenditures (ENIGH, by its Spanish acronym), Section 2 presents the evolution in overall income inequality from the late 1980s until 2014.[1] The evolution of income inequality during this period can be summarized as follows: between 1989 and 1994, inequality increased; between 1994 and 2006, inequality declined; and, between 2006 and 2014, inequality was again on the rise. Section 2 also identifies the influence of the main income components (labour income, capital income and pensions, transfers, and remittances) on the evolution of inequality. As will be seen below, the key component that underlies the 'rise-decline-rise again' pattern was the evolution of labour income inequality. Thus, Section 3 focuses on the role of demand, supply, and institutional factors in accounting for the evolution of labour income inequality. Lastly, the decomposition exercise in Section 2 also shows that transfers were not only an equalizing force but were increasingly so. Hence, Section 4 analyses the evolution of fiscal redistribution with a focus on transfers and other relevant characteristics of the fiscal system. Section 5 concludes.

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[1] Household surveys and their respective documentation are available in INEGI (1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014). Although a household survey for 2016 exists, unfortunately, due to drastic methodological changes undertaken by the National Statistical Institute (or INEGI, by its Spanish acronym) the results would not be comparable.

2 The level and evolution of income inequality and poverty: 1989–2014

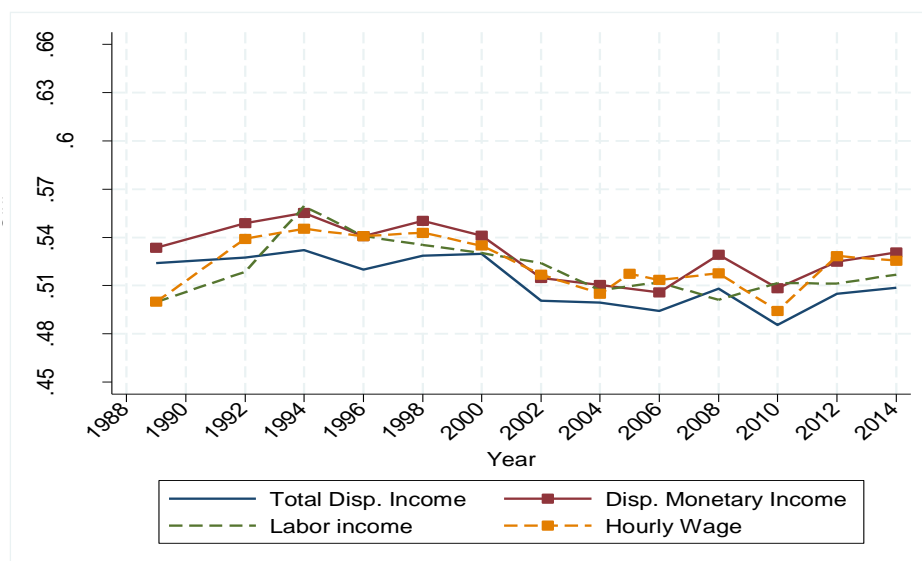### 2.1 Inequality: trends and proximate determinants

As shown in Figure 1, income inequality increased between the late 1980s and mid-1990s and then declined until about 2006. Since then, there appears to have been an upward trend. More precisely, the Gini coefficient for per capita disposable monetary income[2] rose from 0.534 to 0.555 between 1989 and 1994 and declined to 0.506 in 2006.[3] It then rose to 0.531 in 2014.[4] It is worth noting that during the 1989–2014 period, average incomes sometimes rose and sometimes fell, depending on the overall growth performance of the economy. Average incomes fell sharply in 1995 as a result of Mexico's financial crisis. However, from 1996, average incomes recovered at the same time that inequality fell. This auspicious situation came to a halt after 2008, when Mexico suffered the consequences of the Great Recession. Between 2008 and 2014, average incomes fell, and inequality experienced an upward trend.

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[2] As in Campos-Vazquez et al. (2014), 'income' here includes labour income and non-labour income. The former includes all the income that is reported as labour income in ENIGH, including labour income from self-employment. Non-labour income includes income from own businesses, income from assets (including capital gains), pensions (public and private), public transfers (*Oportunidades* and *Procampo*), and private transfers (e.g. remittances) as well as—when indicated—'non-monetary income' (imputed rent on owner-occupied housing and consumption of own production, common in poor rural areas). The surveys capture income net of taxes and contributions to social security and include government and private transfers (remittances). Current disposable monetary income, the concept used in the decomposition of inequality by source presented here, does not include non-monetary income and consumption of own production (common in poor rural areas) and excludes capital gains.

[3] As in Campos-Vazquez et al. (2014) and for the reasons explained there, in this study we use the Gini coefficient as our preferred measure of inequality. We rely on the property that the Gini coefficient is decomposable—albeit not additively decomposable—by proximate determinants and income sources.

[4] For the analysis of trends in overall inequality, labour income inequality, and fiscal redistribution, we use the National Survey of Household Incomes and Expenditures (in Spanish, *Encuesta Nacional de Ingresos y Gastos de los Hogares*, ENIGH) (INEGI 1989, 1992, 1994, 1996, 2000, 2006, 2008, 2010, 2012 and 2014). Although the 1989 survey is not entirely comparable with the subsequent surveys, we use it to present results related to the factors behind the rise in inequality between 1989 and 1994.
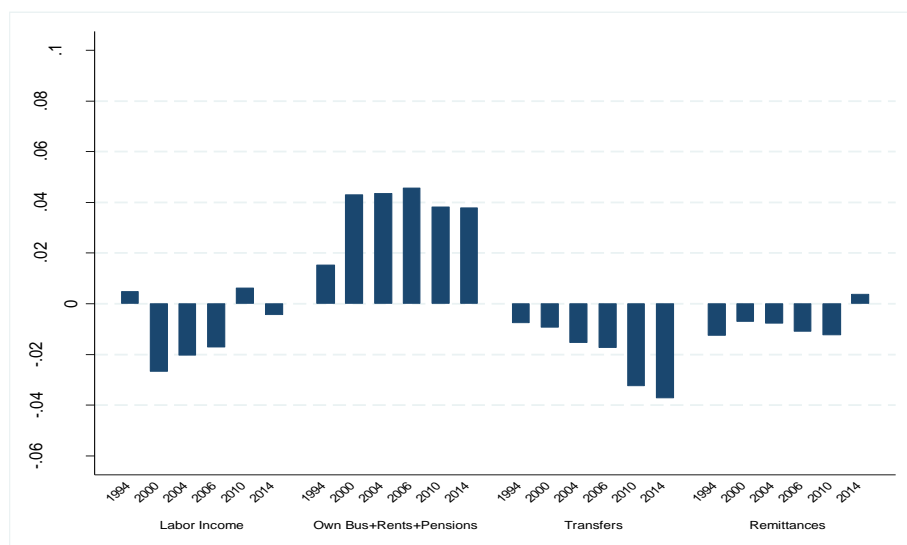
Figure 1: Gini coefficient, 1989–2014

Note: Total disposable income, disposable monetary income[5] and labour income are in per capita terms and include all members of the household regardless of age. Hourly wage is restricted to individuals aged18–65 years. Labour income refers to the income obtained from main job and includes own business' income for the self-employed. Households where head reported zero income were excluded.

Source: Authors' calculations based on the National Survey of Household Incomes and Expenditures (INEGI 1989, 1992, 1994, 1996, 1998, 2000, 2004, 2006, 2008, 2010, 2012, 2014).

How have income sources affected the evolution of income inequality over time? Applying the method developed by Stark et al. (1986), we can quantify the relative contribution of a small change in each main income source to the overall Gini. The pattern is shown in Figure 2. Income from own businesses (profits), property (rents), and pensions combined were an unequalizing income source throughout the period; the unequalizing effect rose from 2000 and remained at this higher level until the last data point in 2014. Government transfers (transfers, henceforth), in contrast, were equalizing throughout and the effect grew systematically over time. In fact, transfers became the income source with the highest marginal effect: i.e. a small increase in transfers would reduce inequality by more than the same marginal increase in other equalizing sources. Labour income was unequalizing during the period of rising overall income inequality (1989–94) and equalizing, but at a decreasing rate, during the period of declining inequality up to 2006. In 2010, labour income became slightly unequalizing and slightly equalizing in 2014. Remittances exercised an equalizing effect throughout almost the entire period except in 2014 when they became slightly unequalizing. The causes of this surprising change in the effect from remittances are not clear. This is an area for further research.

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[5] The difference between disposable income and disposable monetary income is that the latter does not include imputed rent for owner-occupied housing or consumption of own production. The Gini coefficient for disposable income is lower by 2 to 3 Gini points. In the section on fiscal redistribution we use disposable income and that is why the Ginis are lower than those presented here.

Figure 2: Decomposition of the Gini coefficient, marginal effect of main income sources

Note: Households where head reported zero income were excluded.

Source: Authors' calculations using Stark et al. (1986) formula based on ENIGH (INEGI 1994, 2000, 2004, 2006, 2010, 2014).

2.2 Top incomes: survey-based and administrative data

Our microdata-based analysis in this paper uses the National Survey on Households Income and Expenditures (ENIGH). However, household surveys suffer from serious under-reporting and under-coverage especially for incomes at the top that can yield biased inequality indicators. People at the top may be difficult to reach due to statistical and sampling issues; if rich people are a small group, then the likelihood of them being captured by the survey is also small. Moreover, even if captured in the sampling process, rich people may be more reluctant than the average individual to answer the full questionnaire, and this may be particularly the case for questions about income.

One common approach for addressing these limitations is to correct the information in household surveys using administrative data and generate a new distribution and concomitant indicators.[6] Alvaredo et al. (2017) combined data from ENIGH with the universe of personal income taxpayers, obtained from the Mexican Tax Administration Service (roughly 2–2.5 million tax payers per year), and the universe of employer-reported information on wages for formal workers. The latter contains information on gross, taxable, and net labour income for about 20–25 million workers per year.

After a thorough examination and comparison of the two sources of administrative data, Alvaredo et al. (2017) proceeded to integrate them into a single administrative dataset. After matching the data for informal workers using two different definitions of informality (one more restrictive than the other), the authors proceeded to 'merge' the administrative database with the survey and apply different correction methods to address under-reporting and under-coverage. In one method, the authors constructed centiles of the wage distribution of formal workers from ENIGH and estimated average wages by centile. They then constructed centiles and estimated the average wages by centile with the administrative data and identified the point for which the difference between

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[6] See Lustig (2018a) for a survey of the issues and correction methods proposed in the literature.

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the average wages by centile was minimal. The next step consisted of rescaling the averages for all centiles above that threshold based on the ratio between the average wages from the two sources. The authors also tried replacing the observations above the threshold with the administrative data directly. For informal workers, they tried two alternatives: make no adjustments or rescale using the same bounds and scaling factors as those for formal workers.

To generate a new total income distribution, Alvaredo et al. (2017) explored three correction methods: 1) a rescaling method for total income analogous to the one described above for formal workers; 2) a reweighting of individuals from the survey to make room for adding the 1 million richest individuals from administrative data; and 3) applying the first rescaling and then reweighting to make room for adding the 1 million richest individuals from the administrative database.

If these correction methods were a better approximation of the true distribution, Alvaredo et al.'s (2017) results indicate that that survey-based top shares are substantially underestimated. For example, in 2010, the survey-based income share of the top ten per cent equalled 47.6 per cent. With correction methods 1, 2, and 3 described above, the share equalled 58.6, 57.5, and 64.7 per cent, respectively. Unsurprisingly, rescaling survey-based income and adding 1 million of the richest individuals from administraive data, results in the largest increase in the share of the top 10 per cent: 17 percentage points (Table 1). It is also important to mention that Alvaredo et al. (2017) find that even after adjusting the survey using different alternatives, the sum of total income that results is still substantially lower than that reported by the National Accounts.

Table 1: Top income shares

	Top shares					
	10%	5%	1%	0.5%	0.1%	0.01%
Year 2010						
Baseline	47.60	33.56	14.35	9.80	3.99	0.87
Alt 1.	58.60	46.55	24.54	18.23	9.57	4.44
Alt 2.	57.46	45.15	23.63	17.84	7.89	1.73
Alt 3.	64.68	52.99	28.21	21.45	10.42	3.97
Year 2012						
Baseline	46.41	32.71	13.98	9.69	4.26	1.27
Alt 1.	58.63	47.28	26.13	19.74	10.81	5.25
Alt 2.	59.14	46.32	24.32	18.49	8.64	2.58
Alt 3.	66.03	54.05	29.19	22.35	11.42	4.90

Notes: Baseline refers to the ENIGH without introducing any modification. Alt 1. applies the scaling factor; Alt 2. re-weights the whole sample and adds one million observations from administrative data; Alt 3. combines both adjustments.

Source: Estimates by Alvaredo et al. (2017) based on Mexican Tax Administration Service (SAT) data, employer-reported information on wages from the *Declaraci´on Informativa Mu´ltiple (DIM)* and MCS-ENIGH.

There is no formal way to test which correction method approximates the true distribution, so the above results must be viewed with caution. In addition, given that these corrected results are available for only two points (2010 and 2012), it is not possible to assess how the evolution of inequality described at the beginning of this section may change when survey data are combined with tax registries for now. This is an area for further research.

2.3 Poverty

Although the task of this paper does not include the analysis of poverty, the persistence of extreme poverty throughout the period analysed is remarkable. The incidence of extreme poverty in 2014 (20.6 per cent) was similar to the level observed in 1994 (21.2 per cent), and only slightly lower than in 1984 (23.5—not shown) (Figure 3). The persistence of extreme poverty is all the more remarkable given the expansion of programmes targeted at the poor, a topic that will be discussed in the section on fiscal redistribution. Not everything is bad news though. Child malnutrition in rural areas, for example, declined. Stunting fell from 43 to 21 per cent between 1988 and 2012. The acceleration of the improvement took place after the mid-1990s, which is consistent with the switch from urban and general food subsidies to cash transfers and subsidies targeted at the rural poor.

Figure 3: Extreme poverty (disposable income), 1989–2014

Source: Scott et al. (2017).

Social spending in Mexico grew from 5.5 per cent of gross domestic product (GDP) in 1990 to 12.4 per cent in 2015. Part of this expansion financed human capital transfers to the poor through increased coverage of basic health and education services, and effectively targeted food and cash transfers, including the *PROGRESA* conditional cash transfers (CCT) programme. The expectation was that this strategy would reduce both (disposable and consumable) income poverty in the short run, as well as (market) income poverty in the long run. The strategy achieved significant reductions in gaps in access to education, health, and nutrition for poorer households, but, due in large part to mediocre economic growth, Mexico did not experience sustained declining trends in income poverty over this period.

3   The evolution and determinants of labour income inequality[7]

As observed in Figure 1 and Table 2, inequality of labour income per capita, labour income per worker, and the hourly wage increased from the late 1980s up to the mid-1990s and then declined up to the middle of the first decade of the twenty-first century. Since then and up to 2014, the data

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[7] Based on Campos-Vazquez and Lustig (2017).

suggest a slight upward trend. As shown in Figure 2, the evolution of labour income inequality is a key determinant of the evolution of overall inequality. Understanding the main drivers of labour income inequality is key to the understanding of the determinants of overall income inequality.

Table 2: Gini coefficient for labour income for all workers, 1989–2014 (ENIGH)

	ENIGH (Labour income)	
	Gini	Theil
1989	0.500	0.569
1992	0.541	0.669
1994	0.545	0.623
1996	0.539	0.640
1998	0.541	0.584
2000	0.534	0.578
2002	0.516	0.501
2004	0.504	0.502
2006	0.511	0.520
2008	0.516	0.582
2010	0.491	0.471
2012	0.526	0.556
2014	0.523	0.601

Note: Sample restricted to workers aged 20–64 years with positive labour income and working hours.

Source: Campos-Vazquez and Lustig (2017).

3.1 Labour income inequality: characteristics and returns

Labour income inequality is affected by two main factors: the distribution of (observable and unobservable) characteristics of workers (education, experience, gender, etc.) and the returns to those characteristics. Workers' characteristics, in turn, are affected by 'fate' (gender, race, talent, and so on), households' decisions (e.g. to enrol or not in post-secondary education, who marries whom, and so on), and policy (e.g. expanding access to education). Returns to households' characteristics depend on market forces (i.e. demand and supply of workers of different skills and experience) and institutional/policy factors (e.g. minimum wage policy and the unionization rate).

In order to separate the contribution of characteristics and returns, research on the proximate determinants of labour income inequality relies on decomposition techniques. Many decomposition procedures are employed in the literature.[8] Most are variations on the Oaxaca–Blinder decomposition.[9] In this paper, we follow the same approach. We employ the 're-cantered influence function' (RIF) procedure proposed by Firpo et al. (2009) to decompose effects into characteristics and returns effects.

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[8] See the review by Fortin et al. (2011).

[9] We can divide the decomposition into four groups: (i) reweighting procedures (DiNardo et al. 1996); (ii) residual-imputation procedures (Almeida dos Reis and Paes de Barros 1991; Juhn et al. 1993;, (iii) quantile decomposition procedures (Machado and Mata 2005); and (iv) RIF procedures (Firpo et al. 2009).

The RIF procedure is very similar to the typical Oaxaca–Blinder decomposition.[10] The main difference is that the dependent variable, Y, is replaced by the RIF.[11] Firpo et al. (2009) demonstrate that the RIF procedure is equivalent to a simple unconditional quantile regression. They show that $E[RIF(v,y)|X] = X\beta^v$, where the coefficient β^v represents the marginal effect of X on the dependent variable statistic v.[12] The main difference from the basic Oaxaca–Blinder decomposition is that, because of its statistical properties, the RIF approach allows you to decompose the contributions for the entire distribution rather than just having to use the mean. Moreover, the RIF approach has an advantage over other methods that permit decomposition for the entire distribution, in that it does not suffer from path dependency.[13]

As discussed in Campos-Vazquez and Lustig (2017), we start our analysis by calculating the difference in average labour income for each quantile between the initial and end years for every quantile in segments of 1 per cent (that is, from the 1st to the 99th percentile). Then we estimate the RIF regression for each quantile and the initial and end years. Once the parameters β^v are estimated, we proceed to apply the basic Oaxaca–Blinder decomposition for each quantile (1st– 99th percentile). That is, we calculate $\hat{v}(Y_t) - \hat{v}(Y_s) = \hat{\beta}_s^v(\bar{X}_t - \bar{X}_s) + \bar{X}_t(\hat{\beta}_t^v - \hat{\beta}_s^v)$, where t is the final year and s is the initial year.[14] Note that the $\bar{X}$ are for the entire sample, as in the traditional Oaxaca–Blinder. In our application, we set up the initial years as 1989, 1994, and 2006 and the final years as 1994, 2006, and 2014, respectively. The term $\hat{\beta}_s^v(\bar{X}_t - \bar{X}_s)$ refers to the characteristics effects, and the term $\bar{X}_t(\hat{\beta}_t^v - \hat{\beta}_s^v)$ refers to the return or price effects to observable characteristics included in X as well as unobservable ones (which is why this term is often referred to as the 'unexplained component'). We use as reference the wage distribution in the initial year (for each decomposition). With this information, we can decompose all the labour income growth incidence curves into two curves: the characteristics component and the returns component or relative returns.

Research shows that in Mexico changes in labour income inequality can be largely linked to changes in the relative wage between skilled and unskilled workers, that is, in the returns to skill. In particular, the rise in inequality during this period is associated with an increase in returns to schooling.[15] Applying the RIF method proposed by Firpo et al. (2009) and the Oaxaca–Blinder decomposition method, Campos-Vazquez et al. (2014) show that the increase in earnings inequality between 1989 and 1994 is primarily driven by a rise in the returns to characteristics

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[10] See Firpo et al. (2009) and Fortin et al. (2011) for more details of the RIF procedure.

[11] Define $RIF(v,y)$ as the re-centred influence function with distributional statistic of interest $v(F_y)$ and observed wage y. Then it can be shown that $RIF(v,y) = v(F_y) + IF(v,y)$, where IF denotes the influence function such that $\int RIF = v(F_y)$. For the case of quantiles, it can be shown that the influence function is equal to $(Q_\tau, Y) = \frac{\tau - 1\{Y \le Q_\tau\}}{f_Y(Q_\tau)}$. Each statistic $v(F_y)$ refers to a specific quantile in the distribution of Y or to the Gini coefficient or the variance.

[12] For example, if v represents quantile 0.50, then $\beta^{v=0.5}$ represents the effect of X on the wage quantile 0.50. It can also be applied to scalar indicators of inequality such as the Gini or the variance. In order to estimate the RIF regression, we first estimate the sample $\widehat{RIF}(v, y)$. In practice, we follow the ado file *rifreg* in Stata published by Fortin et al. (2011) and provided by N. Fortin online (see Fortin n.d.). The *RIF* dependent variable is estimated using kernel methods. We use the following explanatory variables: dummy variables of female, urban, and education categories and a cubic polynomial in age. We also estimate a more flexible model that included interactions among all variables, but the difference in explained and unexplained components was minimal.
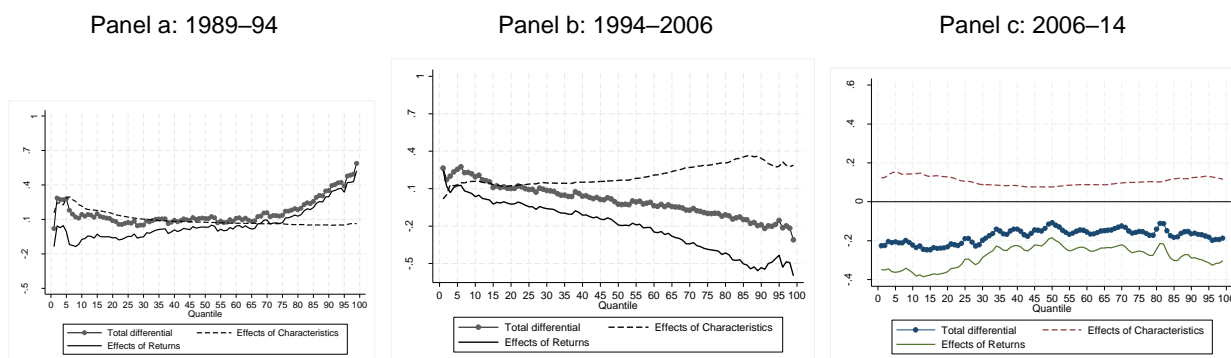
[13] For a discussion and application of such methods and their limitations see, for example, Bourguignon et al. (2005).

[14] See equation 35 in Fortin et al. (2011).

[15] This result was found in many other studies, including Bouillon et al. (1999), Meza González (1999), Bouillon (2000a, 2000b), Lopez-Acevedo (2004, 2006), Popli (2011), and Campos-Vazquez et al. (2014).

(schooling and experience), as shown by the upward sloping curve in Figure 4, Panel a. The distribution of characteristics remains almost flat. In other words, had relative returns remained at the 1989 level, inequality would not have increased.

Figure 4. Decomposition of differences in the distribution of earnings: 1989–2014

Panel a: 1989–94	Panel b: 1994–2006	Panel c: 2006–14

Notes: Calculations using ENIGH. RIF decomposition method proposed by Firpo et al. (2009), which decomposes the change in the monthly wage in characteristics and returns. Smoothed lines with a simple moving average with weights 0.4 for the current observation and 0.3 for the lead and lag. Total differential is the total change in hourly wages (in logs); effects of characteristics (education and experience) and effects of returns are the portions that can be ascribed to changes in characteristics and returns, respectively.

Source: Panels a and b: Campos-Vazquez et al. (2014: Figure 7.4). Panel c: Campos-Vazquez and Lustig (2017).

From the mid-1990s up to the mid-2000s, labour income inequality steadily declined (Figure 1).[16] Applying the RIF method, Campos-Vazquez et al. (2014) show that the decline in earnings inequality between 1994 and 2006 is primarily driven by a fall in the returns to characteristics (schooling and experience), as shown by the downward curve in Figure 4 Panel b. The effect of changes in the distribution of characteristics (education, experience, female, and urban) was, in contrast, unequalizing, as shown by the upward curve for the effect of characteristics. If returns had remained unchanged in this period, the change in characteristics in the population would have resulted in higher levels of inequality. The effect of returns to those characteristics contributed to equalizing the labour income distribution by such an amount that they compensated for the inequality-increasing effects induced by characteristics. The puzzle is why changes in characteristics were unequalizing during a period in which, for example, there was substantial educational upgrading and the distribution of years of schooling became more equal. This seemingly contradictory result was first noted by Bourguignon et al. (2005), who called it the 'paradox of progress'. These authors show that this puzzling result is the mathematical consequence of the convexity in (i.e. increasing) returns to skill.[17]

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[16] It is not only the Gini coefficient and other summary indicators for hourly wages and labour income that decline; firm data, for instance, show a decline in the relative wage of white- over blue-collar workers (Esquivel 2011).

[17] As explained by Campos-Vazquez et al. (2014): 'Although there was significant educational upgrading and the distribution of the stock of education became more equal over the entire period under study, whether this change was equalizing or unequalizing depends on the extent of convexity in the returns to education and at what point of the education equalization process the country found itself. Bourguignon et al. (2005) were among the first to notice that a reduction in the inequality of education—in the presence of increasing returns to education—could lead to a rise in earnings inequality. They call this result the 'paradox of progress' alluding to the fact that a more equal stock of education can be inequality-increasing (at least during part of the educational upgrading process) if the returns to education increase at an increasing rate with the level of attainment (convexity in the returns). As Gasparini et al. (2011) write, the 'paradox of progress' has been quite a pervasive phenomenon in Latin American labour markets in

From 2006 to 2014, labour income inequality shows an upward trend. Figure 4 Panel c shows that the characteristics effect is no longer unequalizing but is flat. The returns effect is somewhat unequalizing because it is negative, especially for the lower centiles. Note that all wages fall but the decline is a bit more pronounced for the bottom of the distribution. Thus, the increase in labour income inequality during this period appears to be driven by a worsening situation for those at the bottom of the distribution rather than an improvement for those at the top, whose incomes also appear to fall slightly more than the group in the middle.

3.2 Relative wages: demand, supply, and institutions

In the previous section we showed that an important determinant of the evolution of labour income inequality is the evolution of relative returns to characteristics, that is, the relative wages for workers of different skills (with skills measured by years of education and experience). Relative wages, in turn, are affected by market forces—demand and supply of workers of different skills—and by institutional factors such as the minimum wage and unionization rate. In order to examine the effect of supply and demand on relative wages, we follow the Bound and Johnson (1992) method.[18]

Assuming a simple CES (constant elasticity of substitution) production function with elasticity of substitution, σ, constant across skills, it is possible to determine the effect of supply and demand on relative wages:[19]

$$\Delta\%\left(\frac{\overline{w}^c}{\overline{w}^s}\right) = \frac{1}{\sigma}\Delta\%(Demand) - \frac{1}{\sigma}\Delta\%(Supply) + \xi$$

The residual term ξ contains the effect of skill-biased technical change and institutional factors such as the minimum wage and unionization rate (sometimes called non-competitive factors).

Changes in demand could come from changes in trade patterns or developments in technology, for example. However, they are unobserved. Data show only labour supply (by years of education and experience) but not real labour demand. Researchers then traditionally use the difference between the change in relative wages or returns and relative supply as an approximation to changes in demand and institutional factors, such as changes in the unionization rate and the value of the real minimum wage as well as technical change (where institutional factors and technical change are captured by the residual). If institutional factors remain unchanged during the period of analysis, the difference can be considered an approximation of changes in relative demand and technical change.

What was the evolution of labour supply during the period of analysis? As shown in Figure 5, relative supply of workers with college and high school education vis-à-vis the rest increased
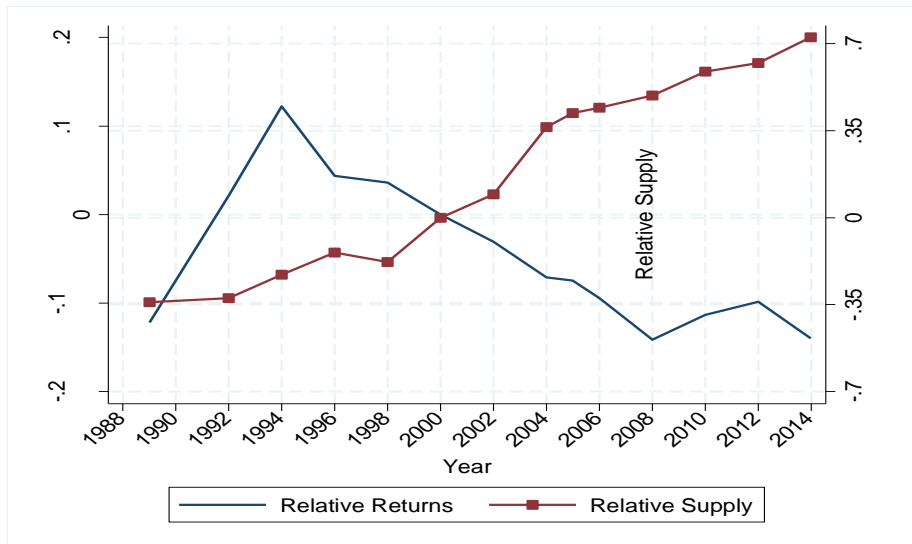
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the last couple of decades.' The 'paradox of progress' had also been found in the analysis for Mexico by Legovini et al. (2005).

[18] We attempt to estimate a model similar to those of Bound and Johnson (1992) and Manacorda et al. (2010). However, as pointed out by Manacorda et al. (2010), the relevant elasticities of substitution for the case of Mexico cannot be precisely estimated. In order to estimate the structural parameter σ, Manacorda et al. (2010) use a sample of workers from Argentina, Brazil, Chile, Colombia, and Mexico; they mention that 'Mexico does not really contribute to the identification of the regression parameters' (2010: footnote 1, page 314).

[19] See formula 3 on page 377 and formula A8 on page 390 of Bound and Johnson (1992).

throughout, but the rate was higher between 1998 and 2006 when labour income inequality declined. As for institutional factors, Figure 6 shows that both the unionization rate and the real minimum wage declined during the period of rising labour income inequality (1989–94) and remained roughly flat until 2014, the period when labour income inequality declined (1996–2006) and then began to rise again from 2006. In other words, if demand and technological change had been constant throughout the entire period, one would have expected labour income inequality to fall from 1996 onwards because of the increase in the supply of skilled workers and its effect on relative wages.

Figure 5: Relative returns and relative supply of workers by education, college and high school vs rest

Notes: Sample restricted to individuals or workers aged 20–64 years. Base year is 2000. The figure calculates the relative return and relative supply of the group mentioned in the subtitle. The relative return line is calculated as the log of the ratio in the average labour income of college and high school workers over the rest of workers adjusting the weights using administrative data and the relative supply is calculated as the log of the ratio of individuals with a college and high school degree over the rest).

Source: Authors' calculations based on ENIGH (INEGI 1989, 1992, 1994, 1996, 1998, 2000, 2004, 2006, 2008, 2010, 2012, 2014).

Figure 6: Unionization rate and the real minimum wage, 1988–2017

Notes: Unionization rate calculated for workers aged 20-65 years. Figures from 1989–2004 obtained from ENIGH and from 2005–16 from the Labour Force Survey ENOE (Encuesta Nacional de Ocupacion y Empleo). Minimum wage figures obtained from the Central Bank.

Source: Authors' calculations based on ENIGH (INEGI 1989, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005), ENOE (2005–2017), and Central Bank of Mexico (2017).

We now turn to the estimates from applying the Bound and Johnson (1992) decomposition. The results in Table 3 can be interpreted as follows. If we take, for example, the period of rising labour income inequality of 1989–94, we see that relative wages for skilled workers rose by 24.4 per cent. If the change in relative demand and institutional factors had been zero instead of positive, the relative wages of skilled workers would have fallen by 5.5 per cent. In contrast, if the supply of skilled workers had not increased, relative wages would have risen by 30 per cent. Given that the real minimum wage and the unionization rate fell during this period, one cannot ascribe the rise in the skill premium entirely to demand factors. Both demand and institutional factors likely played a role.

Table 3: Bound and Johnson decomposition: 1989–94; 1994–2006; 2006–14 (assuming an elasticity of substitution σ=2 and comparing college and high school educated workers with rest of workers)[20]

	Change Log Labour Income	Change in Supply Effect	Change in Demand Effect[a]
1989–94	0.244	-0.055	0.300
1994–2006	-0.216	-0.336	0.119
2006–14	-0.046	-0.141	0.096

Notes: Labour income for workers aged 20–65 years. [a]This effect includes not only demand but also institutional factors and technological change.

Source: Authors' calculations based on ENIGH (INEGI 1989, 1994, 2006, 2014).

As discussed in Campos-Vazquez and Lustig (2017), the fact that demand for skilled workers increased during the 1989–1994 period is considered a rather surprising effect. Given Mexico's abundance in low-skilled workers, a key question is why demand for higher-educated individuals

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[20] Results for σ=1 and for college educated versus the rest are qualitatively similar and are available upon request.

increased at a time when theory would have predicted the opposite. Mexico experienced a large opening of its economy in 1986 when it joined the precursor to the World Trade Organization, the General Agreement on Tariffs and Trade (or GATT). Due to the relative abundance of less-skilled labour, the Stolper–Samuelson theorem would have predicted that liberalization would lead to a decrease in the relative wage of high-skilled workers and, therefore, a fall in inequality. However, as noted by Cragg and Epelbaum (1996) and Esquivel and Rodríguez-Lopez (2003), the opposite occurred. What drove this seemingly contradictory outcome? There are several persuasive explanations that offer an answer to the puzzle.

First, there is evidence that the most protected industries during the previous period were low skill-intensive sectors (e.g. textiles) and, thus, trade liberalization reduced the relative price of these industries and, as a consequence, the relative wage of the low skilled (Robertson 2004, 2007).[21] Second, there is evidence that during this period there was skill-biased technical change and a change in the composition of output that gave skill-intensive industries a higher share.[22] Third, changes in the pattern of foreign direct investment (FDI) favoured skill-intensive firms. With trade liberalization, FDI also increased primarily through the expansion of *maquiladoras*. These establishments import most of their inputs and assemble the product to export (mainly to the USA). *Maquiladoras* are important both as a source of employment and in the share of exports to the USA: the employment share in *maquiladoras* (within manufacturing) grew from 5 to 25 per cent in the 1980–97period, and in 1995 the share of exports from *maquiladoras* was 40 per cent (Hanson 2003). Hence, if this sudden change is correlated with skill intensiveness, it might explain the increase in wage inequality prior to the North American Free Trade Agreement (NAFTA) being in place. Using industry and state-level data from 1975 to 1988, Feenstra and Hanson (1997) track the impact of FDI on employment and wages. They find that the outsourcing of US multinationals caused an increase in the number of establishments in Mexico that favoured skill-intensive industries.[23]

In other words, there is no real contradiction with the standard Stolper–Samuelson theorem: trade opening benefited skill-intensive industries relatively more because, contrary to expectations, low-skill industries had been relatively more protected before. This change, combined with skill-biased

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[21] Hanson and Harrison (1999) and Feliciano (2001) both find a decline in protection for less-skilled industries but are unable to find a link to wages. Using more detailed and varied price data, however, Robertson (2004, 2007) finds evidence of changes in output prices and wages. Also, Revenga (1997) finds that trade liberalization after GATT caused a decline in wages of 10–14 per cent in the most protected industries.

[22] Cragg and Epelbaum (1996) argue that the export-oriented sector became more skill-intensive, causing an increase in demand for skilled workers relative to unskilled workers. A similar pattern is observed by Esquivel and Rodríguez-Lopez (2003) using an industry-level dataset as opposed to a household survey. Esquivel and Rodríguez-Lopez are able to separate the channels of pure trade vs technology and find that while the trade channel acted to decrease inequality, this was more than offset by the skill bias in technological change, resulting in an increase in inequality. Although inequality increased within observable characteristics, there is evidence that between-industry shifts among tradable industries explain part of the increase in wage inequality (Airola and Juhn 2005).

[23] As shown by Kurokawa (2011), industries in the USA that shift production to Mexico are low-skilled within the USA but high-skilled within Mexico. Hanson (2003) reviews the evidence of FDI and trade, concluding that 'Mexico's economic opening thus appears to have raised the relative demand for skilled labour, and tariff and quota reductions have altered inter-industry wage differentials' (2003: 3). There have also been changes in regional inequality. For an analysis of these patterns and their determinants see, for example, Hanson (2003), Cortez (2005), Garduño-Rivera (2010), Borraz and Lopez-Cordova (2007), and De Hoyos (2013). Another possible channel is the upgrading quality hypothesis (Verhoogen 2008), which states that in the case of the devaluation in the Mexican peso, capital-intensive industries have incentives to increase exports (upgrade the quality of their products) and, as capital is complementary to skilled labour, wage inequality occurs.

technical change and the change in the composition of output towards more skill-intensive sectors, favoured wages of skilled workers and increased labour income inequality.[24]

In addition to the positive impact on skilled workers' wages stemming from trade liberalization and skill-biased technical change, the evolution of the minimum wage and unionization rate might have played a role. From 1988 to 1996 the real minimum wage lost close to 50 per cent of its value and the unionization rate declined by roughly 40 per cent (Figure 6). If the sharp decline in minimum wages and the unionization rate are correlated with workers' bargaining power, they could affect the distribution of labour income because of their downward pressure on the wages of the low skilled. In the case of unionization, there is evidence that its decline before NAFTA affected the wage structure. Using ENIGH, Fairris (2003) and Fairris and Levine (2004) conclude that the fall in the unionization rate from 1984 to 1996 explains 11 per cent of the increase in wage inequality. In terms of minimum wages, Bosch and Manacorda (2010) analyse the effect of the minimum wage on the wage structure and wage inequality during the 1989–94 period and in later years. They find that all of the increase in inequality in the bottom part of the distribution is caused by the fall in the real minimum wage. This is mainly due to the fact that the minimum wage affects other wages close to the minimum wage (lighthouse effect). In particular, Kaplan and Perez-Arce Novaro (2006) argue that although the minimum wage binding process has declined over time (at least until 1996), it affects other wages in the distribution (a similar result is provided by Fairris et al. 2008). Cortez (2001) analyses both aspects (unionization and minimum wages) and concludes that the increase in wage inequality can be fully explained by the decline in institutional forces.

During the 1994–2006 period, when labour income inequality (and overall inequality) declined, relative wages for the skilled fell by 21.6 per cent. Since the real minimum wage and the unionization rate were flat, this result must be the outcome of the relative strength of supply versus demand forces. As can be observed, and in contrast with the 1989–94 period, the dampening effect on the skill premium stemming from the increase in relative supply strongly dominates the increase in demand for skilled workers.

Although the RIF method does not disaggregate the returns into their various components, the result shown in Figure 4 (Panel b) is consistent with the fall in the relative returns to education shown in Figure 5, where it can be seen that the relative supply of college-educated (skilled) workers rose substantially during this period while the relative returns declined. This means that: (i) supply of skilled labour during this period outpaced demand; (ii) institutional factors moved in favour of the unskilled; or (iii) both.[25] Figure 6 shows that the real minimum wage and the unionization rate remained largely constant during this period. Thus, changes in institutional determinants cannot drive the decrease in wage inequality.[26] As Campos-Vazquez et al. (2014) suggest, the change in the skill premium during this period is the result of a combination of a rising supply of workers with college education and a slow-down in demand for skilled workers. So, what drove the slow-down in demand growth for skilled workers?

Robertson (2004, 2007) argues that although trade benefited more skill-intensive industries in the 1980s and early 1990s, with NAFTA this process was reversed. After NAFTA, the relative price

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[24] In addition to the impact of trade liberalization and its implications on the demand for skills, there may be an adverse effect on their supply: e.g. more job opportunities available in the *maquiladoras* could cause a higher high-school dropout rate. For instance, Atkin (2016) finds that for every twenty-five jobs created one student dropped out of school at grade 9 (final year of middle school).

[25] The gross enrolment rate almost doubled in the 1994–2004 period (Campos-Vazquez 2013).

[26] There is evidence that the minimum wage is currently not binding and has not been binding since the mid-1990s. For a detailed and recent explanation of the role of minimum wages in Mexico see Escobar Toledo (2014).

of tradable goods continued to decline over time. This potentially explains the decline in the skill premium given that NAFTA favoured skill-intensive industries. Thus, this process drives, in part, the decline in wage inequality. Other explanations that have been proposed for the decline in inequality include international migration, labour market distortions, and technical change that may have hurt older skilled workers. Migration increased during this period, probably due to the large negative effects of the 1995 crisis. Mishra (2007) shows that the increase of migration to the USA by low-skilled workers caused a decrease in their relative supply (holding everything else constant), which in a traditional supply and demand model would increase their wages.

Other research has shown that misallocation across firms induced by labour market distortions may have contributed to the decline in labour income inequality. Levy and Lopez-Calva (2016) argue that these distortions limit the growth of the high-productivity sectors, which are also more skill-intensive. As a result, there is a 'surplus' of workers with post-secondary education, who end up having to work in low-productivity firms, where their wages are lower. The misallocation of workers with high levels of education into low-productivity firms may be one of the drivers of the fall in absolute wages for college-educated workers and the stagnation of wages at the bottom.[27] Campos-Vazquez et al. (2016) explore the reasons behind the decline in absolute wages for college-educated workers. They observe that older cohorts are worse affected than younger cohorts and argue that the displacement of older educated workers may have been a result not only of technological change making skilled workers redundant but also of younger workers, who can be paid lower wages, being more adept in the use of the new technologies.

Hence, it seems that the changes in the composition of output induced by NAFTA, the misallocation of skilled labour because of labour market distortions, and the characteristics of technological change were behind the slow-down in demand growth for skilled workers.

During the last period analysed here, when inequality was again on the rise (2006–14), the picture is less clear. The skill premium continues to fall but at a sharply lower rate and, while the supply effect continues to dominate, it has become considerably weaker. As was shown above, during this period all labour income fell but it fell more for the bottom of the distribution and for those at the very top. The latter is probably due to a continuation—albeit weaker—of the supply and demand-side dampening forces on the skill premium observed in the previous period. The higher decline of incomes at the bottom is probably due to a decline in the demand for low-skilled workers as a consequence of how Mexico's growth was hit by the Great Recession in the United States. Further research is needed to understand the labour market dynamics that prevailed during this recessionary period.

4   Fiscal redistribution: 1996–2015

Based on results in Scott et al. (2017), here we analyse the redistributive and poverty-reducing effects of the fiscal system—i.e. taxes (personal and indirect), transfers (in cash and in kind), and (mainly) consumption subsidies—for the period from 1996 to 2014 (and a simulation of policy changes for 2015),[28] though the tax side is only included for the 2008–14 period.

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[27] Halliday et al. (2016) obtain similar results using firm heterogeneity.

[28] In addition to the original research, Scott et al. (2017) draw on Komives et al. (2009), Scott (2002, 2004, 2005, 2009a, 2009b, 2014), and Scott and Hernandez (2018).

The period of analysis is of particular interest as it covers a number of significant changes in social and fiscal policy. First, after contracting during the 'lost decade' of the 1980s, social and (other redistributive spending such as energy consumer subsidies and agricultural subsidies almost tripled from 1988 to 2012 (they have since declined from this historical maximum, by 17% by 2018). Second, cash transfers became significantly more pro-poor, benefiting the rural poor in particular. The crown jewel of social policy reforms was the launch of the flagship conditional cash transfer programme PROGRESA in 1997 (which since then has changed its name and scope several times).[29] PROGRESA involved a reallocation of costly generalized food subsidies from urban (particularly metropolitan) areas with low impact on extreme poverty and malnutrition, to cash transfers targeted at the extreme poor in rural areas.[30] In addition, some agricultural transfers were no longer linked from prices and output levels and, thus, they were able to reach poor, non-commercial farmers and, a self-targeted temporary workfare programme was introduced to address seasonal and disaster-related unemployment. In addition, the coverage of basic education increased significantly both through supply-side measures and the demand-side increase in attendance that resulted from the conditions attached to the PROGRESA cash transfers.

Finally, in the 2000s, an important effort was made to increase social protection for the uninsured by increasing financing and access to health services and medicines for this population through a non-contributory health insurance programme, the *Seguro Popular* (People's Insurance) and through a basic, non-contributory, universal pension, the *Programa de Adultos Mayores* (Programme for Senior Citizens). Both of these programmes expanded their coverage gradually and are aiming to achieve coverage of uninsured households and senior citizens, respectively.[31]

The pro-poor good news, however, stops here. A much larger share of growth in social spending has been absorbed by transfers to the contributory pension systems in this period. A small share of these transfers represents statutory government contributions or minimum pension guarantees but most are devoted to payments of current pensions, fully financed by the government, in the transition towards defined contribution systems or from unfunded benefits of systems yet to be reformed (such as the one associated with the state-owned oil company, PEMEX). Of note is the fact that, in the context of austerity measures, between 2015 and 2017 total spending by the Ministry of Social Development (mainly the two flagship cash transfers) declined by 10 per cent while transfers to fill the financial gap of the contributory pensions system rose by 18 per cent.

It is important to note that the expansion of social spending (including the transfers to contributory pensions) was not financed through new taxes (as repeated attempted fiscal reforms failed to pass), but through a reallocation of the functional distribution of public spending, from economic to social development in the 1990s—as the share of central government spending, social spending doubled from 30 to 60 per cent—and through rising but short-lived oil revenues associated with the oil boom in the 2000s. The reallocation of public spending from the economic function was mostly achieved through a significant reduction in public investment and privatization of public enterprises of lesser importance.

In more recent years, in the face of collapsing oil revenues due to declining international oil prices as well as declining oil production (from 5.9 per cent of GDP in 2012 to 1.6 per cent in 2016), non-oil tax revenues were at last significantly increased: from roughly 10 per cent in 2014 to 14 per

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[29] For an overview of the extensive PROGRESA evaluation literature, see Parker and Todd (2017).

[30] For a detailed description of the programmes, see Scott et al. (2017).

[31] For an overview of the evolution of multi-dimensional poverty and Mexico's social programmes, see CONEVAL (2017a, 2017b), respectively.
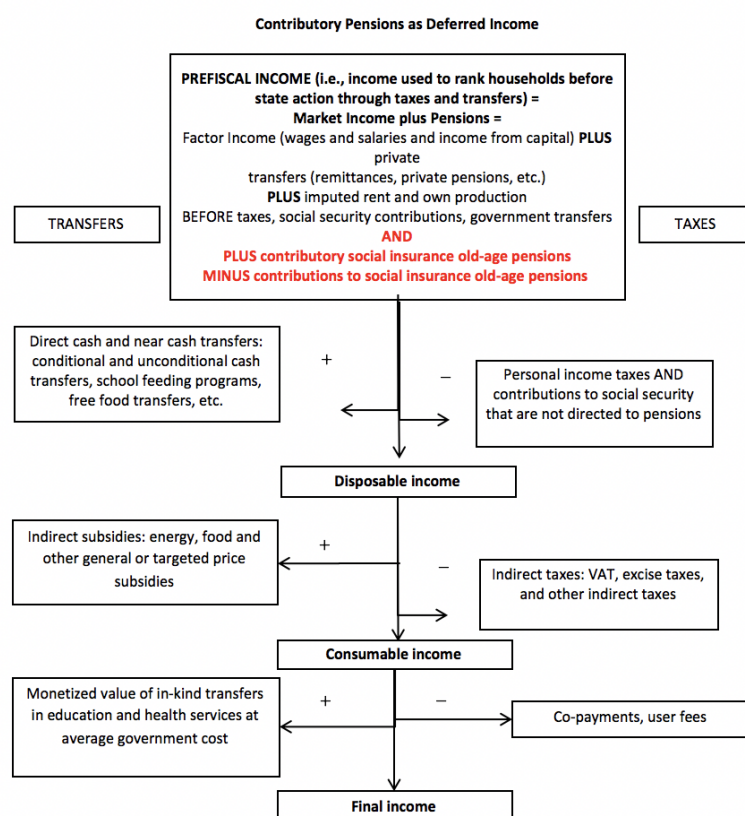
cent in 2016), making up some of the loss in oil revenues. This increase has been achieved mainly through the reduction of exemptions on (mostly corporate) income tax, and the transition from gasoline subsidies to taxes.

In order to estimate the redistributive and poverty-reducing effects, Scott et al. (2017) rely on standard fiscal incidence analysis.[32] As stated in Lustig and Higgins (2018): '[f]iscal incidence analysis consists of allocating taxes (personal income tax and consumption taxes, in particular) and public spending (social spending and consumption subsidies, in particular) to households or individuals so that one can compare incomes before taxes and transfers with incomes after taxes and transfers' (Lustig and Higgins 2018: 15) That is, starting from pre-fiscal income—which here we call market income plus (contributory) pensions[33]—taxes and transfers are sequentially subtracted and added to construct three additional key income concepts: disposable income (subtracts direct personal income taxes and adds cash transfers to market income plus pensions), consumable income (subtracts indirect taxes and adds subsidies to disposable income), and final income (adds government spending on education and health to consumable income). See Diagram 1.

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[32] For a detailed description of the methodology, data, and caveats, see Scott et al. (2017).

[33] As discussed in Lustig and Higgins (2018: 16), 'social insurance contributory pensions are partly deferred income and therefore should have a portion of them added to Market Income (and contributions subtracted from factor income); and partly government transfer and therefore a portion of them should be included with the rest of government transfers (and contributions treated as any other direct tax). However, since at this point there is no conventional method to determine which portion should be allocated to Market Income and which to government transfers when the only information available is a cross-section household survey', one should calculate the impact of the net fiscal system under the two extreme scenarios: (1) contributory pensions are pure deferred income (also known as replacement income) and (2) contributory pensions are a pure government transfer. Here we present results for the first scenario. Results with contributory pensions as pure transfers should be requested from John Scott, lead author of Scott et al. (2017). Note that non-contributory pensions are always treated as a pure government transfer.

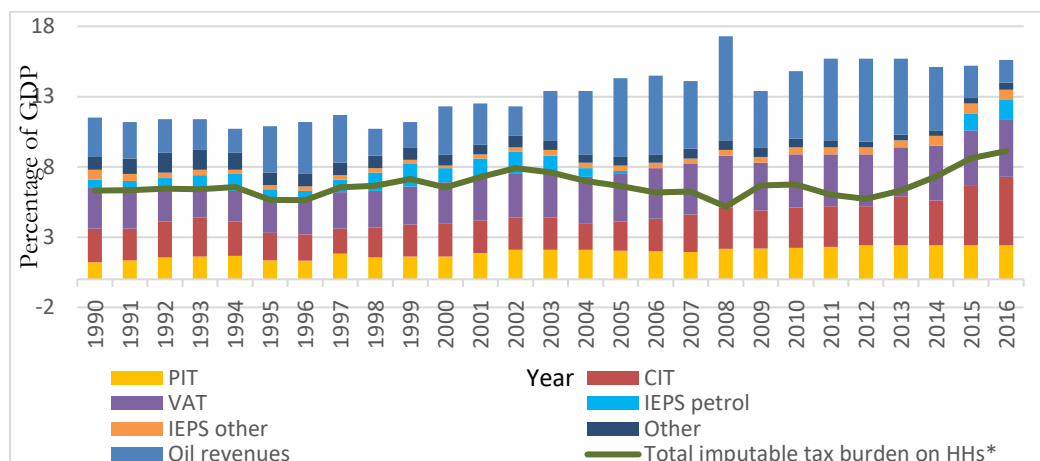Diagram 1: Fiscal incidence analysis, core income concepts

Contributory Pensions as Deferred Income

	PREFISCAL INCOME (i.e., income used to rank households before state action through taxes and transfers) = **Market Income plus Pensions =** Factor Income (wages and salaries and income from capital) **PLUS** private transfers (remittances, private pensions, etc.) **PLUS** imputed rent and own production BEFORE taxes, social security contributions, government transfers **AND** **PLUS contributory social insurance old-age pensions** **MINUS contributions to social insurance old-age pensions**	

TRANSFERS   TAXES

Direct cash and near cash transfers: conditional and unconditional cash transfers, school feeding programs, free food transfers, etc.

    +   −

Personal income taxes AND contributions to social security that are not directed to pensions

Disposable income

Indirect subsidies: energy, food and other general or targeted price subsidies

    +   −

Indirect taxes: VAT, excise taxes, and other indirect taxes

Consumable income

Monetized value of in-kind transfers in education and health services at average government cost

    +   −

Co-payments, user fees

Final income

4.1   Revenues and spending: size and composition

As discussed in Lustig (2018b), the redistributive and poverty-reducing effects of the fiscal system depend on the size and progressivity of the various components that integrate the fiscal system. In terms of revenue collection, Mexico's fiscal capacity has been historically limited (Figure 7). In contrast to many middle- and high-income countries, where tax revenues expanded significantly over the century, (non-oil) tax revenues in Mexico have remained stagnant at around 10 per cent of GDP (mostly below this) over the last 40 years (1974–2014). This, of course, is largely explained by the availability of large oil revenues during this period, a fact that has made it easier for the government to avoid the political cost of raising taxes to levels similar to those in other countries. Implicitly, oil revenues can be interpreted as a poll tax (per capita tax is the same for everybody), which would make it a very regressive tax. However, this scenario is not included in our analysis. Nor are corporate taxes. The share of total revenues contemplated in the results is shown by the solid line.

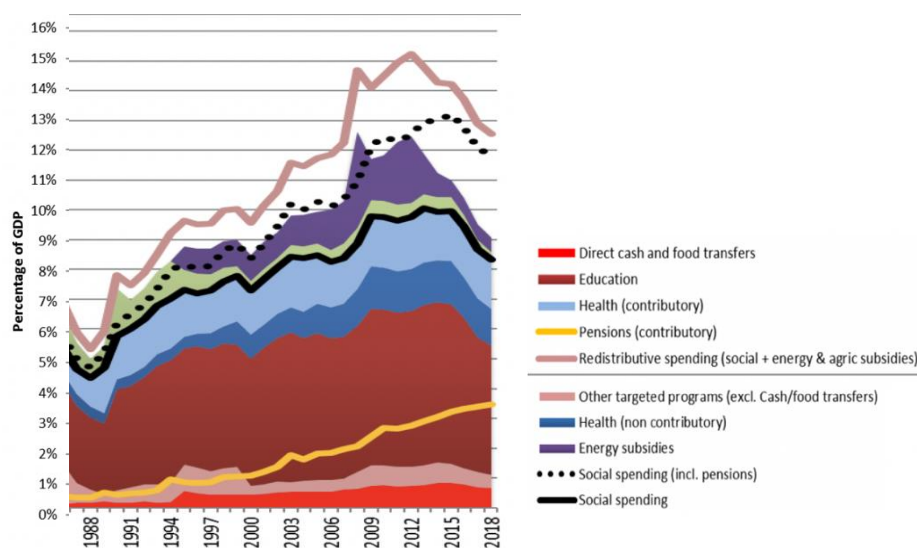Figure 7: Size and composition of government revenues (as a percentage of GDP): 1990–2016)

Notes: *Total imputable tax burden on households (HHs) includes all direct and indirect taxes, including petrol subsidies in 2005–14, which in Mexico are classified as negative special taxes on products and services (*Impuesto Especial sobre Productos y Servicios*, IEPS), but excludes corporate income tax (CIT) and oil revenues.

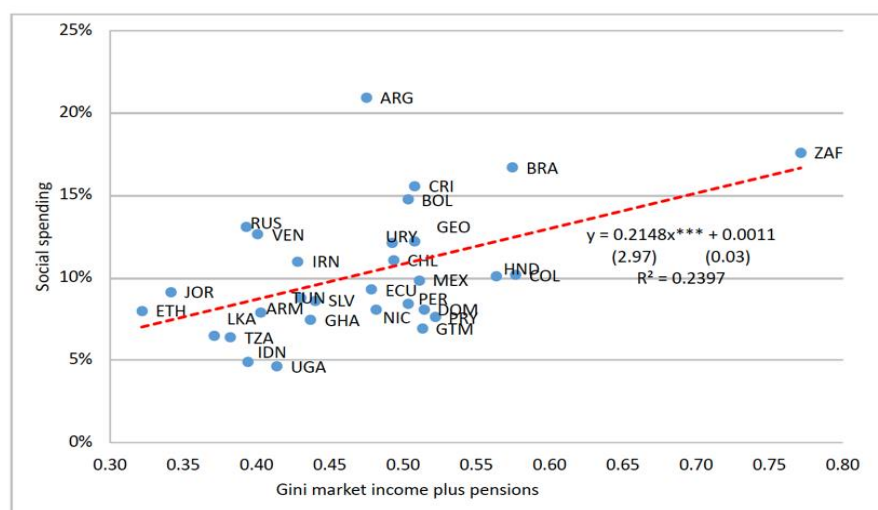Source: Scott et al. (2017) based on data from SHCP (2017).

Social spending expanded over the last two decades, reaching around 10 per cent of GDP by 2015, excluding contributory pensions, and 13 per cent including pensions (Figure 8). Total redistributive spending (including agricultural and energy subsidies) reached 15 per cent of GDP in 2012. Since 2015, social spending has declined to 8.3 per cent of GDP, excluding pensions (2017 and 2018 federal budgets), and redistributive spending to 12.6 per cent. As shown in Figure 9, Mexico's size of social spending in relation to GDP is below the trend line for a group of 30 low- and middle-income countries.

Figure 8: Government transfers (percentage of GDP): 1988–2018

Source: Scott et al. (2017).

Figure 9: Inequality and social spending as a share of GDP, Mexico in comparison
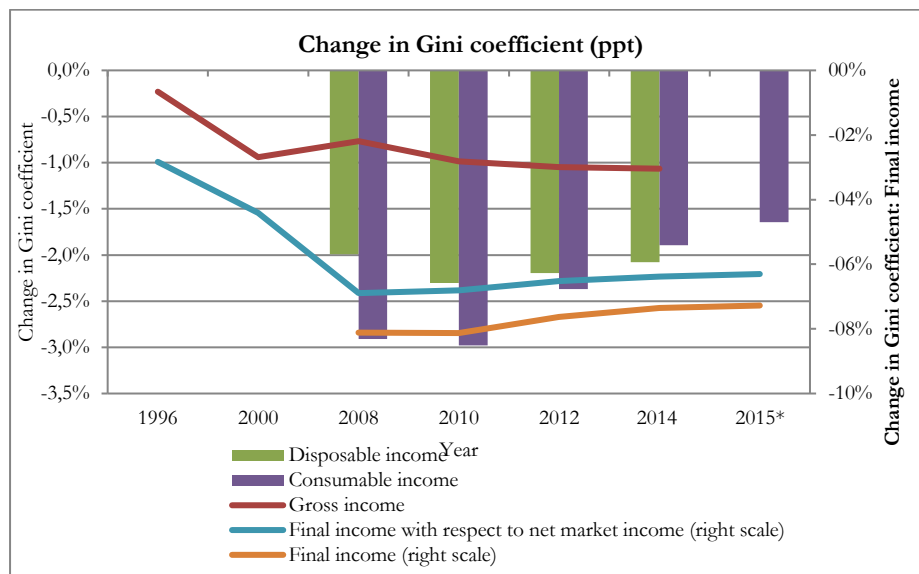
4.2 Redistributive effects of the fiscal system: inequality and poverty

Figure 10 shows the effects of fiscal policy on the Gini coefficient for the period between 1996 and 2014. From 1996 to 2006, the analysis includes the spending side only. From 2008 to 2014, the effects of taxes (personal and indirect) have been incorporated. The results for 2015 are produced by simulating the switch from subsidizing to taxing gasoline consumption on the 2014 fiscal incidence exercise. In the figure, we show the change in the Gini coefficient from market income plus pensions to the income concepts described in Diagram 1. For the period 1996 to 2008, one can observe a notable increase in the equalizing effect of direct cash transfers up to 2000 followed by a reduction of this effect (shown by the line that traces the change from market income plus pensions to gross income). In contrast, the equalizing effect of education and health spending estimated at 2.6 percentage points in 1996 rose throughout.

For the 2008–14 period, in which the analysis comprehends both the tax and spending sides, the total redistributive effect is modest and declines after 2010: with respect to market income plus pensions, inequality in disposable income fell by 2.3 percentage points in 2010 and 2 percentage points in 2014, while consumable income inequality fell by 3 percentage points in 2010, 1.9 percentage points in 2014, and 1.6 percentage points in 2015 (although the latter is obtained from a simulation as indicated above). Adding in-kind transfers such as education and health valued at average cost to the government has a larger redistributive effect. The latter was estimated at 6.9 percentage points in 2008 and declined thereafter, but it is still considerably higher than it was in 1996, as shown by the solid line for final income with respect to net market income.

The marginal contribution of direct transfers (measured by the change in gross income Gini with respect to market income plus pensions) is equalizing and rose from 1996 to 2000 and remained unchanged for the rest of the period. In contrast to previous years, by 2014 the marginal contribution of net indirect subsidies is unequalizing: that is, the fiscally induced decline in inequality would have been higher if there were no net indirect taxes.

Figure 10: Fiscal policy and inequality, 1996–2015

Note: *The 2015 estimate considers the effect of the increase in net indirect taxes in that year, using the 2014 survey and assuming the rest of the fiscal system remains the same as in 2014. The redistributive effect for final income appears on the right-hand scale. The definition of income concepts is shown in Diagram 1. Gross income equals market income plus pensions plus direct transfers. "ppt" means percentage points.
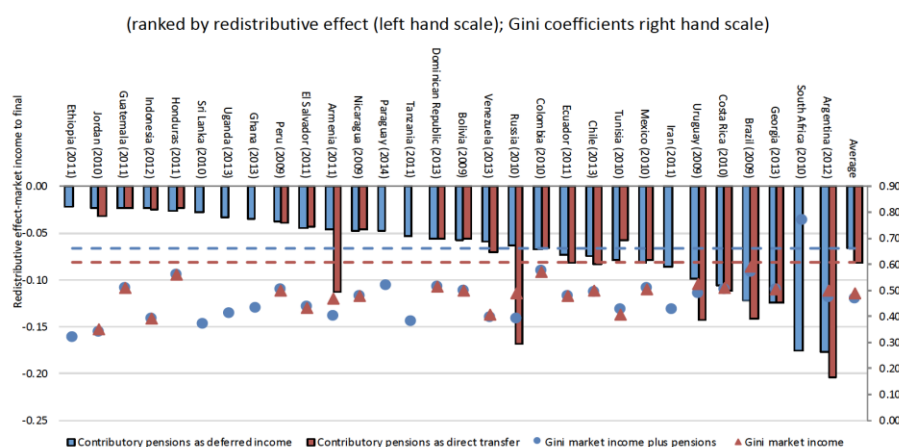
Source: Scott et al. (2017).

How does Mexico compare with other low- and middle-income countries? Figure 11 shows results for a set of thirty countries for around 2010 from the Commitment to Equity (CEQ) Institute's Data Center, as analysed in Lustig (2018b). As one can observe, Mexico (2012) ranks in the top third of countries and, for the scenario with contributory pensions as deferred income, its redistributive effect is slightly above the average (blue horizontal line) and about average for the scenario that assumes contributory pensions are a pure government transfer (red horizontal line).
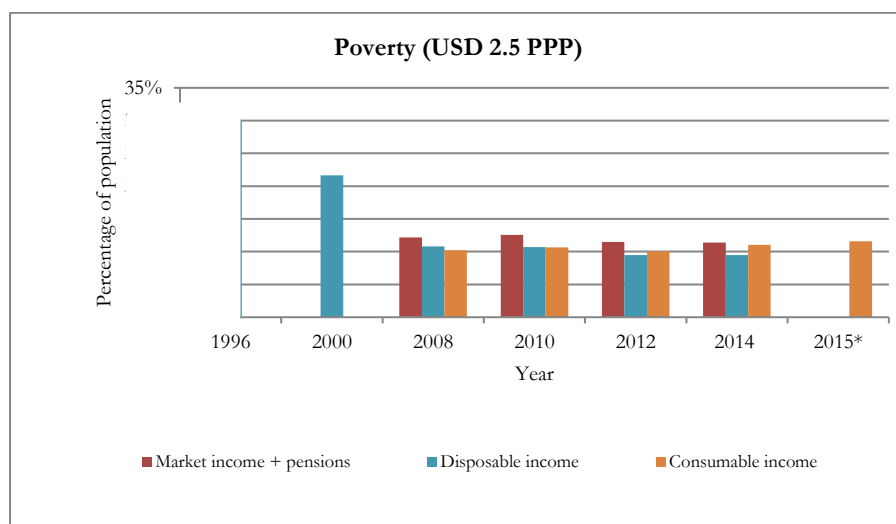
Figure 11

Source: Lustig (2018b: chapter 10), reproduced under CC BY-NC-ND 4.0.

It is important to stress that the effects of a fiscal system on inequality and poverty are distinct. As shown in Lustig (2018b), while fiscal systems are equalizing for a group of thirty low- and middle-income countries, they are poverty-increasing in a number of them because what the poor pay in taxes exceeds what they receive in transfers. In Mexico, the fiscal system has been both equalizing and poverty-reducing. However, as shown in Figure 12, the effect on poverty has been falling over time and, if the simulated results for 2015 are an accurate description of the effects of switching from subsidizing to taxing gasoline consumption, the fiscal system may have switched to a poverty-increasing one (consumable income poverty surpasses market income poverty).

Figure 12: Fiscal policy and poverty: 2008–15

Note: Poverty measured by the incidence (headcount ratio). *The 2015 estimate considers the effect of the increase in net indirect taxes in that year using the 2014 survey and assuming the rest of the fiscal system constant as in 2014.

Source: Scott et al. (2017).

The effect of direct transfers on extreme poverty increased from a reduction of less than 0.5 percentage points in 1996 to more than 2 percentage points in 2012 and 2014 (using the USD 2.5 international poverty line). This represents some 2.4 million persons out of poverty as an effect of direct transfers. Once we add net indirect taxes (consumable income), however, this gain is significantly reduced, except in 2008 when gasoline subsidies reached an all-time high and net subsidies actually reduced poverty with respect to disposable income (Figure 12). By 2014, when gasoline subsidies had been almost completely eliminated, net indirect taxes erased the poverty effect of direct transfers and increased extreme poverty by more than 1.4 percentage points. By 2015, when gasoline subsidies gave way to a large gasoline tax, the impoverishing effect of net indirect taxes increased by 2.5 percentage points, with some 3 million persons added to the extremely poor category.

It is important to note that the rising impoverishing effect of net indirect gasoline taxes over this period was largely due to the decline in international oil prices, which were not passed on to consumers, rather than through increases in domestic prices, so these effects are with respect to the increase in consumable income that households would have obtained had they benefited from these international price reductions. However, the elimination of gasoline subsidies also required a gradual adjustment strategy of domestic public gasoline prices implemented by the government over the last decade, which in fact increased the price of regular gasoline by 41 per cent in real terms between 2010 and 2014. So, while the analysis is strictly correct in terms of the economic definition of subsidies (defined with respect to international opportunity costs), the decline in

consumable income associated with this reform happened earlier and more gradually than this analysis suggests.

5   Main conclusions and policy implications

With a Gini coefficient hovering around 0.5, Mexico belongs to the group of countries in the world with high levels of income inequality. When data is corrected for under-coverage and under-reporting of top incomes using tax registries, concentration at the top becomes even more pronounced. For example, depending on the correction method, the income share of the top 10 per cent can increase by between roughly 10 to 20 percentage points in 2010 and 2012.

The evolution of income inequality during the 1989–2014 period can be summarized as follows: between 1989 and 1994, inequality increased; between 1994 and 2006, inequality declined; and, between 2006 and 2014, inequality seemed to be on the rise again. The key component that underlies the 'rise-decline-rise again' pattern is the evolution of labour income inequality. Labour income inequality seems to be influenced in particular by the evolution of the skill premium. During the 1989–94 period, driven by both market forces (demand for skills) and institutional factors (real minimum wage and unionization rate fell) the skill premium rose. During the period of declining labour income inequality (1994–2006), the skill premium declined. The latter was not driven by institutional factors because the real minimum wage and unionization rate remained flat. The increase in supply of workers with at least high school degrees, over and above the increase in their demand, appears to have driven the decline in returns to higher skills. Lastly, during the 2006–14 period, as we saw, inequality appeared to be on the rise again. While all workers' incomes fell as a consequence of the Great Recession's impact on Mexico, the returns to workers' characteristics at the bottom of the distribution fell more pronouncedly. Demand for workers with low skills appears to have suffered disproportionately during the years of negative or low growth. Coupled with an unchanged real minimum wage, the incomes of low-skilled workers were significantly hurt.

Given the patterns observed in the dynamics of labour income inequality, two key policy implications emerge. First, continuing the expansion of access to higher levels of education is key, as long as it is of reasonable quality. Second, minimum wages should be gradually increased towards their levels before they started to decline in the 1980s. Given the large size of Mexico's informal labour market, however, care must be taken that the minimum wage increases do not exacerbate it. There are a whole set of reforms that should be undertaken in social policy to address informality, as discussed by Levy (2018).

Direct cash transfers are largely targeted at the poor. However, in spite of the expansion of targeted programmes since the second half of the 1990s, their effect remains limited because of their small scale (relative to the fiscal system and to market household income). As a result, while the combination of taxes, transfers, and spending on education and health has a significant redistributive effect on final income inequality, it has a relatively more modest one on disposable or consumable income inequality (which only captures the effect of direct cash transfers and direct and indirect taxes but not spending on education and health). Moreover, the redistributive effect has declined significantly since 2010, as transfers have become less progressive and net indirect taxes have increased.

The modest redistributive impact of Mexico's fiscal system is not due to a particularly high indirect tax burden (even after the recent increase, Mexico lags behind most countries), nor to limited revenues, but to a minimal allocation of these resources to cash transfers benefiting the poor. Even

at their peak (2014), these transfers represented just 0.8 per cent of GDP, transferring 0.35 per cent of GDP to the poorest quintile (which roughly corresponds to the extreme poor). More gravely, the expansion of net indirect taxes and recent reduction of direct transfers has implied a continuous reduction in net cash benefits reaching the extreme poor, from 0.38 per cent of GDP in 2012 to 0.19 per cent in 2016 and, based on the approved budgets, were projected to fall further to 0.16 per cent in 2017 and 0.14 per cent in 2018. The reduction of net transfers reaching the extremely poor after 2012 has thus completely reversed the expansion of these benefits that were achieved over the previous decade (2002–12). The increase in net indirect taxes would have been an effective basis for a powerful redistributive reform of the fiscal system had it been used to finance a significant increase in such transfers. Instead, it was used to substitute for declining oil revenues and to finance the expansion of regressive contributory pension subsidies associated with the transition to a defined contributions system, while pro-poor transfers were reduced.

What would be an optimal redistributive fiscal reform for Mexico in this context? An obvious reform would be to increase cash transfers through the flagship conditional cash transfer programme (*PROSPERA*), currently the most effectively targeted transfer instrument available in Mexico with significant coverage. Given the coverage that this programme has already achieved (6 million households, or a fifth of the population), and the possible economic disincentives that a significant expansion in the level of transfers per beneficiary might entail, a major expansion, which preserves its current targeting and effectiveness, may be difficult to achieve. Recent efforts to introduce new components into the programme to increase the productive capacities of its beneficiaries have been frustrated by the institutional and operational difficulties of implementing such a complex component on a large scale. In addition, some results indicate that the errors of exclusion—that is, poor individuals who do not receive the *PROSPERA* cash transfer—are rather significant.

Perhaps the time has come to consider more universal transfers. Based on Scott (2017), Scott et al. (2017) simulate the redistributive potential of the simplest, cheapest (in terms of targeting, administrative, as well as participation costs), and least distortionary transfer possible: a universal, non-targeted, non-conditional transfer. This may be interpreted as a universal basic income designed to eliminate extreme poverty or as a universal, non-contributory, social protection system designed to achieve full coverage and eliminate the gaps in social protection associated with informality. The authors find that in spite of the absence of targeting, if all the resources devoted to non-progressive transfers could be reallocated to the universal basic income scheme, this reform would be highly progressive in the context of Mexico's high market income inequality. Of course, the inequality- and poverty-reducing effect of these resources would be higher if they were allocated to the poorer segments of the population but, as mentioned above, administrative targeting mechanisms at the household level appear to have run their course. In addition, the political resistance of a pro-poor reallocation of the transfers that currently also benefit the non-poor could prove to be insurmountable.

An alternative and bolder policy scenario would be to increase the size of the universal basic income to equal the average poverty gap in 2014 (instead of keeping it equal to the total current budget allocated to transfers divided by the population). According to Scott et al. (2017), the fiscal cost of this basic income would be 2.87 per cent of GDP. Although this would represent a significant commitment in the context of Mexico's limited tax revenues, it is still below both the recent increase in net indirect taxes and the current tax-financed transfers to the contributory pension systems. To make this change budget neutral, the authors consider two scenarios: relying on the use of oil revenues or increasing direct taxes. Under either, extreme poverty measured with consumable income would be reduced by an estimated 2 percentage points, taking approximately 2 million additional people out of extreme poverty. The incidence of direct personal income taxes for the top 10 per cent would have to rise from roughly 8 per cent to 13 per cent, an order of

magnitude which seems reasonable given the enormous concentration of income and wealth at the top and the relatively low burden of direct personal and wealth taxes for the richest group within the top.

A more realistic and potentially effective alternative would be to combine the best of both worlds by targeting the poorest and most vulnerable as population groups—poor localities, indigenous population, senior citizens, infants, the disabled, unemployed youth—but offering transfers universally within these groups.

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