INEQUALITY AND FISCAL REDISTRIBUTION IN MEXICO

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The CEQ logo is a stylized graphical representation of a Lorenz curve for a fairly unequal distribution of income (the bottom part of the C, below the diagonal) and a concentration curve for a very progressive transfer (the top part of the C).

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ABSTRACT

This paper uses income and expenditure surveys from 1992 to 2014 and public tax and spending accounts to estimate the redistributive impact of Mexico's fiscal system over this period. It presents standard and marginal benefit incidence analysis for the principal public transfers (education, health, social security, direct cash transfers) in 1992–2014, and for the full fiscal system for 2008–14. The paper also estimates the effects of a major recent fiscal reform for the years 2015–18: the transition from large subsidies to taxes on petrol. The analysis shows a continuous improvement in the redistributive effects of the fiscal system through the 1990s and 2000s associated with an increase in social spending and in the progressivity of this spending over this period. This trend stagnated and reversed after 2008/2010, reflecting in part an interruption of the expansive and progressive trend of social transfers, but especially a sharp decline of net indirect subsidies.

JEL classification: D31, H22, H42, I38

Keywords: fiscal incidence, taxation, social spending, inequality, poverty, Mexico

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WIDER Working Paper 2017/194

Inequality and fiscal redistribution in Mexico

1992–2015

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United Nations University World Institute for Development Economics Research

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1 Introduction

Like other countries in Latin America and the Caribbean region, but in contrast to less unequal regions of the world (Western Europe and offshoots, East Asia, Eastern Europe), Mexico combines high redistributive demands, comparatively high levels of market income inequality, and market income poverty (for the country's income level), with comparatively weak redistributive capacities, measured by sustainable (non-oil) fiscal revenues and limited allocations of these resources to effective transfer instruments. This paper uses income and expenditure household surveys for the last 25 years (1992–2014) (i.e. the National Survey of Household Income and Spending or *Encuesta Nacional de Ingresos y Gastos de los Hogares*, ENIGH by its Spanish acronym), public federal tax and spending accounts, and national accounts to estimate the redistributive impact of Mexico's fiscal system and its evolution.

The analysis includes the principal tax and social spending instruments, including indirect subsidies. The study uses average and marginal fiscal incidence analysis, and adopts a standardized methodology allowing international comparisons with a large and growing set of countries (CEQ or 'Commitment to Equity' project, described in detail in Lustig 2018, forthcoming). An incidence analysis for rural/urban and indigenous/non-indigenous populations is presented for selected years, as these groups represent the poorest populations in Mexico. In addition to household surveys, the paper presents estimates based on income adjustment methods using national accounts and administrative social security data, to correct for income underreporting. These adjustments increase measured income inequality significantly, consistently with what has been found in other recent studies, but the effects on estimated fiscal redistribution are modest and reflect mainly differences in tax/transfer rates associated with each adjustment method. The paper also includes an estimation of the redistributive effects of introducing a universal basic income under alternative financing scenarios.

There is a wide range of literature evaluating fiscal redistribution instruments in Mexico, from the large impact evaluation literature on the pioneering conditional cash transfer (CCT) programme *Programa de Educación, Salud y Alimentación* (PROGRESA; i.e. Education, Health and Food Programme), (today *Prospera*) (Parker and Todd 2017) to comprehensive tax and benefit incidence studies (Scott 2014; SHCP 2001–16). The paper seeks to expand on the latter through the following main contributions:

- A comprehensive and comparable historical benefit and fiscal incidence analysis covering a quarter of a century (1992–2014) for the principal transfers (education, health, social security, direct cash transfers, indirect subsidies), and the full fiscal system for 2008–14. This includes estimations on fiscal redistribution on inequality and poverty measures.
- The historical analysis series allows an analysis of the distribution of expansions in coverage and resources through marginal benefit incidence analysis, which we present for the principal transfer: public education spending.
- In addition to the standard survey-based analysis, we estimate fiscal incidence using two recent methods to correct survey data for underreporting by adjusting individual income sources to national accounts and administrative data.

- It presents incidence analysis results for indigenous versus non-indigenous populations, allowing us to evaluate the redistributive effect of the fiscal system on the poorest and most vulnerable population sub-group in Mexico. It estimates the redistributive effects of the evolution of the fiscal system after 2014, for 2015–18. This allows us to obtain preliminary estimates of the effects of two important recent developments in Mexico's fiscal system: (a) the elimination of petrol subsidies and introduction of petrol taxes by 2015, representing *de facto* the principal fiscal reform implemented over the last decade, leading to a 30 per cent increase in tax revenues over in 2008–15, but an 88 per cent increase in the *net tax burden* on households (taxes net of direct transfers and indirect subsidies); and (b) a general decline of transfers and further increase in taxes after 2015, reflecting a rapid decline in 'fiscal space' associated with declining oil revenues and increasing public pension liabilities.
- Finally, to illustrate a possible policy response to the limited redistributive impact of Mexico's current fiscal system, reflecting mainly the comparatively small scale of direct cash transfers, we estimate the redistributive effects of a significant expansion of these transfers through the least distortionary instrument available: a universal basic income in Mexico, under alternative financing scenarios.

The analysis shows a continuous improvement in the redistributive effects of the fiscal system through the 1990s and 2000s associated with an increase in social spending and in the degree of progressivity of this spending over this period. This trend stagnated and reversed after 2008/2010, reflecting in part an interruption of the expansive and progressive trend of social transfers, but especially a sharp decline of net indirect subsidies. We estimate that by 2015 the fiscal system reduced consumable income inequality by only 1.6 percentage points (ppt) of the Gini coefficient (with respect to market income, from 52.2 to 50.6 per cent), and *increased* extreme and total (consumable) income poverty by 2.4 and 5.3 ppt (to 22.9 and 58.1 per cent, respectively, using national poverty lines). This result does not reflect a comparative lack of progressivity of direct transfers in Mexico (excluding contributory pensions), but a low (and recently declining) share allocated to direct cash transfers relative to the growing tax burden imposed on households. Even at their peak (in 2014), these transfers represented just 0.8 per cent of gross domestic product (GDP), transferring 0.35 per cent of GDP to the poorest quintile. The expansion of net indirect taxes and recent reduction of direct transfers implied a reduction in net transfers reaching the extreme poor from 0.38 per cent of GDP in 2012 to 0.26 per cent in 2014, continuing to fall to 0.16 per cent in 2017 and 0.14 per cent in 2018 (estimates based on the 2017 approved federal budget and 2018 budget proposal). We show that even without targeting, increasing cash transfers through a small universal basic income would significantly improve the impact of Mexico's fiscal system on extreme poverty and social protection.

The rest of the paper is structured as follows. Section 2 documents the historical evolution of income inequality, poverty, and fiscal redistribution in Mexico. Section 3 presents the concepts, methodology, and data used for the analysis, and explains its principal uses and limitations. Section 4 presents the results of the benefit and fiscal incidence analysis for 1992–2014, including the analysis with the adjusted data as well as estimates of the effects of increasing net indirect taxes in 2015–18. Section 5 presents an interpretation of the results, identifies the principal policy implications, and estimates the effect of a universal transfer.

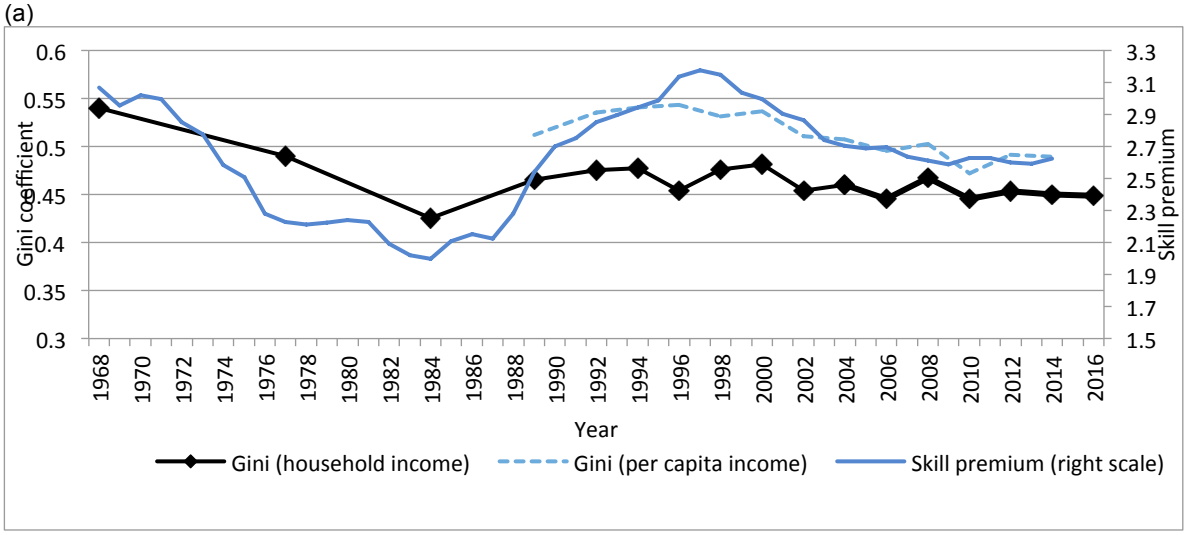
2 Income inequality, poverty, and (fiscal) redistributive instruments in Mexico: A short history

There is a large and growing literature on the measurement, evolution, and determinants of income inequality and poverty in Mexico and Latin America over the last two decades (Székely 1998, 2005; López-Calva and Lustig, 2010; Bustos and Leyva 2017; Del Castillo Negrete 2017; Reyes et al. 2017), as well as in longer historical perspectives (Prados de la Escosura 2007; Williamson 2010; Arroyo 2011; Arroyo et al. 2012; Allen et al. 2015; Astorga 2015; Challú and Gómez-Galvarriato 2015; Bleynat et al. 2017; Scott 2017a). The two companion papers in the Mexico component of the United Nations University World Institute for Development Economics Research project 'Inequality in the Giants' are devoted to income inequality (based on labour income and functional shares, respectively; see Ibarra and Ros 2017; Campos et al. 2017).

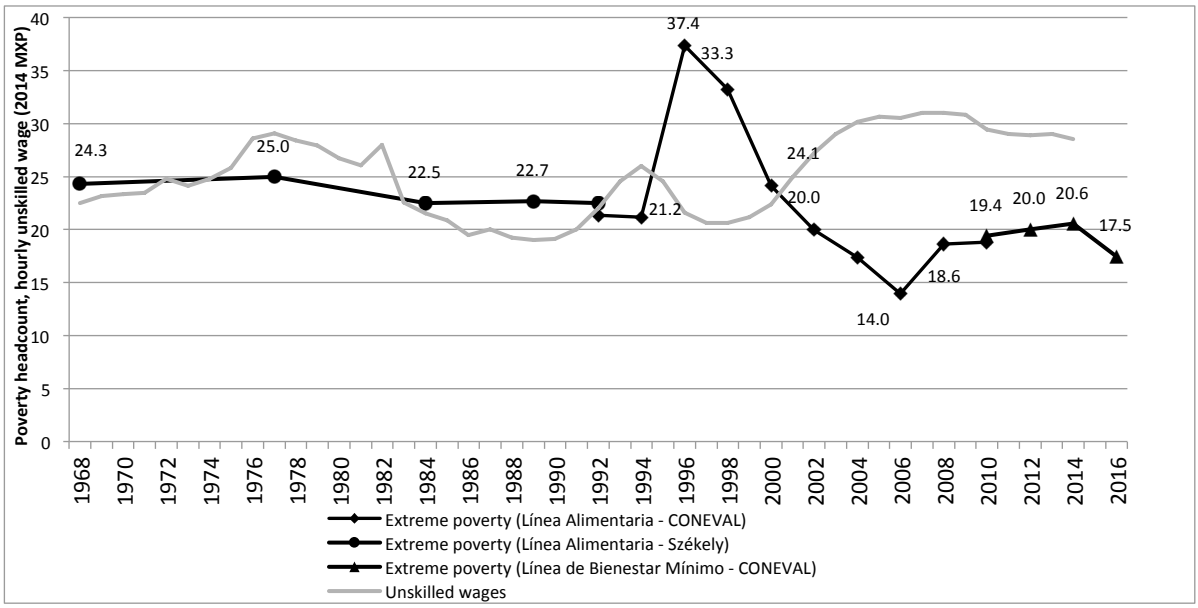
Figure 1 shows the evolution of (disposable) income inequality (Gini coefficient) and income extreme poverty using official food poverty lines, over almost half a century (1968–2014), based on household income surveys. Given the obvious comparability issues for such a long series, we also report independent series of unskilled hourly manufacturing wages and skilled/unskilled wage gaps as proxies for the evolution of poverty and inequality, respectively, as well as different measures of child undernutrition in rural areas for the same period.

Figure 1: (a) Income inequality, (b) extreme poverty (disposable income), and (c) child undernutrition in rural localities, 1968–2016

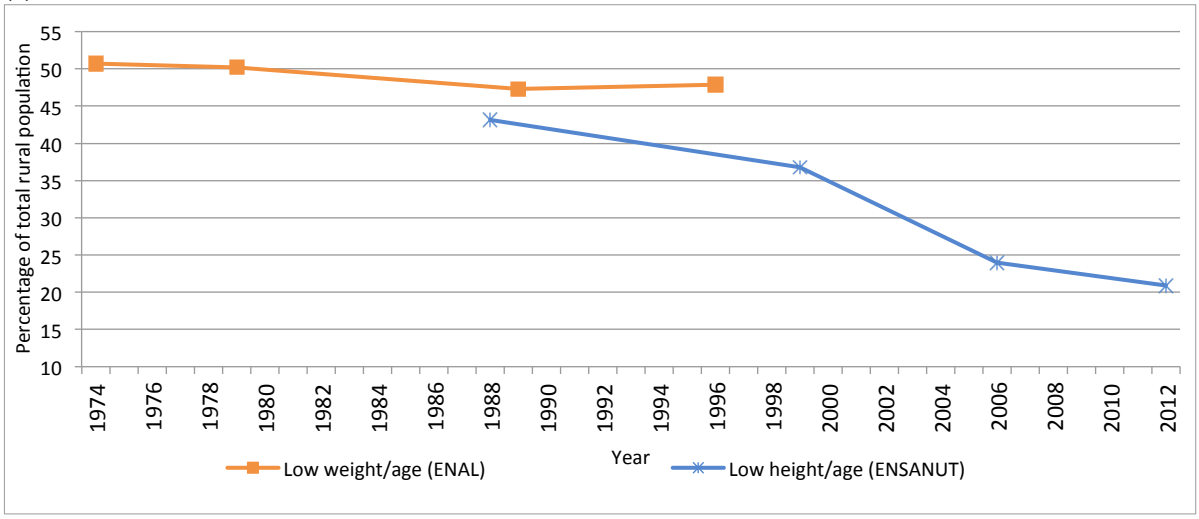
(a)



(b)



(c)



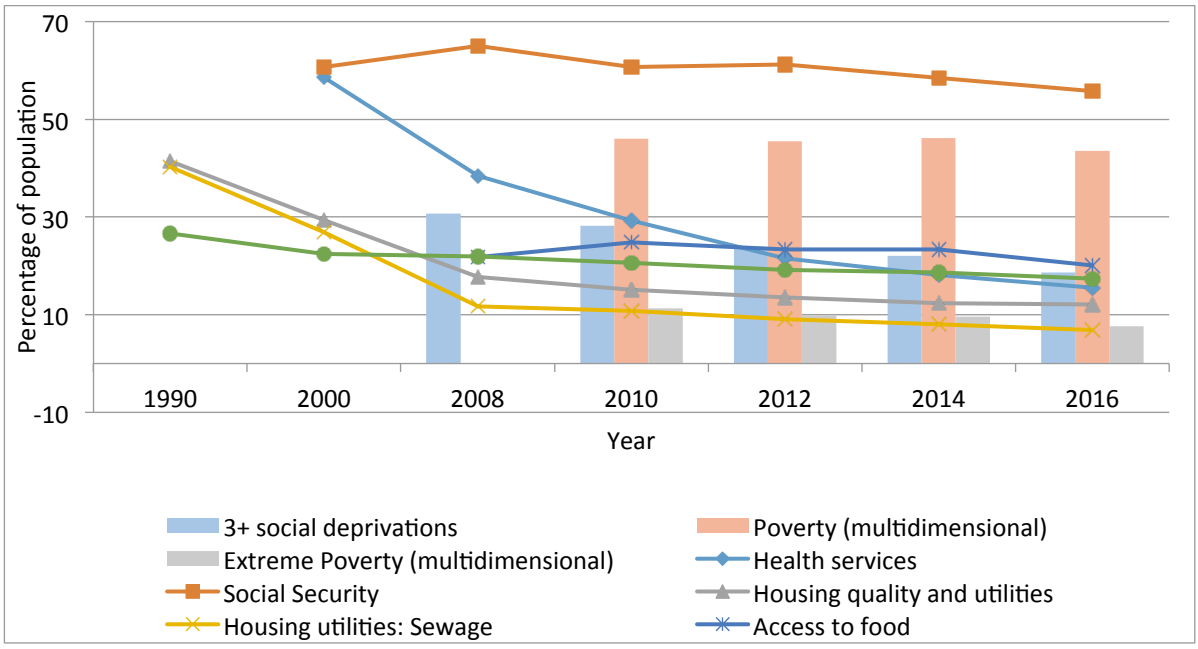
Source: Authors' compilation based on data from Consejo Nacional de Evaluación de la Politica de Desarrollo Social (CONEVAL 2017; i.e. National Council for the Evaluation of Social Development Policy): poverty, 1992–2014; Székely (2005): poverty and inequality, 1968–92; Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography; INEGI 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014a, 2016): inequality in total household income, 1992–2016; Socio-economic Database for Latin American and the Caribbean (SEDLAC): inequality in per capita income, 1989–2014; and INEGI (2014b) [*Encuesta Industrial Mensual*, 1968–2006; *Encuesta Mensual de la Industria Manufacturera*, 2007–14 (reported in *Estadísticas Históricas de México*)]: skilled and unskilled hourly manufacturing wages.

The data suggest a remarkable degree of persistence in both inequality and extreme poverty over this period. Inequality has fluctuated, declining from 1970 to 1984, increasing from 1984 to the mid-1990s, and declining again since then. However, the Gini coefficient today is similar to the level of 1984, and the current wage gap is comparable to the gap of the mid-1970s.

The persistence of absolute poverty is more surprising. 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 per cent) and even 1968 (24 per cent). Despite two 'lost decades' and the recurrent crises interrupting growth in the 1980s and 1990s, GDP per capita increased in real terms by almost 80 per cent in 1968–2014. However, this growth did not translate into an equivalent growth of labour income, which *declined* by 12 per cent over this period. As Figure 1 shows, unskilled wages show no long-term growth trend (except in 2000–05, when they coincide with the only period of rapid decline in extreme poverty). However, although the anthropometric series is consistent with the stagnation of extreme poverty between the 1970s and mid-1990s, it shows a clear decline in rural undernutrition by 1999, which accelerates over the next decade (reducing the incidence of stunting in rural areas from 43 to 21 per cent between 1988 and 2012). This evolution is consistent with the reallocation and effective targeting of food subsidies and cash transfers to poor rural areas over the last two decades, as documented below (Figures 5 and 17).

Since 2008 the official poverty measure in Mexico is multidimensional, combining income with six social dimensions or rights: access to basic education, to health services, to social security, to food, to housing of sufficient quality and space, and to basic housing services (electricity, clean water, drainage. A person is classified as *poor* if his/her income is below a moderate income poverty line (*línea de bienestar*, LB) and lacks access to at least one social right, and *extremely poor* if his/her income is below the cost of a basic food basket (*línea de bienestar mínimo*, LBM) and lacks access to three or more social rights. Figure 2 presents the evolution of poverty and extreme poverty thus measured, as well as the individual social dimensions. Two dimensions, in addition to income, show no or marginal progress since 2000: access to social security and access to food.

Figure 2: Evolution of multidimensional poverty and its social dimensions, 1990–2016



Source: Authors' compilation based on poverty measurements published by CONEVAL (2017).

The persistence of comparatively high levels of income poverty and inequality into the twenty-first century should also be surprising given the role of redistributive institutions in Mexico's history. The modern Mexican state emerged from the aftermath of the Mexican Revolution as a corporativist state with a strong redistributive agenda. The 1917 Constitution of Mexico introduced two important redistributive institutions, an agrarian reform and advanced labour protection laws, and the national public education, health, and social security systems were established in the first half of the twentieth century.

However, the coverage and fiscal resources allocated to these systems grew slowly and unequally over the second half of the twentieth century, with a bias in favour of urban populations. The notable exception was primary education (for those aged 6–12 years), which expanded rapidly in the first half of the twentieth century, although universal coverage was only achieved in the 1970s. By contrast, in 1970 the coverage of lower-secondary education (for those aged 13–15 years) was only 30 per cent (universal coverage was achieved in the 2000s), whereas upper-secondary and tertiary education covered less than 10 per cent of the relevant age groups in the same year.

The principal social security institutions were created in the 1940s (Instituto Mexicano del Seguro Social, IMSS; i.e. Mexican Social Security Institute) and 1950s (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, ISSSTE; i.e. Institute for Social Security and Services for State Workers), covering private and public sector workers, respectively. However, by 1970 only 15 per cent of the population was covered, and even at present half of the population lacks access to contributory social security.

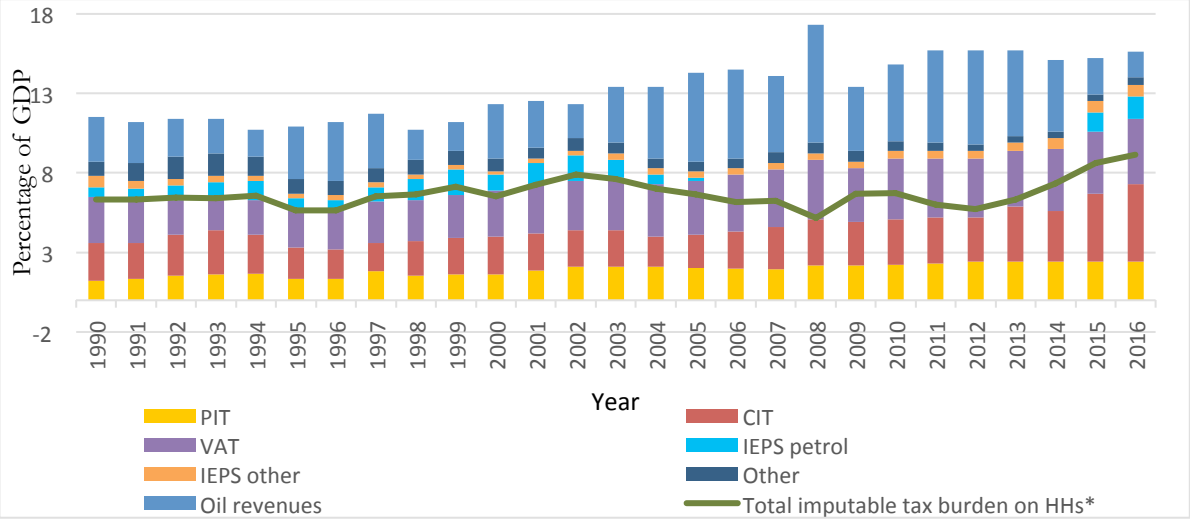
The Health Ministry (Secretaría de Salud) was created to provide health services for the uninsured also in the 1940s, leading to a dual and unequal health system. In contrast to social security, however, health coverage for the uninsured has increased significantly over the last two

decades through the expansion of these services and financial resources (most recently, through *Seguro Popular*, a public, non-contributory health insurance scheme). This contrast is clearly visible in Figure 2: health access deprivation was reduced from 61 to 19 per cent since 2000, whereas social security deprivation has barely declined from the same initial level.

As we will see in Section 4, large differences in the degree of progressivity persist between different programmes and system components (educational levels, health institutions), so the overall level of progressivity of the aggregate instruments—education, health, social security, direct transfers—depends on the allocation of fiscal resources between the different sub-components.

Mexico's fiscal capacity has been limited historically (Figure 3). 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 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 significant oil revenues over this period.

Figure 3: Tax and oil revenues (percentage of GDP), 1990–2016

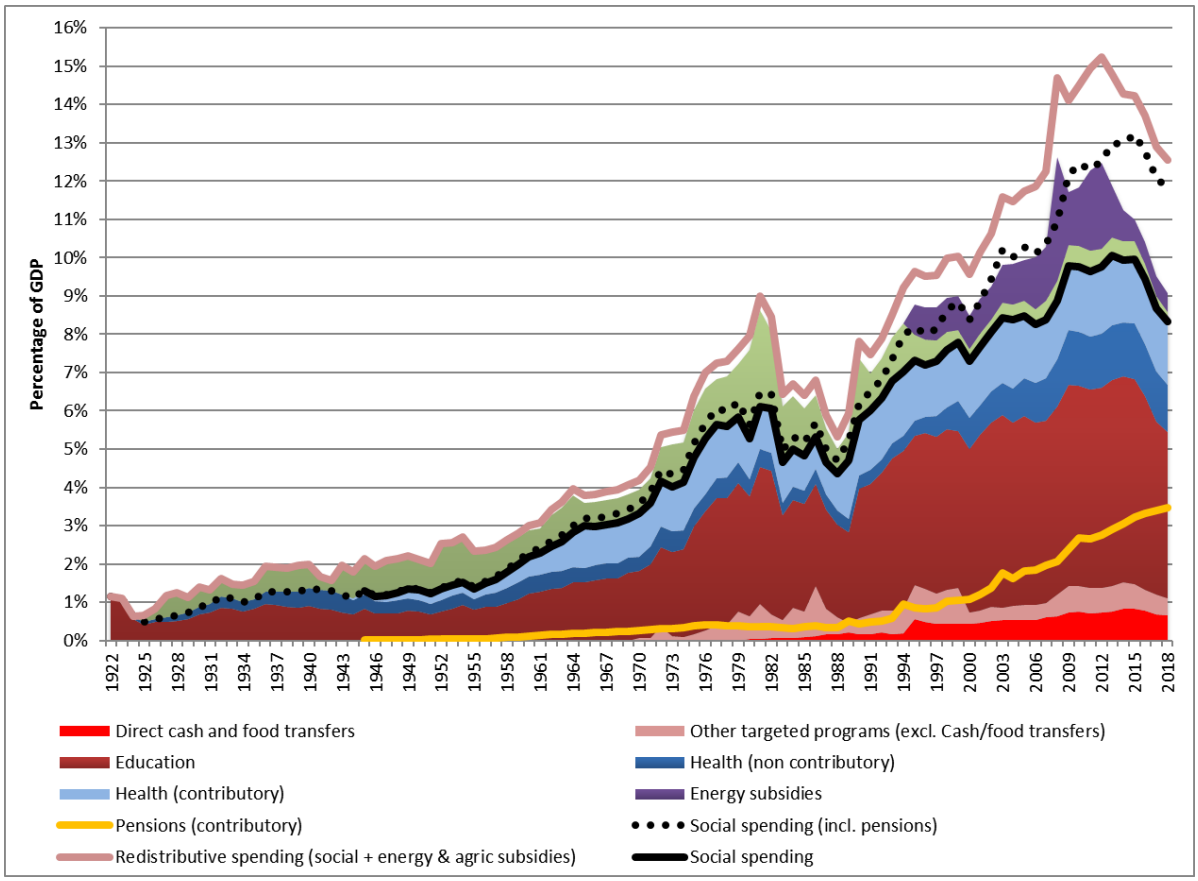


Notes: *Total imputable tax burden on households (HHs) includes all direct and indirect taxes, including petrol subsidies in 2005–14 which in Mexico are classified as negative special taxes on products and services (*Impuesto Especial sobre Productos y Servicios*, IEPS), but excludes corporate income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

Source: Authors' compilation based on data from SHCP (2017).

Public social spending expanded very slowly in the first half of the twentieth century (representing only 1.4 per cent of GDP by 1955, mostly in education), increased to 6 per cent by 1982, and again (after contracting in the 1980s) over the last two decades, reaching and remaining at around 10 per cent of GDP by 2015, excluding contributory pensions, and 13 per cent including pensions (Figure 4). Total redistributive spending (including agricultural and energy subsidies) reached 15 per cent of GDP in 2015. 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.

Figure 4: Public transfers (percentage of GDP), 1925–2018



Source: Authors' compilation based on data from INEGI (2014b), Instituto Mexicano del Seguro Social (Mexican Social Security Institute; IMSS 2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), SHCP (2017a, b, c, d), and Scott (2017a).

The period of analysis covered in this study (1992–2018) is of particular interest as it covers a number of significant transformations in social and fiscal policy in Mexico. These can be summarized as follows:

- *Growth of social spending*: Following the budgetary contractions in the 1980s' fiscal adjustment, social and redistributive spending almost tripled over the last three decades (1988–2018).
- *Increasing benefits to the poor*: Part of this growth in transfers has been allocated through more effective and equitable instruments than in previous decades, benefiting especially the rural poor. A broad reform process of social and agricultural support programmes was implemented in Mexico over the last two decades, including the introduction of agricultural cash transfers delinked from commercial production (and thus reaching poor farmers, *Programa de Apoyos Directos al Campo*, PROCAMPO; i.e. Programme for Direct Support in Agriculture), the introduction of a self-targeted temporary workfare programme, the *Programa de Empleo Temporal* (PET), and especially the creation of an effectively targeted CCT programme, PROGRESA, in 1997. PROGRESA grew in coverage across four federal administrations, expanding to urban areas and upper-secondary education as *Oportunidades* from 2001, and as *Prospera* from 2014 (introducing objectives of productive inclusion), while retaining its core objectives, instruments, and target population. Directly, the programme involved a reallocation of costly but ineffective food subsidies from urban (especially metropolitan) populations with low incidence of poverty and malnutrition to effectively targeted cash transfers on the

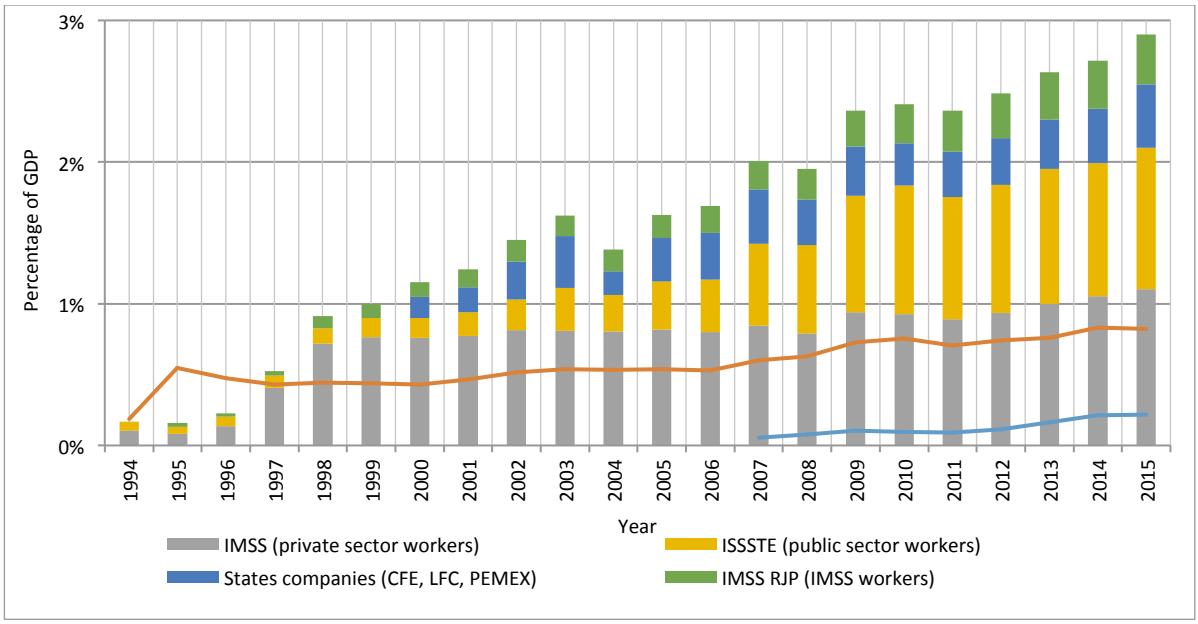
extremely poor in rural areas (for a detailed analysis of this reform, see Scott and Hernández 2018). Indirectly, the conditional design (together with the expansion of basic education and health services to rural areas) led to a significant increase in the access of poor households to these services. 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 (*Seguro Popular*), and through a basic, non-contributory, universal pension, the *Programa de Adultos Mayores* (PAM; i.e. Programme for Senior Citizens). Both of these programmes expanded their coverage gradually over the last decade, and have achieved or are close to achieving near universal coverage of uninsured households (*Seguro Popular*) and the uninsured elderly population lacking contributory pensions (*Adultos Mayores*), respectively.

- *Increasing transfers to contributory social security*: While these programmes have aimed to reduce the historical gaps in access to health and social protection between poorer uninsured and richer insured households, a much larger share of growth in social spending has been absorbed by transfers to the contributory pension systems in this period (Figures 4 and 5). A small part of these transfers represents statutory government contributions or minimum pension guarantees in IMSS and ISSSTE, but most arise from payments of current pensions fully financed by the government in the transition towards defined contribution systems (IMSS, ISSSTE), or from unfunded benefits of systems yet to be reformed (Petróleos Mexicanos, PEMEX). These transfers represent the component of social spending with the fastest growth in recent years, and will remain so for most of this century. In the context of recent austerity measures, total spending by the Social Development Ministry mainly in *Prospera* and *Adultos Mayores*, declined in real terms by 10 per cent between 2015 and 2017, whereas transfers to contributory pension schemes increased by 18 per cent.
- *Financed through the oil boom (1975/1990–2012)*: The expansion of social spending in this period 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 first decade (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 of the 2000s. The reallocation of public spending from the economic function was achieved in part through privatizations of non-strategic public firms, but also through a significant reduction in public investment.
- *After the oil boom, increasing tax burden (2012–18)*: In the face of collapsing oil revenues in recent years due to declining 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 have finally increased significantly, from 10 per cent in the last couple of years to 14 per cent in 2016), making up some of the loss in oil revenues (Figure 3). This increase has been achieved mainly through the reduction of exemptions on (mostly corporate) income tax, and the transition from petrol subsidies to taxes, as described next.
- *From petrol subsidies to petrol taxes*: Between 2006 and 2014, the special taxes on products and services (i.e. *Impuesto Especial sobre Productos y Servicios*, IEPS) on petrol became negative (i.e. a subsidy) as domestic petrol prices were not adjusted to keep up with the increase in international petrol prices accumulated since 2002 (Scott 2017a). In the context of an energy reform and the recent decline in petrol prices, the subsidy again turned into a tax by 2014. This, plus the elimination of a subsidy on liquefied petroleum gas (LPG) and a reduction in electricity subsidies, has led to a significant reduction in indirect subsidies and increase in indirect taxes.
- *Increasing net tax burden (2008–18)*: The redistributive power of a fiscal system measured by the change from market to consumable income depends on the size of cash benefits

received by poorer households (direct transfers plus indirect subsidies) relative to their tax burden. The main constraint on the redistributive power of Mexico's fiscal system on consumable income is the small share of direct cash transfers, generally (certainly in Mexico) the most effective transfer instrument available to governments. The uncompensated increase in the decline in indirect subsidies combined with the increase in the tax burden has reduced net cash transfers and subsidies in Mexico from −5.2 to 9.8 per cent of GDP, or increased the tax burden net of cash benefits by 4.6 per cent of GDP (Figure 6).

To illustrate Mexico's fiscal system in a comparative perspective on the last point, Figure 7 compares estimates of the reductions in the Gini coefficient associated with direct taxes and transfers (disposable income), with the size of cash transfers relative to GDP, for two groups of countries: (a) low-income to upper-middle-income countries, from the CEQ database, and (b) upper-middle-income to higher-income countries, from the Organisation for Economic Co-operation and Development (OECD) database. As can be seen, there is a strong correlation between the scale of transfers and the redistributive effect. The OECD estimate for cash transfers in Mexico is higher than the value reported in this paper (and CEQ), because the former includes contributory pensions, but this is still distant from the OECD average (2 versus 12 per cent of GDP, associated with a 2- versus 16-point reduction of the Gini coefficient). Mexico also falls in the lower half of the CEQ sample in scale of cash transfers. Its redistributive effect is slightly higher than countries with larger transfers, reflecting the comparative progressivity of its transfers, but this effect is again very distant from what is achieved by the countries with the largest transfers.

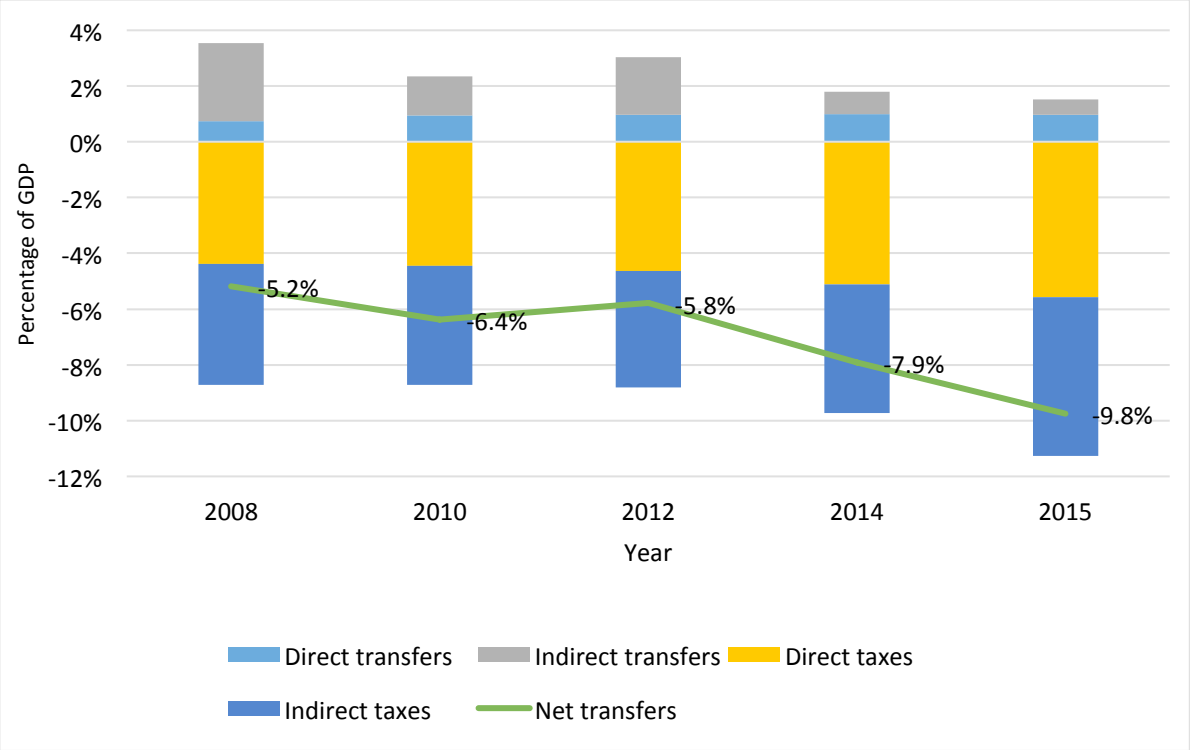
Figure 5: Contributory pensions and transfers to contributory pensions, contrasted with direct cash transfers and non-contributory pensions, 1990–2015 (percentage of GDP)



Note: Targeted cash and food transfers include: PROGRESA-*Oportunidades-Prospera*, *Programa de Apoyos Alimentarios* (PAL), PROCAMPO-*ProAgro*, *Programa de Adultos Mayores*, *Programa de Empleo Temporal* (PET), *Desarrollo Integral de la Familia* (DIF; i.e. integral family development) school breakfast/food baskets, *Diconsa*, and *Liconsa*.

Source: Authors' compilation based on data from Gobierno de los Estados Unidos Mexicanos (2017) and SHCP (2017b).

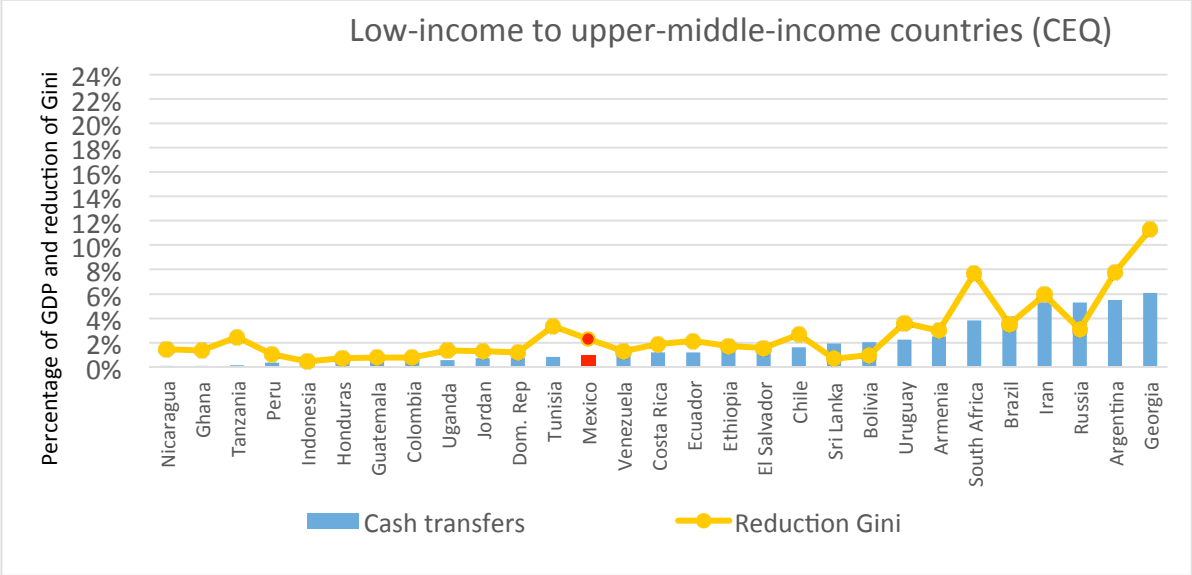
Figure 6: Cash benefits versus tax burden: Net direct and indirect transfers, 2008–15 (percentage of GDP)



Source: Authors' compilation based on data presented in Figures 3, 4, and 6.

Figure 7: Fiscal redistribution and cash benefits versus tax burden: Comparative perspective (percentage of GDP)

(a)



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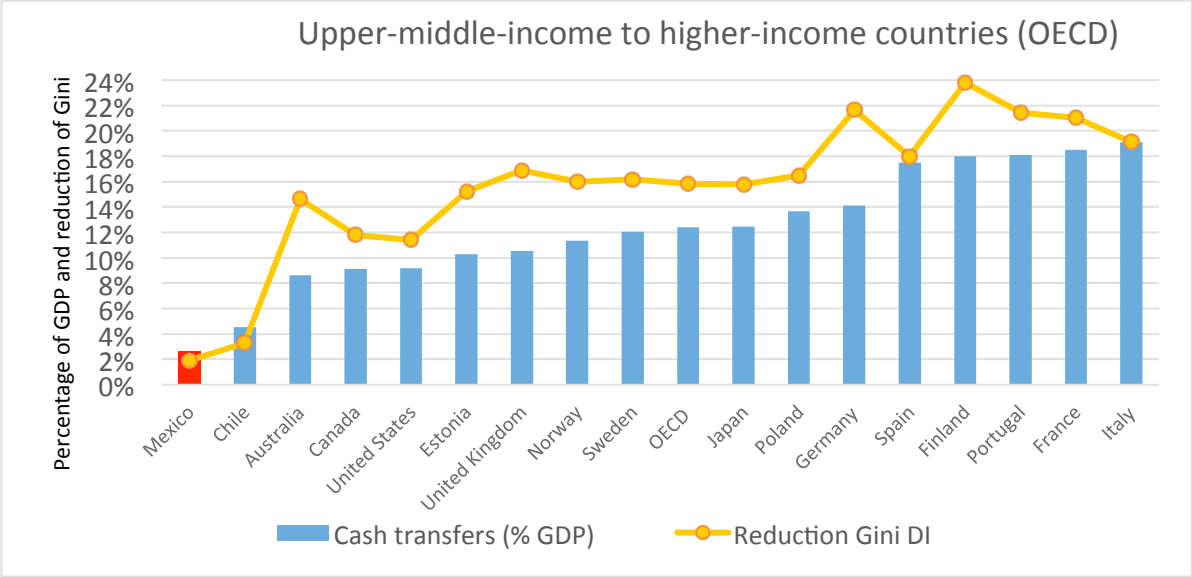


Notes: Dom. Rep, Dominican Republic. Most data are from 2010 or later.

Source: Authors' compilation based on the OECD Income Distribution Database (OECD 2017) and the CEQ project database (CEQ 2017), accessed 24 July 2017.

3 Fiscal incidence analysis: Methods, data, and limitations

This section describes the methods and data used in this analysis. We consider at the outset the uses and limitations of the basic methodology of fiscal incidence (Section 3.1), before describing the data and assumptions for the standard analysis applied to Mexico (Section 3.2) and the adjustment method for income underreporting (Section 3.3).

3.1 Uses and limitations of the analysis

The study uses standard (average and marginal) fiscal incidence analysis. The basic fiscal incidence methodology is a powerful tool to estimate the distribution of public transfers and tax burdens and their redistributive effects, but its uses and limitations should be stated clearly at the outset.

- It estimates the distribution of public benefits and tax burdens based on data on the reception of transfers, use of services, income and expenditures reported by households in income and expenditure surveys, and of transfer and tax data reported by public accounts.
- It estimates incidence and distributive effects in an accounting rather than impact evaluation framework, and in its simplest form ignores behavioural, equilibrium, and dynamic effects, but it allows us to estimate the distributive effect of the principal instruments of social and fiscal policy and the fiscal system as a whole, for which of course an impact evaluation would not be possible.
- It reveals and makes transparent the collective distributive choices of society, through governments.
- Given its limitations in contrast to economic modelling and impact evaluation, its results should be interpreted as a starting point, rather than as the end point, for more sophisticated, detailed, specialized analysis and techniques. More sophisticated and time-consuming analysis may often not affect the principal results and policy implications revealed by fiscal incidence analysis.
- Fiscal policy can affect the distribution of final income: (a) by modifying the relationship between market income and final income through the direct, first-order (accounting) effect of taxes and transfers, (b) by modifying market income through the behavioural and market equilibrium effects of the fiscal system, and (c) by modifying market income through the distribution of assets, in the long run. Fiscal incidence analysis considers only the first effect. Microsimulations can be used to analyse the second effect.
- The asset-redistribution effects of fiscal policy on market income are generally ignored by fiscal incidence analysis or simulation methods, despite the fact that this is the primary objective of in-kind transfers (human capital) and CCTs.
- Specific limitations:
    - In-kind transfers, valued as benefits to users at cost of provision (public accounts), ignore inefficiencies, rents, or corruption in the production of public services.
    - In-kind transfers, often imputed by general use of services, ignore differences in quality and costs of different services (especially where variations can be very large, as in health care)
    - Cash transfers are distributed as reported by households, as in the case of other income sources; public transfers are generally underreported by households in income surveys.
    - Taxes are imputed on the basis of tax laws and evasion assumptions, but tax laws are complex and the level of detail may not be represented in the data. Results may be sensitive to assumptions on tax avoidance.
    - The burden of personal direct taxes are assumed to fall fully on workers, indirect taxes/subsidies on consumers, and corporate income tax and other important sources, like oil rents, are excluded from the estimate as we lack a clear basis to impute these to households.

- Contributory pensions are generally treated either as market income or as transfers. Generally, they involve both, but these are difficult to unpack.
- Imputing net benefits from contributory pensions require lifecycle information on the flow of benefits and contributions, but this is generally not available.
- Adjustment methods to correct for underreporting are imperfect, require strong assumptions, and results can vary widely for different methods.

- Caveats on interpretation:
  - All public policy has redistributive effects, intentionally or collaterally; incidence is always of interest, but should not be interpreted as the only or even principal objective of social spending.
  - In the case of education, health, and social security systems, provided universally, nominally accessible to all, without administrative barriers or targeting mechanisms, the degree of progressivity depends on multiple factors, including: (a) population coverage, (b) geographic coverage (physical access), (c) costs, (d) quality, and (e) capture. High costs exclude poorer households, whereas low quality dissuades richer households. Progressivity may be achieved by increasing coverage, reducing costs, or controlling capture, but also through low quality of services (self-selecting the poor).

3.2 Data and assumptions

The basic methodology, data, and assumptions for benefit incidence analysis used in this study were originally developed by the principal author of this study (Scott 2002, 2004). These methods have also been adopted in official fiscal incidence reports published annually by Mexico's Finance Ministry since 2001 (see SHCP 2001–16). We have in turn drawn on the latter studies for some of the assumptions for the tax incidence estimates presented in this study. The main analysis and indicators of redistributive effects presented in the present study, for 2008–14, have been developed in the context of an international standardized comparative project on fiscal incidence, currently covering 29 countries: the 'Commitment to Equity' project[4] and institute coordinated by Nora Lustig at Tulane University (CEQ 2017).[5]

The principal data sources used to estimate the distribution of taxes and benefits at the household level is ENIGH (1992–2014) and Mexico's federal public accounts (SHCP 2017b). ENIGH is the most detailed source available in Mexico for distributive analysis of household income and expenditures, including cash and in-kind government transfers. ENIGH reports directly the principal federal cash transfers, including *Prospera*, PROCAMPO (ProAgro), *Programa de Adultos Mayores* (PAM), *Programa de Apoyo Alimentario* (PAL, a cash/food transfer integrated with *Prospera* in 2016), PET, and public scholarships (other than PROGRESA), as well as non-contributory pension programmes implemented by state governments, similar to PAM; we use household residence to identify separately the largest and oldest of these in Mexico City.

The principal in-kind transfers—health and education services—are imputed on the basis of *use* of these services reported by households in the survey (except *Seguro Popular*, which is estimated

[4] Led by Nora Lustig since 2008, the Commitment to Equity (CEQ) project is an initiative of the Center for Inter-American Policy and Research and the Department of Economics, Tulane University, the Center for Global Development and the Inter-American Dialogue. The CEQ project is housed in the CEQ Institute at Tulane.

[5] For a description of the methodology, see Chapters 1, 6, 7, and 8 in Lustig (2018, forthcoming).

on the basis of reported *affiliation*), and the cost of provision as reported in public federal accounts. This analysis also considers state spending on these services based on data reported by the federal Health (National and State Health Accounts) and Education Ministries (based on the enrolment in state-financed schools, with spending per student assumed to be the same as in federal schools). The incidence of education spending is estimated by level of education (primary, secondary, and tertiary), and of health services by providing institutions, in particular contributory and non-contributory services.

Smaller social programmes are included in a general transfer label ('other social programmes') in ENIGH, but we also use a special module of social programmes commissioned by the Social Development Ministry as part of ENIGH for selected years (most recently in 2010) to identify some of the smaller in-kind transfers. These include *Piso Firme* (concrete floors), *Desayunos escolares/Despensas* food assistance programmes (school breakfast and food baskets) provided by *Desarrollo Integral de la Familia* (DIF; i.e. integral family development), *Liconsa* (targeted milk-subsidy), *Diconsa* (a large rural network of subsidized stores providing basic products), and *Estancias Infantiles* (day-care centres).

Contributory pension income is classified as part of market income in the main incidence analysis presented here. All estimates are available from the authors treating pension income as a direct transfer. As noted in Section 2, the contributory pension systems in Mexico are at present heavily subsidized. Although these subsidies are not included as transfers in the estimates of fiscal redistribution in the present analysis, concentration coefficients are estimated based on the affiliation to social security institutions reported by active workers and pensioners in ENIGH.

The *domestic electricity subsidy* is imputed using previously published estimates by the authors (see Annex 5 in Komives et al. 2009, based on the tariff structure and household spending reported in the 2006 ENIGH survey. The *gasoline subsidy* is imputed on the basis of household spending, estimating separately three effects: (a) direct spending on gasoline for private transport, (b) indirect benefit from public transportation, and (c) indirect benefits from transportation of goods and services (the share allocated to public versus private transportation is obtained from SHCP (2001–16). The *LPG subsidy* is imputed on the basis of household LPG consumption.

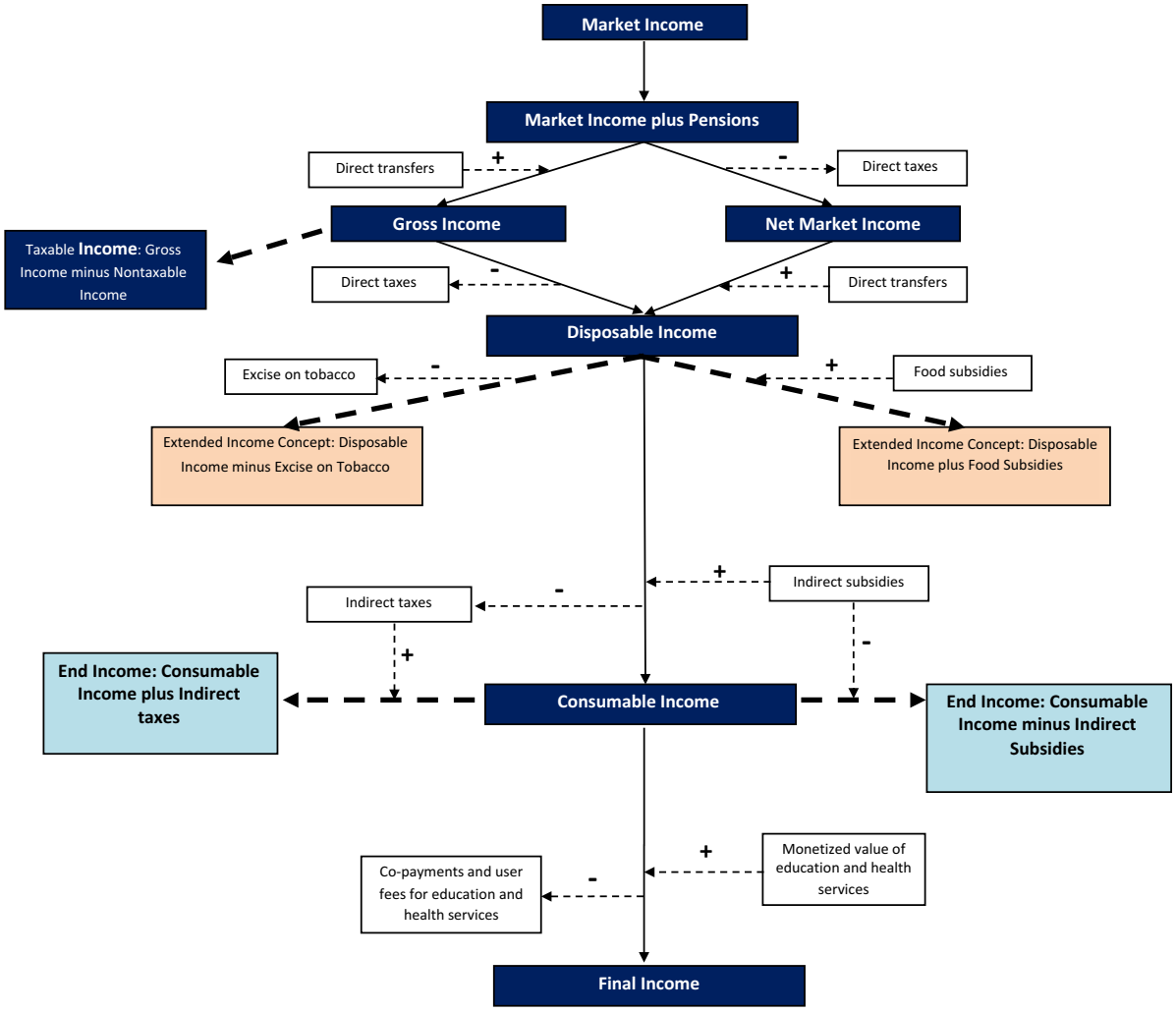
ENIGH reports incomes and expenditures *after taxes*, but does not report taxes directly. Taxes are imputed applying tax laws to the relevant income sources, taking into account tax avoidance or informality as described in Annex A.

Changes in poverty are presented using Mexico's national income poverty lines (LBM and LB) as well as international poverty lines.

Figure 8 defines the different income concepts used in the fiscal incidence analysis.

Figure 8: Income concepts in fiscal incidence analysis

Definitions
Core Income Concepts in dark blue background
Fiscal Interventions in white background
Examples of Extended Income Concepts in light orange background
Examples of End Income Concepts in light blue background



Source: Lustig (2018, forthcoming).

3.3 Adjustment for income underreporting

As most income/expenditures surveys in the world, ENIGH suffers from income underreporting. In the case of fiscal incidence analysis, adjusting for underreporting is necessary not only to obtain a more accurate estimate of the distribution of market income but also to ensure consistency between the two principal data sources used: market income from ENIGH, and the fiscal system which we assume to be accurately reported in the public accounts. We estimate fiscal incidence using a benchmark method and two alternative methods of adjustment. The benchmark method (*adjustment 1*) is the simplest possible adjustment to ensure consistency between these two sources. We apply a common adjustment factor to all income sources in

ENIGH which is equal to the ratio of total disposable income in the national accounts to total disposable income reported in ENIGH (the poverty lines are adjusted by the same factor). The adjustment is obviously equivalent to scaling back the taxes and transfers obtained from public accounts by the inverse of this ratio (while keeping the original unadjusted poverty lines). This adjustment ensures consistency between total fiscal resources and total market income, but preserves the original market income distribution obtained from ENIGH.

Besides the benchmark method, the two alternative adjustment methods change the income distribution reported in ENIGH, considering that the degree of underreporting is not homogeneous across income sources and income groups. The first alternative method (*adjustment 2*) applies adjustment factors derived from wage data obtained from the administrative records of the social security system covering private sector workers (IMSS). The factor used is equal to average wage in the administrative data × 80 per cent / average wage in survey, per percentile, and affects only the top 60 per cent of the distribution, increasing from 1 in the 40th percentile to 2.3 in the 100th. Applying these factors to formal wage income only has no significant effect on the results from the previous analysis. Alternatively, we may assume that the degree of underreporting by income percentile observed in these data is representative not only of formal wages but also of all income sources. Given that the comparison of ENIGH with national account shows that wage income has the lowest degree of underreporting among all income sources (Table 1), this assumption may still be considered as a conservative lower-bound correction of underreporting for total income.

The second alternative method (*adjustment 3*) applied in this study adjusts income sources separately to their equivalent in national accounts, and uses other sources to determine the allocation of the missing income between income groups within each source. The specific methodology used here is based on the study by Del Castillo Negrete (2015), and has older antecedents in the adjustment methods applied by the Economic Commission for Latin America and the Caribbean. Table 1 compares the main income sources as reported by ENIGH and the national accounts.

Table 1: Comparison between the national accounts and ENIGH, 2012

	ENIGH (*a*) (in million MXP)	National accounts (*b*) (in million MXP)	Factor (*b*/*a*)
Wage income (subordinate workers)	2,499,683	3,668,535	1.47
Mixed income (independent business)	607,819	2,929,462	4.82
Interests	5,163	102,679	19.89
Dividends	143,828	2,416,475	16.8

Source: Authors' compilation based on data from Del Castillo Negrete (2015).

The two sources accounting for the largest differences are income from independent business activities (mixed incomes) and property income (dividends). While it is clear that the ENIGH survey is especially unsuited to capture property income, it is also possible in principle that the national accounts overestimate the share of property income received by households (the size of property income relative to other sources in the households account of the national accounts is unusually large in Mexico, and this is the only country in the OECD where 100 per cent of dividend income is reported in the households account). In addition to understanding these differences, the main challenge for the adjustment methodology is how to allocate the missing income. Here, we adopt the assumptions proposed by Del Castillo Negrete, which are informed

in other (administrative) data but have inevitably a large element of uncertainty. This exercise must therefore be interpreted as an illustration of how much the income distribution can change when adjusting by income sources and income strata, rather than any suggestion that this is the only or most defensible set of assumptions. The three main allocation assumptions are discussed below.

Wage income

The classification of occupations, based on the Sistema nacional de clasificación de ocupaciones (SINCO; i.e. the National Classification System of Occupations), is used to impute the missing income. Evidence from administrative sources indicates that underreporting is larger for higher occupational hierarchies. Assumptions to allocate missing income: 80 per cent to officials, managers, and directors; 15 per cent to professionals and technicians; 5 per cent to auxiliary workers in managerial activities (income allocated within each group in proportion to the declared wage income).

Mixed income

Twenty per cent of missing income is allocated to self-employment workers whose occupation is ranked in the first three divisions of SINCO. The remaining 80 per cent is distributed among all households reporting independent business income, in proportion to the declared income.

Property income: Interests on bank deposits and dividends

Missing interest income is allocated to individuals reporting such income in the survey, in proportion to the amount declared. Missing dividend income is allocated based on the number of private investment accounts reported in the financial system, to the 2.5 million of individuals with highest adjusted incomes by the previous criteria.

The three adjustment methods imply different total adjustment factors for market income as reported in the ENIGH survey, and therefore different tax/transfer rates, as shown in Table 2.

Table 2: Average adjustment factors on 2012 ENIGH: Market income and tax/transfer rates (percentage of market income)

	Average adjustment factor	Transfer rate (%)	Tax rate (%)
Benchmark	2.19	15.7	11.6
Adjustment 2	1.44	23.3	17.3
Adjustment 3	2.26	15.4	11.4

Source: Authors' calculations based on adjustment methods and sources described in this section.

4 Fiscal incidence results: 1992–2015

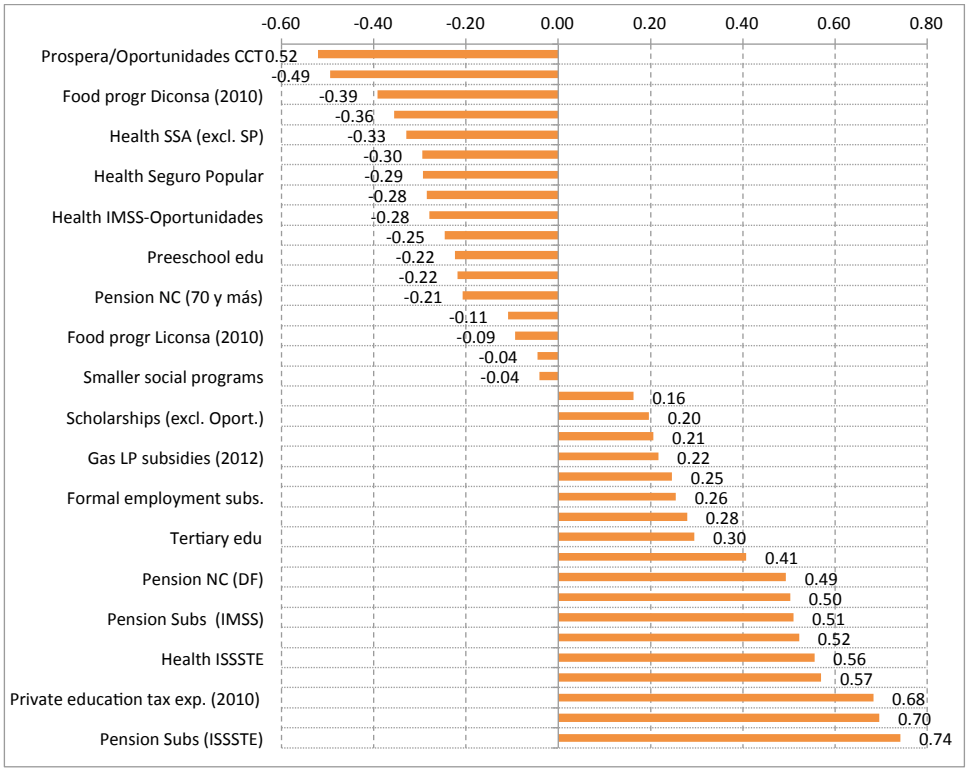
4.1 Distribution and incidence of taxes and transfers

This section presents a comprehensive benefit incidence analysis for the principal public transfers (education, health, social security, direct cash transfers) for 1992–2014, and the full fiscal system for 2008–14, as well as an estimate for 2015 (reflecting the effect of an increase in net indirect taxes).

Comparable data for fiscal incidence analysis prior to the early 1990s are not available in Mexico, but the low coverage rates of many basic social benefits in earlier decades (Section 2) clearly imply that most social spending in earlier decades was not pro-poor, and a large part was probably regressive (unequalizing).

We observe a wide range in the degree of progressivity of social transfers (Figures 9–12). The most progressive are targeted cash and food transfers (*Prospera*, PET, *Diconsa*, PAL, DIF school breakfast/food baskets), followed by PROCAMPO, health services for the uninsured, basic education, and non-contributory pensions. The least progressive are transfers to contributory social security benefits for public sector workers (ISSSTE), basic private education tax deductions, and petrol subsidies (effect on private transport), all of which are regressive (unequalizing), followed by transfers to IMSS, petrol subsidies (effect on transport of goods), and tertiary education. Scholarships other than *Prospera* as well as some targeted transfers (*Liconsa*, Estancias Secretaría de Desarrollo Social, SEDESOL; i.e. Secretariat of Social Development) are not effectively targeted on the poor but concentrated on middle-income groups.

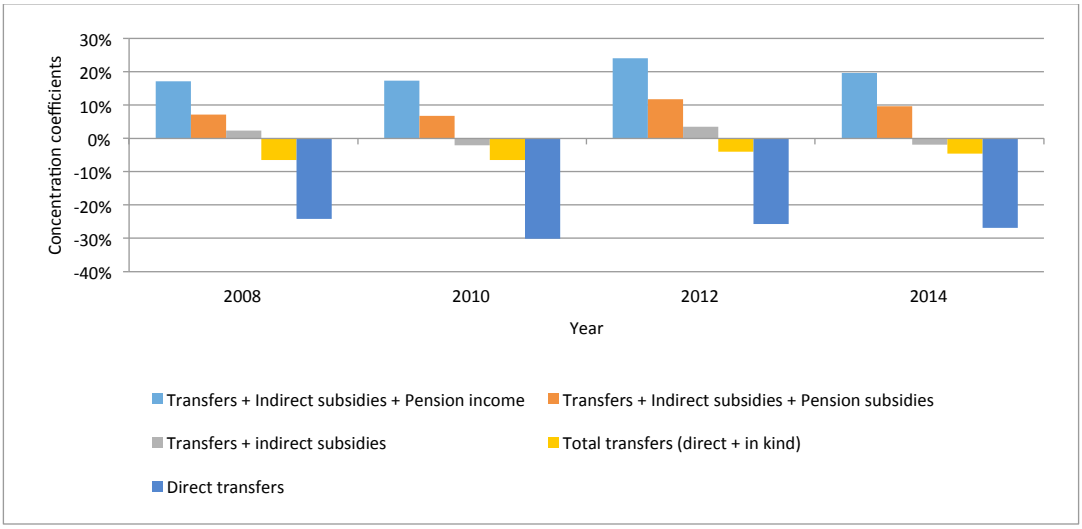
Figure 9: Concentration coefficients for all transfers and subsidies, 2014*



Note: *Except where otherwise noted.
Source: Authors' estimates based on data in ENIGH (see INEGI 2010, 2012, 2014a).

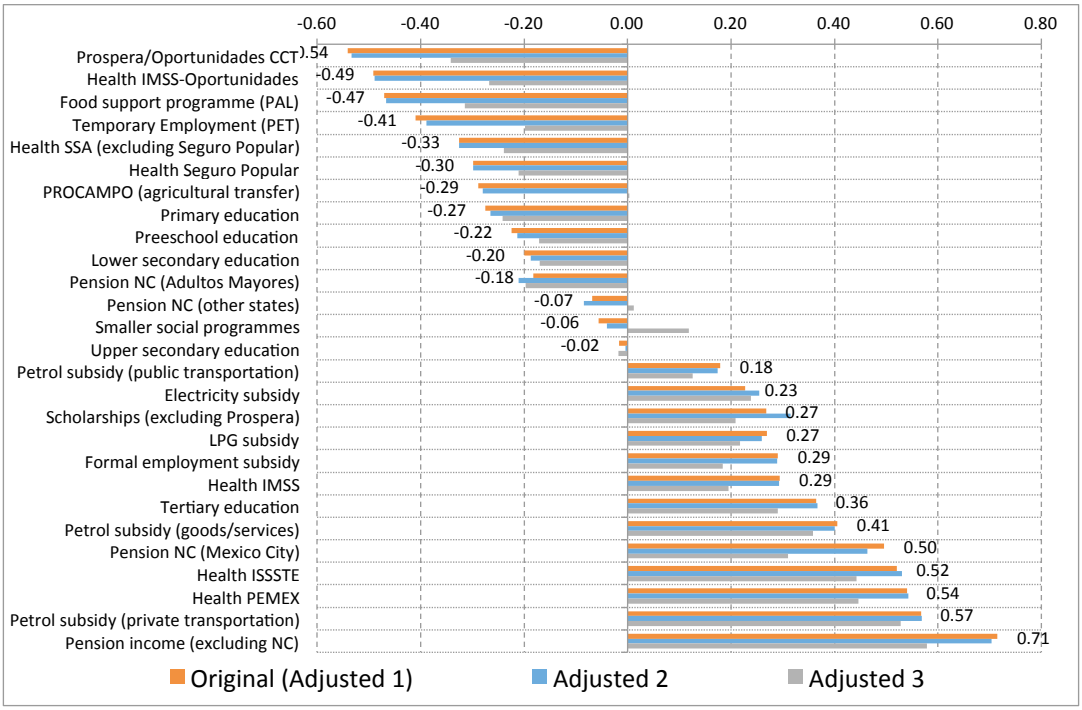
Considering broader transfer categories, direct transfers are the most progressive, while in-kind transfers are close to neutral (flat) in absolute terms (Figure 10 and Table 3). We observe an increasing loss of progressivity if we start with direct transfers and add in-kind transfers, indirect subsidies, pension subsidies, and finally pension income.

Figure 10: Concentration coefficients of total transfers



Source: Authors' estimates based on data reported in ENIGH (see INEGI 2008, 2010, 2012, 2014a), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

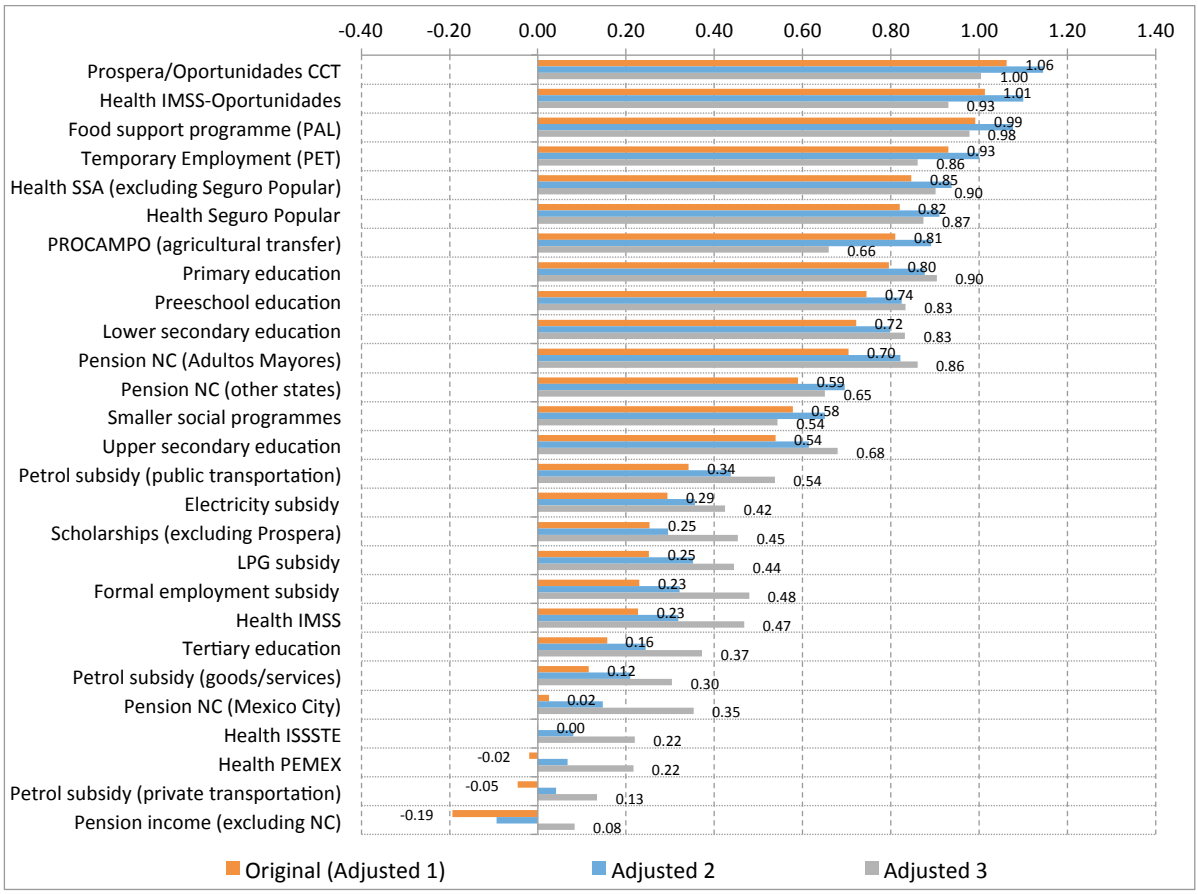
Figure 11: Concentration coefficients for all transfers and subsidies with alternative adjustments, 2012



Notes: CCT, conditional cash transfer; PAL, *Programa de Apoyo Alimentario*; PET, *Programa de Empleo Temporal*; SSA, Secretaría de Salud; SP, *Seguro Popular*; NC, non-contributory; IMSS, Instituto Mexicano del Seguro Social; DF, Distrito Federal (Mexico City); ISSSTE, Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado; PEMEX, Petróleos Mexicanos.

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b); percentile adjustment factors based on IMSS wage records (provided by Facundo Alvaredo).

Figure 12: Kakwani coefficients for transfers and subsidies with alternative adjustments, 2012



Note: Same as for Figure 11.

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b); percentile adjustment factors based on IMSS wage records (provided by Facundo Alvaredo).

Table 3: Concentration coefficients and resources for the principal transfers and taxes, 2008–14

	Concentration coefficient				Kakwani coefficient		Resources (% market income)			
	2008	2010	2012	2014	2012	2014	2008	2010	2012	2014
Net transfers and subsidies							4.9	4.4	5.2	2.7
Transfers + indirect subsidies + pensions	0.1708	0.1734	0.2416	0.1972			20.0	19.3	21.3	18.8
Transfers + indirect subsidies + pension subsidies	0.0715	0.0678	0.1174	0.0961			17.4	16.7	17.2	15.8
Transfers + indirect subsidies	0.0229	−0.0196	0.0348	−0.0184	0.4857	0.5409	15.5	14.1	14.9	13.2
Total transfers	−0.0653	−0.0644	−0.0397	−0.0455	0.5602	0.5680	11.5	12.1	12.0	12.1
Direct transfers	−0.2406	−0.3008	−0.2570	−0.2693	0.7776	0.7918	1.1	1.3	1.3	1.4
In-kind transfers	−0.0476	−0.0350	−0.0205	−0.0252	0.5411	0.5478	10.5	10.8	10.7	10.7
Health	0.0042	0.0356	0.0489	0.0559	0.4716	0.4666	3.8	4.3	4.5	4.2
Education	−0.0770	−0.0866	−0.0707	−0.0777	0.5913	0.6002	6.7	6.3	6.2	6.5
Indirect subsidies	0.2758	0.2558	0.3559	0.2890	0.1646	0.2335	4.0	2.0	2.8	1.1
Pension subsidies	0.4774	0.5425	0.6242	0.6624	−0.1036	−0.1399	1.9	2.6	2.4	2.6
Pension income (excluding non-contributory)	0.6885	0.6956	0.7165	0.6959	−0.1959	−0.1733	4.4	5.2	6.4	5.7
Total taxes	0.5952	0.6173	0.6148	0.5782	0.0590	0.5952	11.6	11.4	11.2	12.2
Direct	0.8253	0.8060	0.7439	0.7427	0.2233	0.8253	3.1	3.2	3.3	3.7
Indirect	0.5076	0.5213	0.5003	0.4884	−0.0203	0.5076	6.2	6.0	5.7	6.2
Social security contributions	0.5143	0.6080	0.6617	0.5676	0.1411	0.5143	2.2	2.2	2.2	2.3

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2008, 2010, 2012, 2014a), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

Table 4 compares concentration shares and incidence estimates between indigenous and non-indigenous populations. Here, we use the narrower ethnic definition, in terms of language (rather than auto-identification), which identifies just 6.4 per cent of the population as indigenous in 2014. This represents the poorest, most isolated, and vulnerable group in Mexico: extreme market income poverty in 2014 was 17.7 per cent for the non-indigenous population, but 61.4 per cent for the indigenous population (Figure 23). However, this is not a homogeneous group: income inequality within the indigenous population (0.54) is significantly higher than within the non-indigenous population (0.51).

Table 4: Concentration shares and incidence of fiscal system for indigenous and non-indigenous populations, 2014

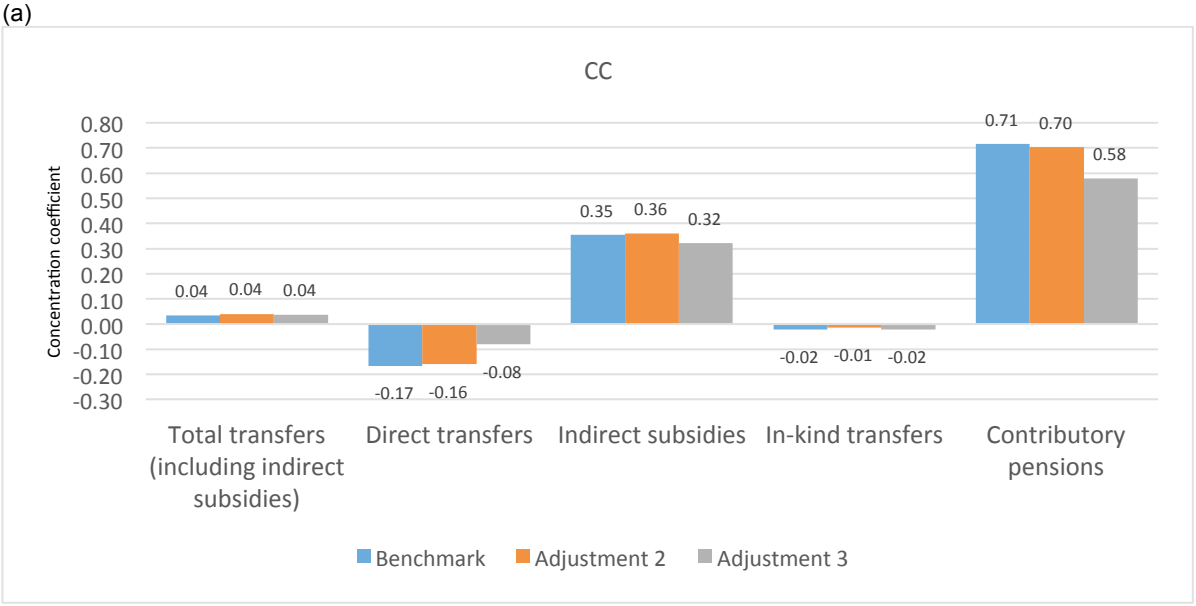
	National concentration shares (%)		Decile 1: Incidence (%)	
	Indigenous	Non-indigenous	Indigenous	Non-indigenous
Population	6.4	49		
Original income	2.2	25		
All transfers	6.5	30.3	159.4	125.1
All direct transfers	10.2	30.7	33.4	25.7
Flagship conditional cash transfers	18.9	36.5	23.0	13.6
Non-contributory pensions	9.7	27.9	5.8	5.1
Education	6.3	29.7	79.1	64.0
Health	6.1	33.2	44.8	30.8
All taxes	1.7	20.5	−9.4	−12.5
Net indirect taxes	2.5	18.8	−11.5	−17.0
Direct taxes	1.1	20.1	0.0	−0.1

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2014a), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

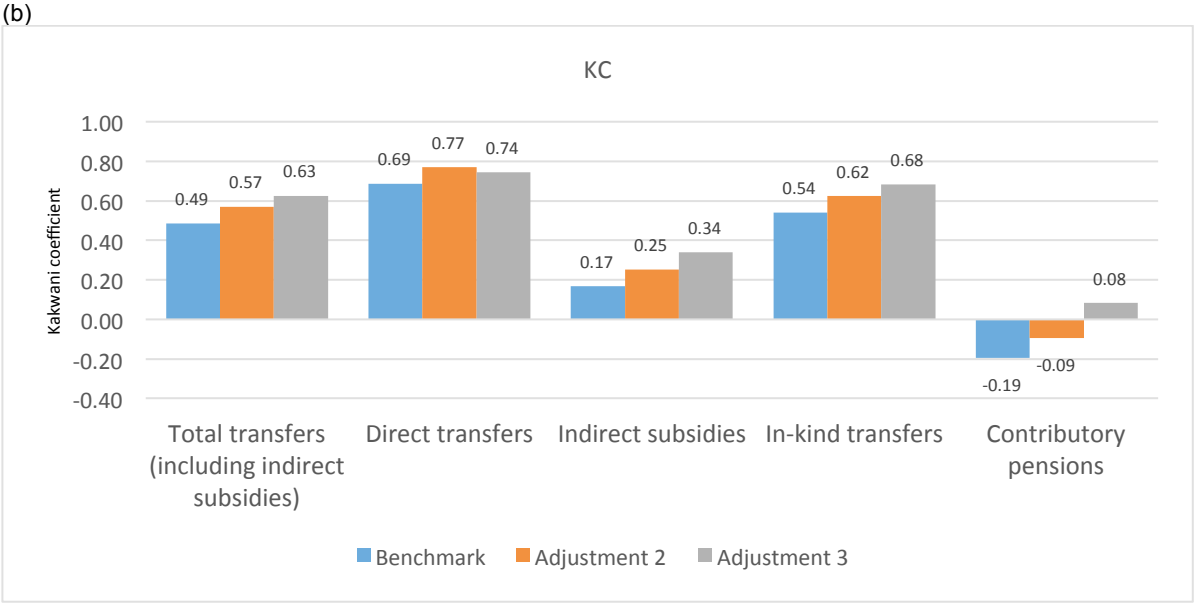
Figures 13–15 and Table 5 compare the benchmark concentration estimates using a common national accounts adjustment factor (benchmark), with estimates obtained from two alternative adjustment methods described in Section 3.3, based on IMSS wage records (adjustment 2) and on differentiated national accounts adjustments by income source and group (adjustment 3). Adjustment 2 concentration coefficients are very similar to the benchmark scenario, but adjustment 3 compresses the range of concentration coefficients significantly: from (−0.54, 0.71) to (−0.34, 0.58). Despite this, the overall distribution of transfers plus indirect subsidies (excluding contributory pensions) is practically neutral in absolute terms in the three scenarios. The Kakwani coefficients are more progressive for adjustment 2 than for the benchmark scenario for all transfers, reflecting the higher market income Gini coefficient. Despite the compression of the concentration coefficients, adjustment 3 values are even more progressive than adjustment 2 ones (except for direct transfers), again reflecting mainly the high market income Gini coefficient obtained with this method. As these adjustments for underreporting 'stretch' the upper end of the market income distribution, the beneficiaries of the least progressive transfers fall into lower income strata than what is implied by the benchmark scenario. The ranking of the transfers in terms of progressivity is maintained precisely in adjustment 2, and broadly in adjustment 3 (with some interesting exceptions in the latter: PROCAMPO falls in relative degree of progressivity, whereas IMSS subsidies and upper secondary education rise).

Figure 13: Concentration (a) and Kakwani (b) coefficients of transfers and subsidies with alternative adjustments, 2012

(a)



(b)



Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b); percentile adjustment factors based on IMSS wage records (provided by Facundo Alvaredo).

Table 5 presents Kakwani coefficients for taxes. The tax system as a whole is only slightly progressive, but becomes neutral and slightly regressive under the adjustment 2 and 3 scenarios, respectively. This reflects the effect of indirect taxes, mainly value-added tax (VAT), which are close to neutral in the benchmark scenario, but become regressive in the adjustment 3 scenario. The special taxes on products and services (i.e. IEPS) vary from quite progressive (alcohol) to quite regressive (petrol taxes as they affect public transport, and the recent 'sin' taxes on sugary sodas and calories).

Given the strong impoverishing effect of (net) indirect taxes to be shown below, it is important to test the robustness of VAT coverage. In addition to the alternative adjustment scenarios, Table 5 also presents an alternative estimate excluding all rural households from VAT, not only

those buying in 'informal' venues within the rural sector, as in the benchmark scenario. This has a small effect on VAT and a negligible effect (0.02 ppt) on the overall progressivity of the tax system.

Table 5: Kakwani coefficients for taxes with alternative adjustments, 2012 and 2014

Taxes	2012			2014	
	Benchmark	Adjustment 2	Adjustment 3	Benchmark	VAT (rural excluded)
All taxes	0.09	0.01	−0.06	0.07	0.09
Direct taxes	0.23	0.21	0.18	0.23	
Total indirect	−0.02	0.06	−0.21	−0.02	0.03
VAT	−0.03	−0.12	−0.23	−0.03	0.03
IEPS					
Tobacco	0.01	−0.12	−0.13	0.02	
Telecommunications	0.00	0.14	−0.14	0.00	
Alcohol	0.25	0.16	0.10	0.27	
High calories				−0.19	
Flavoured drinks				−0.24	
Fossil fuels				0.05	
Petrol (private transport)				−0.05	
Petrol (goods and services)				−0.11	
Petrol (public transport)				−0.36	

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012) and SHCP (2017a, b); percentile adjustment factors based on IMSS wage records (provided by Facundo Alvaredo).

4.2 Historical evolution and marginal incidence analysis

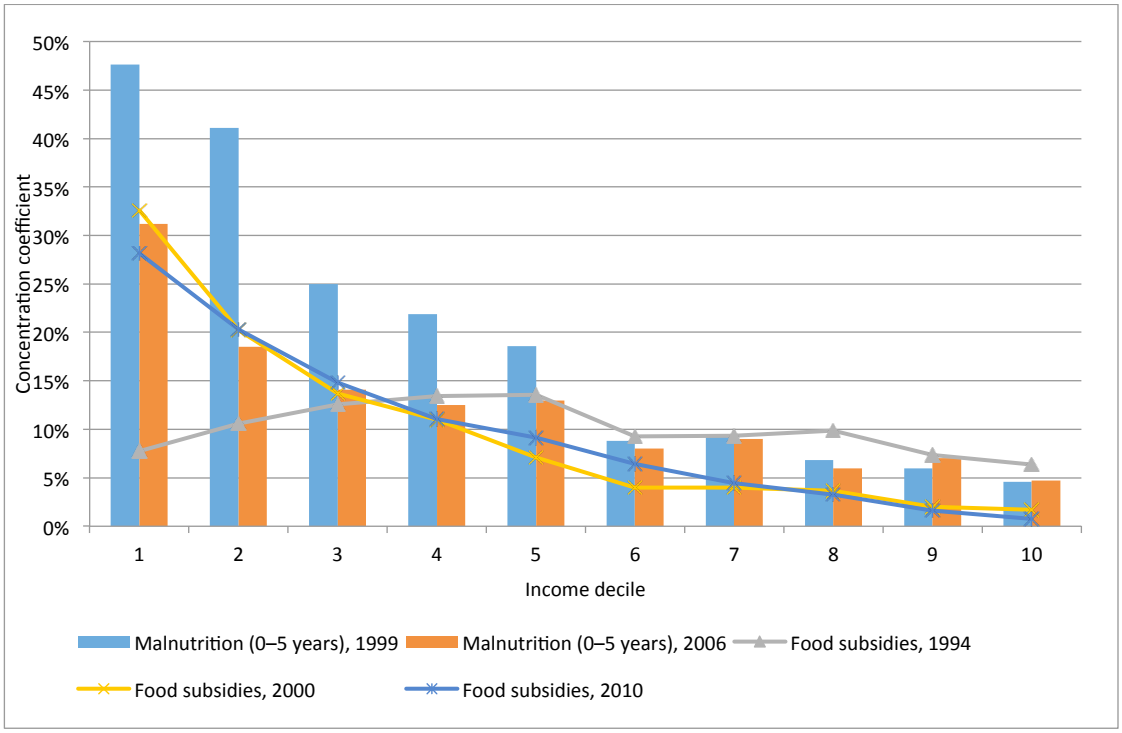
Figures 14–17 show the evolution of the distribution of the principal social transfers over the last two decades. We observe a clear trend of increasing progressivity over the 1990s, which is essentially halted over the next decade. The gain in progressivity in the 1990s is especially strong for food programmes and direct transfers, reflecting the introduction of PROGRESA. Education and total transfers reach the point of maximum progressivity in 2006 and stabilize afterwards, whereas health and direct transfers reach this point closer to 2000 but then reverse their trend to decreasing progressivity. This may respond to the expansion in coverage of programmes such as PROGRESA, *Seguro Popular*, and *Adultos Mayores*, which at the beginning were highly targeted at the rural extremely poor, but as they expand into urban areas gradually become less progressive. Contributory social security never gains in progressivity in this period and becomes increasingly less progressive after 2006, contributing also to the loss of progressivity in health services. In the case of education, we observe increasing progressivity at each level over the whole period, although at a slower pace after 2006.

Figures 18 and 19 present a marginal incidence analysis of education, showing the distribution of the gains in coverage and resources accumulated between 1992 and 2014. Marginal incidence over the whole period is pro-poor for all levels and for total education spending, but not for tertiary education. The poorest deciles were not only excluded from tertiary education in 1992, but they were also excluded from the important expansion in coverage (from 15 to 30 per cent of the age group) and resources over the last two decades: only 3 per cent of this expansion benefited the poorest decile. The gains in progressivity in basic education are remarkable and clearly started with the first phase of PROGRESA, whereas the gains in upper secondary education coincide with the second expansion as *Oportunidades*, when the programme was extended to this level.

Figure 14: Concentration coefficients of principal transfers, 1994–2014

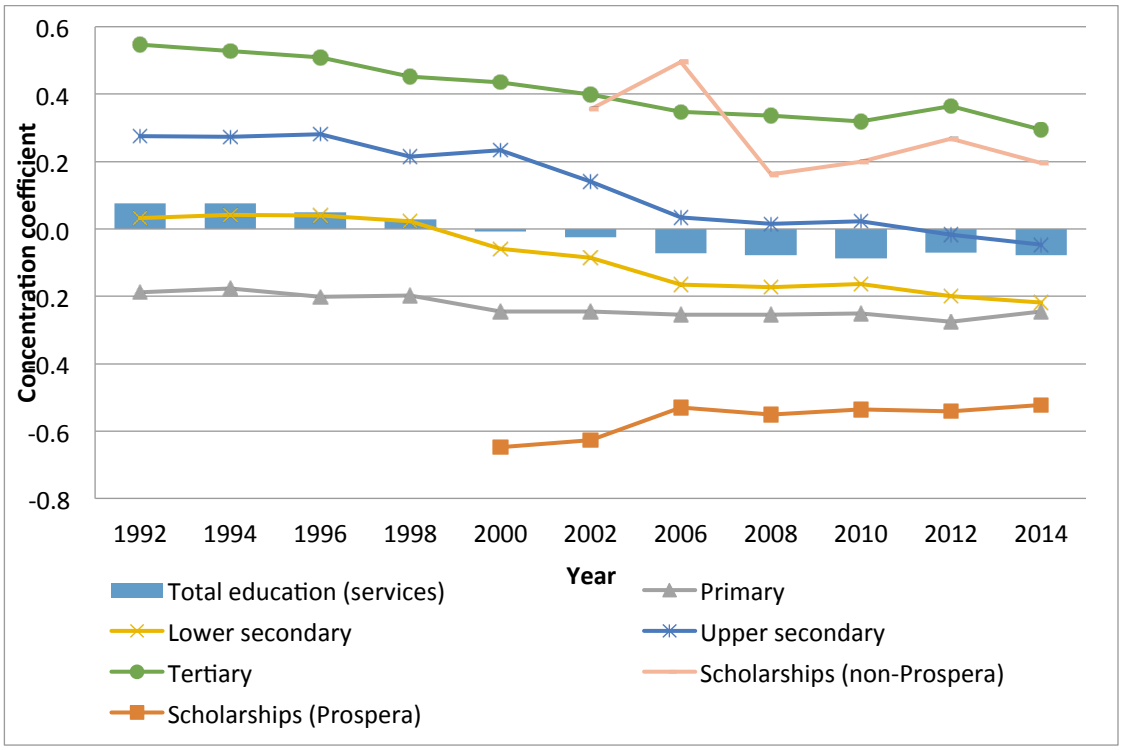
Source: Authors' estimates based on data reported in ENIGH (see INEGI 1994, 1996, 1998, 2000, 2002, 2006, 2008, 2010, 2012, 2014a), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

Figure 15: Concentration coefficients for food programmes, 1994–2000



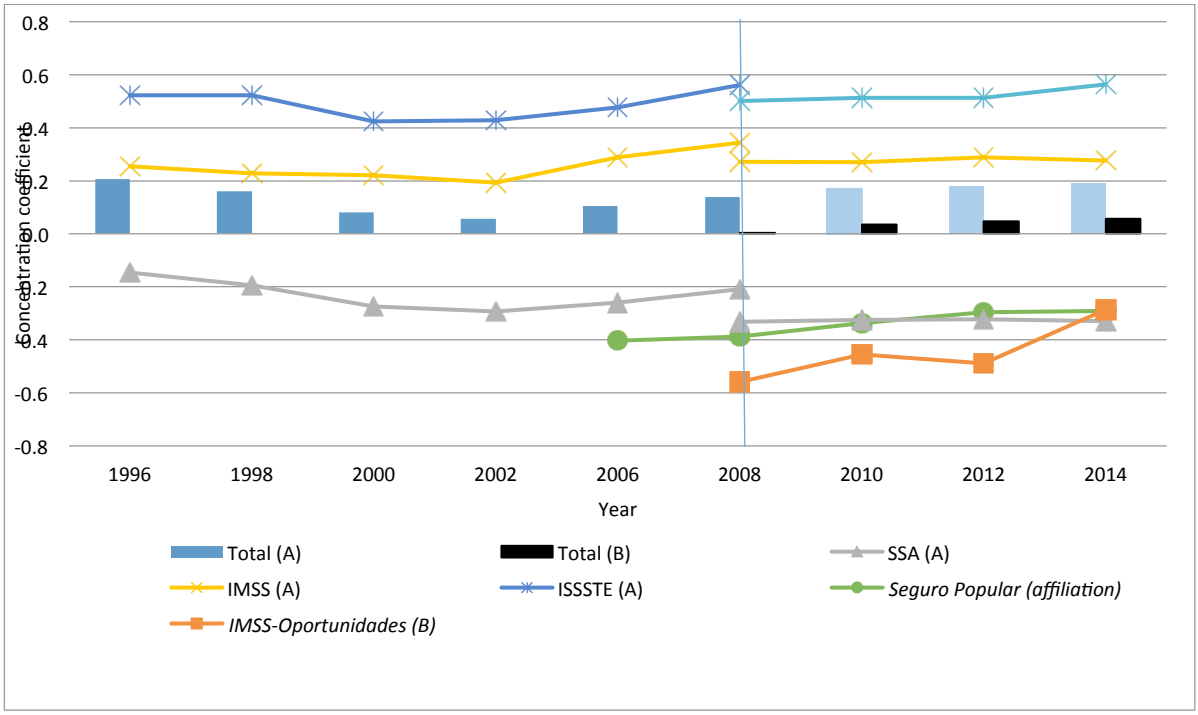
Source: Authors' estimates based on Encuesta Nacional de Nutrición (1999), Encuesta Nacional de Salud y Nutrición (2006), ENIGH (see INEGI 2000, 2010), and SHCP (2017b). For 2010 we also use a module generated together with ENIGH 2010 and provided by the Social Ministry (SEDESOL) (*Módulo de Programas Sociales*).

Figure 16: Concentration coefficients of education transfers, 1992–2014



Sources: Authors' estimates based on data reported in ENIGH (see INEGI 1994, 1996, 1998, 2000, 2002, 2006, 2008, 2010, 2012, 2014a), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

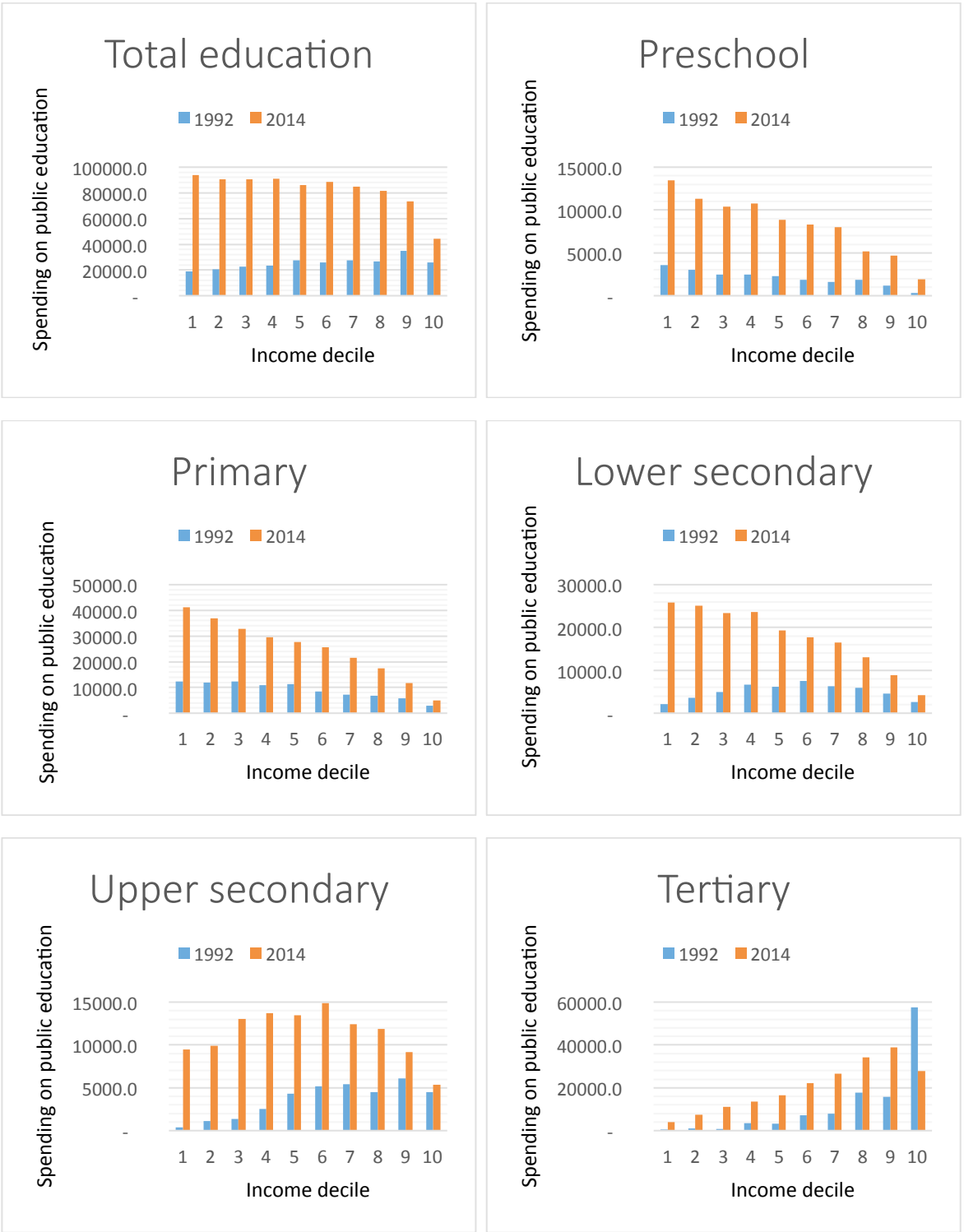
Figure 17: Concentration coefficients of health transfers, 1996–2014



Note: Estimates for use of services in the 1996–2008 series is based on reports of use of events, while the 2008–14 series is based on 'usual' use of services, reflecting a change in the survey information.

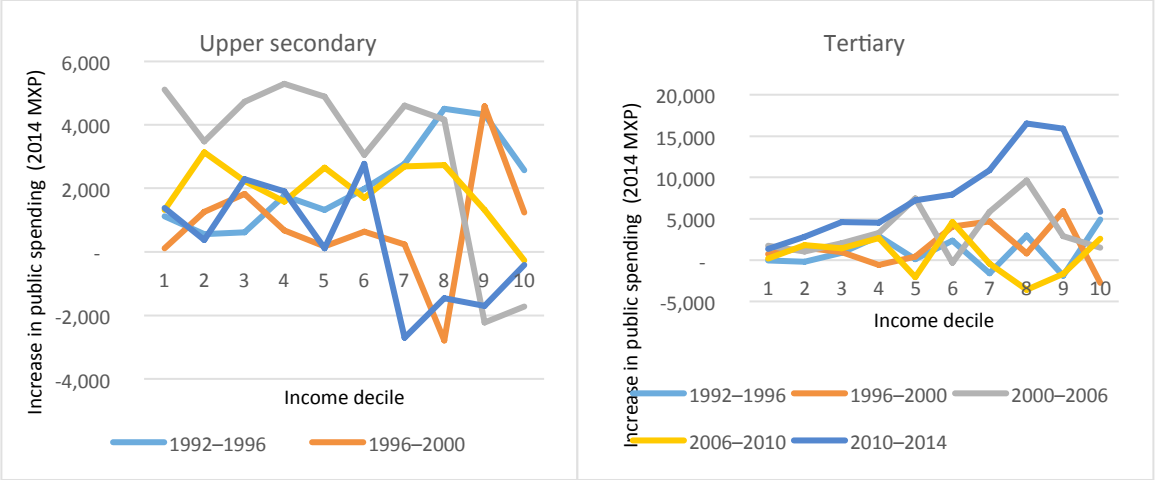
Source: Authors' estimates based on data reported in ENIGH (see INEGI 1994, 1996, 1998, 2000, 2002, 2006, 2008, 2010, 2012, 2014a), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017b).

Figure 18: Distribution of increases in spending on public education, 1992–2014 (in Mexican pesos at 2015 rates)



Source: Authors' estimates based on data reported in ENIGH (see INEGI 1992, 2014a) and SHCP (2017b).

Figure 19: Marginal incidence of public education spending, 1992–2014



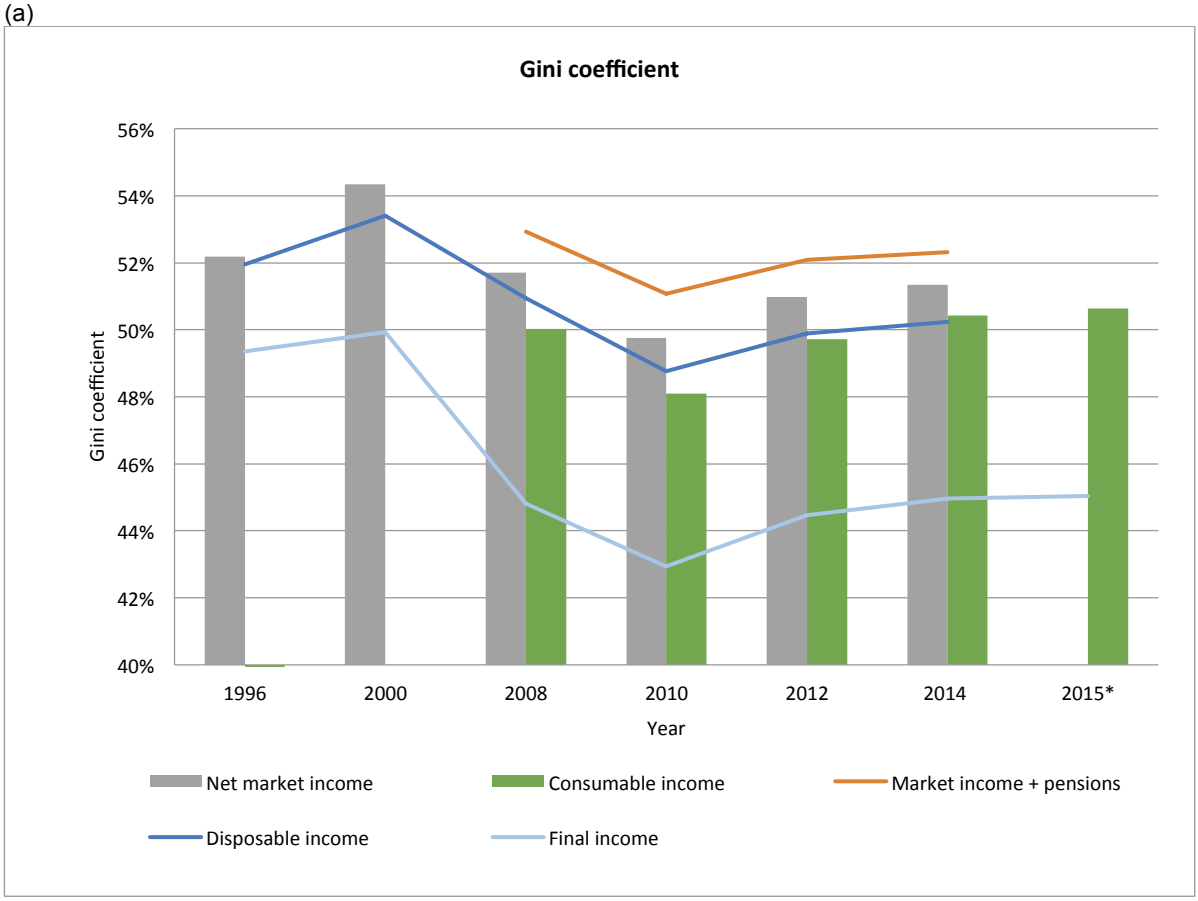
Source: Authors' estimates based on data reported in ENIGH (see INEGI 1992, 1996, 2000, 2006, 2010, 2014a) and SHCP (2017b).

4.3 Redistributive effects: 1996–2015

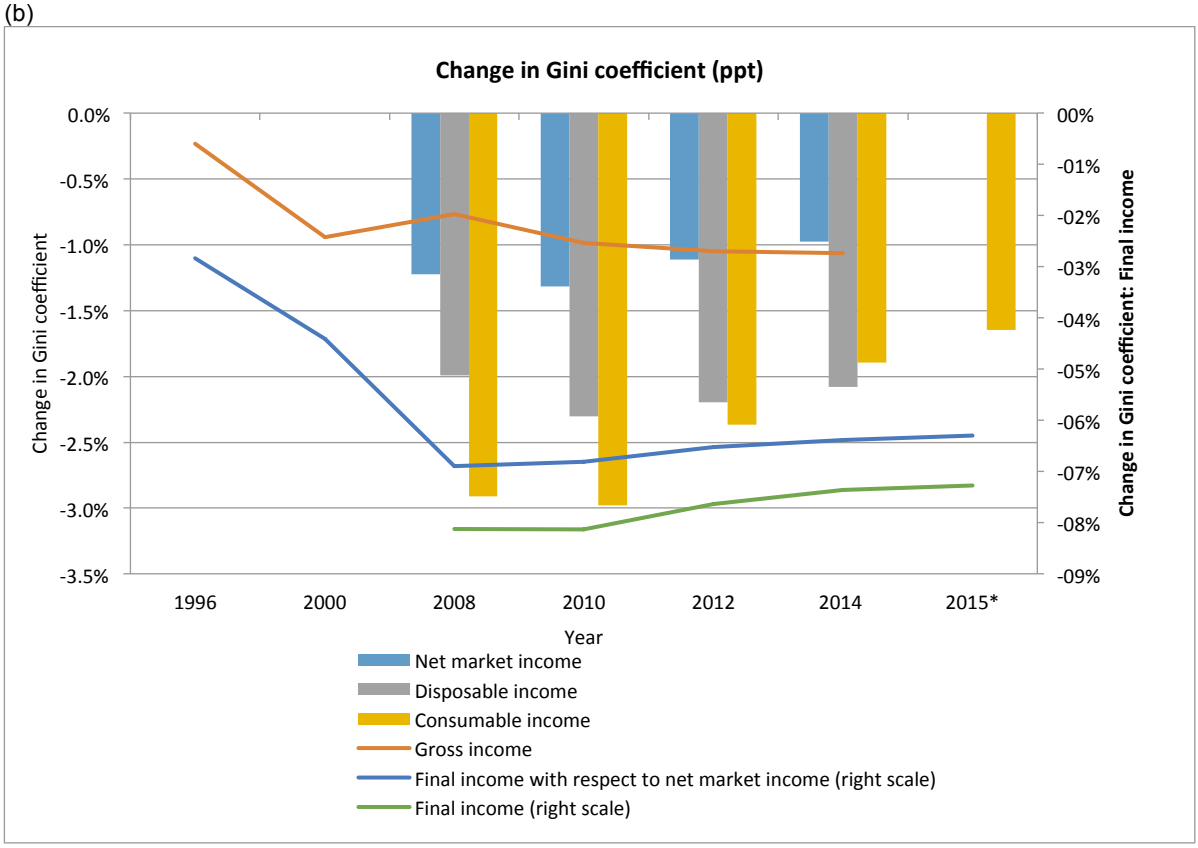
We analyse the evolution of the redistributive effects of the fiscal system between 1996 and 2015 on the Gini coefficient and extreme poverty. The 2015 estimate is a simulation of the effect of the 2015 transition from petrol subsidies to petrol taxes, using the 2014 survey, and assuming the rest of the fiscal system as in 2014 (Figures 20 and 21).

Figure 20: (a) Gini coefficient and (b) changes in Gini coefficient (ppt) due to fiscal interventions (cumulative effects with respect to market income including pensions), 1996–2015

(a)



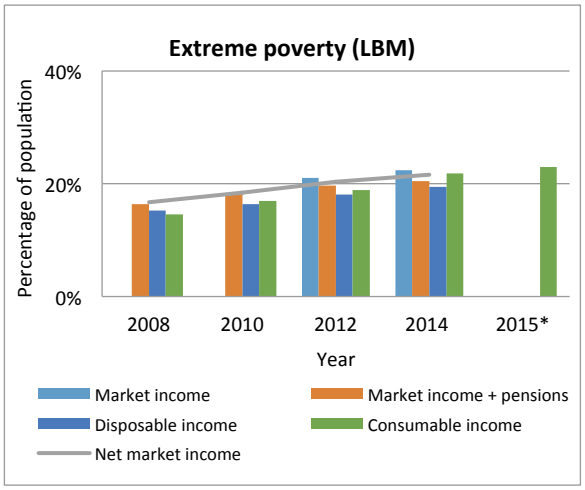
(b)

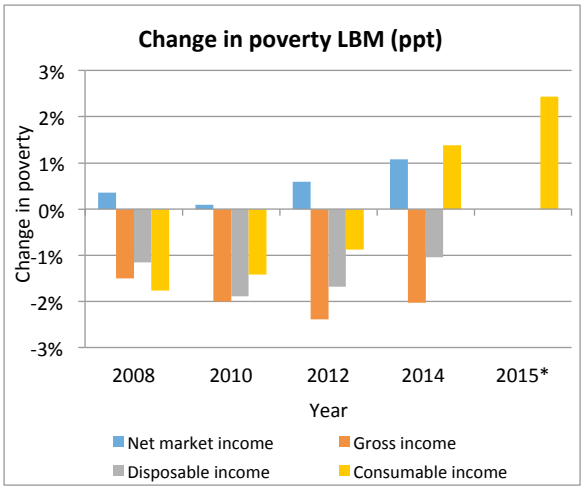


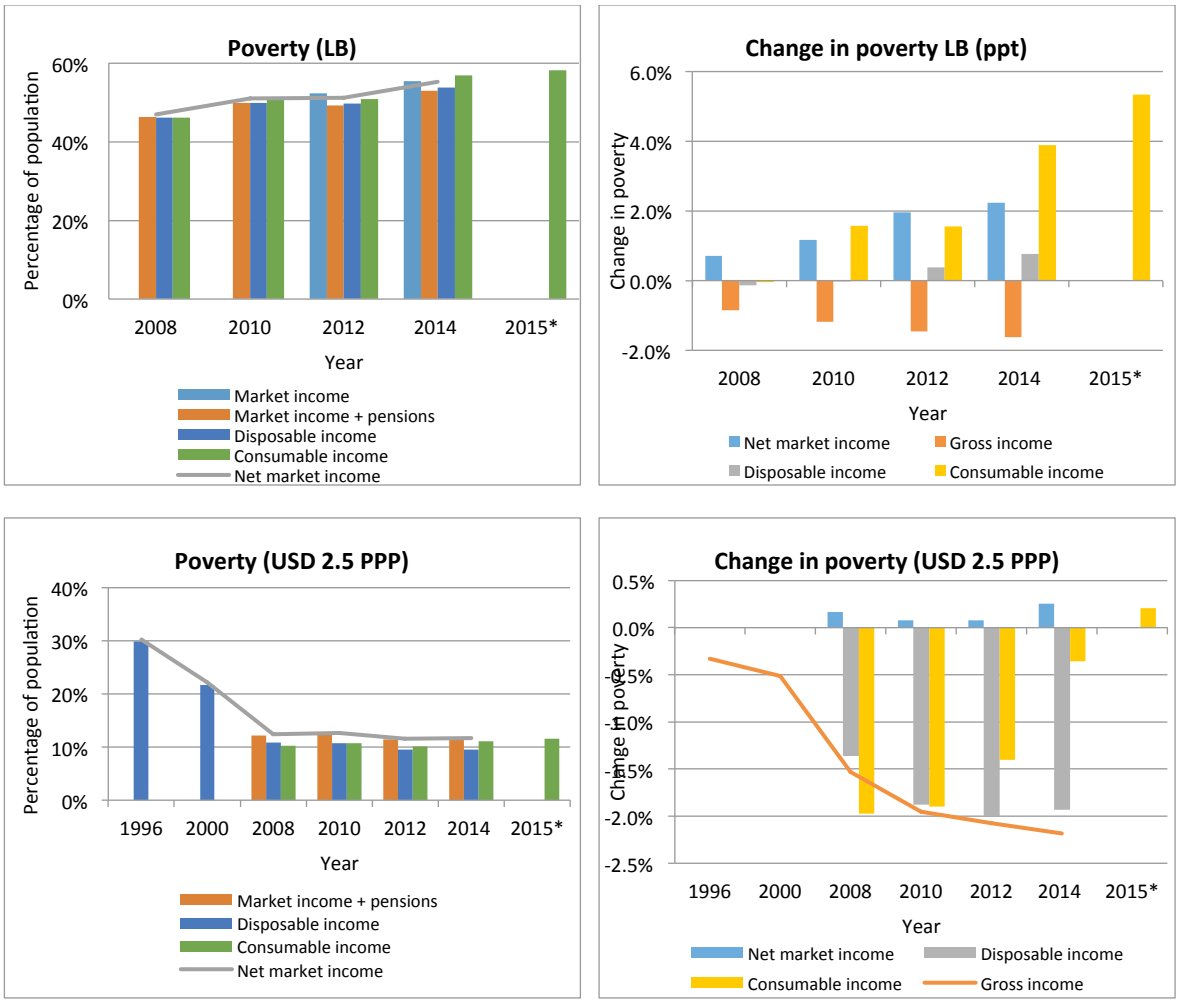
Note: *The 2015 estimate considers the effect of the increase in net indirect taxes in that year, using the 2014 survey and assuming the rest of the fiscal system constant as in 2014.

Source: Authors' estimates based on data reported in ENIGH (see INEGI 1996, 2000, 2008, 2010, 2012, 2014a), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017a, b).

Figure 21: Poverty and changes in poverty (ppt) due to fiscal interventions (cumulative effects with respect to market income including pensions), 1996–2014







Note: LBM, *línea de bienestar mínimo* (minimum welfare poverty line); LB, *línea de bienestar* (welfare poverty line). *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: Authors' estimates based on data reported in ENIGH (see INEGI 1996, 2000, 2008, 2010, 2012, 2014a), IMSS (2016), Secretaría de Salud (2017), Gobierno de los Estados Unidos Mexicanos (2017), and SHCP (2017a, b).

The total effect of taxes and income transfers on income inequality is modest, and declining after 2010: with respect to market income (including pension income), inequality in disposable income fell by 2.3 ppt in 2010 and by 2 ppt in 2014, while consumable income inequality fell by 3 ppt in 2010, by 1.9 ppt in 2014, and by 1.6 ppt in 2015. In contrast to previous years, by 2014 net indirect subsidies contributed to increase rather than decrease in income inequality. The effect of direct transfers on inequality (gross income) increased from 1996 to 2000 but was very small (1 ppt) and remained so for the rest of the period. Adding in-kind transfers (assuming these are valued by households by their fiscal cost) has a much larger effect (final income), increasing from 2.8 ppt in 1996 to 6.9 ppt in 2008, and declining slightly thereafter.

The effect of direct transfers on extreme poverty increased from a reduction of less than 0.5 ppt in 1996 to more than 2 ppt in 2012 and 2014 (using the USD 2.5 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 petrol subsidies reached an all-time high and net subsidies actually reduced poverty with respect

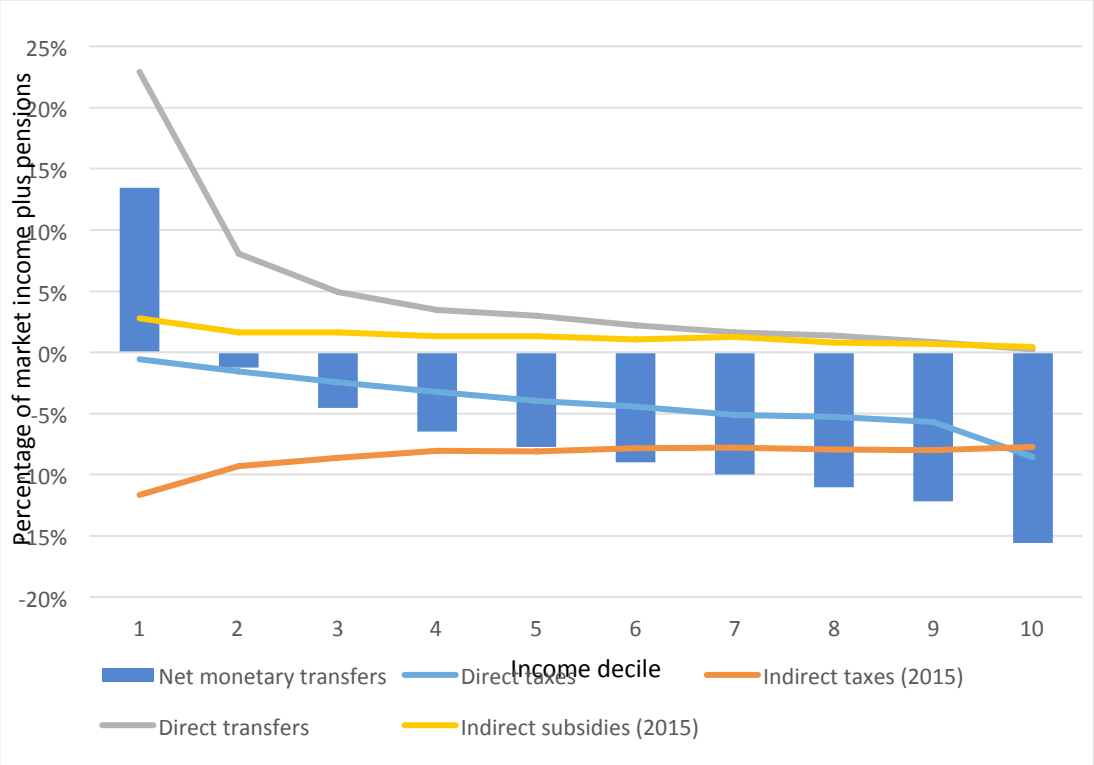
to disposable income. By 2014, when petrol subsidies were almost completely eliminated, net indirect taxes erased the poverty effect of direct transfers and increased extreme poverty by more than 1.4 ppt. By 2015, when petrol subsidies gave way to a large petrol tax, the impoverishing effect of net indirect taxes increased by 2.5 ppt, some 3 million persons added to the extremely poor category. The positive effects of direct transfers on total poverty (LB) are smaller, and the negative effects of net indirect taxes much larger, increasing poverty by almost 4 ppt by 2014 and by 5.3 ppt by 2015.

The strong impoverishing effect of indirect taxes may be surprising given that the principal indirect tax, VAT, exempts foods and medicines, and the estimates take into account informality, by excluding purchases in 'informal' establishments (see Annex A). We tested the robustness of this result by strengthening the informality criterion to exclude all purchases in rural localities. The impoverishing effect remains under this assumption, only slightly reduced (an increase of 1.1 and 3.7 ppt in extreme and total poverty, respectively).

It is important to note that the impoverishing increase in net indirect petrol taxes over this period was achieved largely through declines in international petrol 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 consumer income that households would have obtained had they benefited from these international price reductions. However, the elimination of petrol subsidies also required a gradual adjustment strategy of domestic public petrol prices implemented by the government over the last decade, which in fact increased the regular petrol price (Magna) 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 impoverishing decline in consumable income associated with this reform happened earlier and more gradually than this analysis suggests.

Figure 22 presents the incidence of transfers and taxes by deciles, showing clearly the contrasting effects of indirect taxes and direct transfers on the poorest deciles.

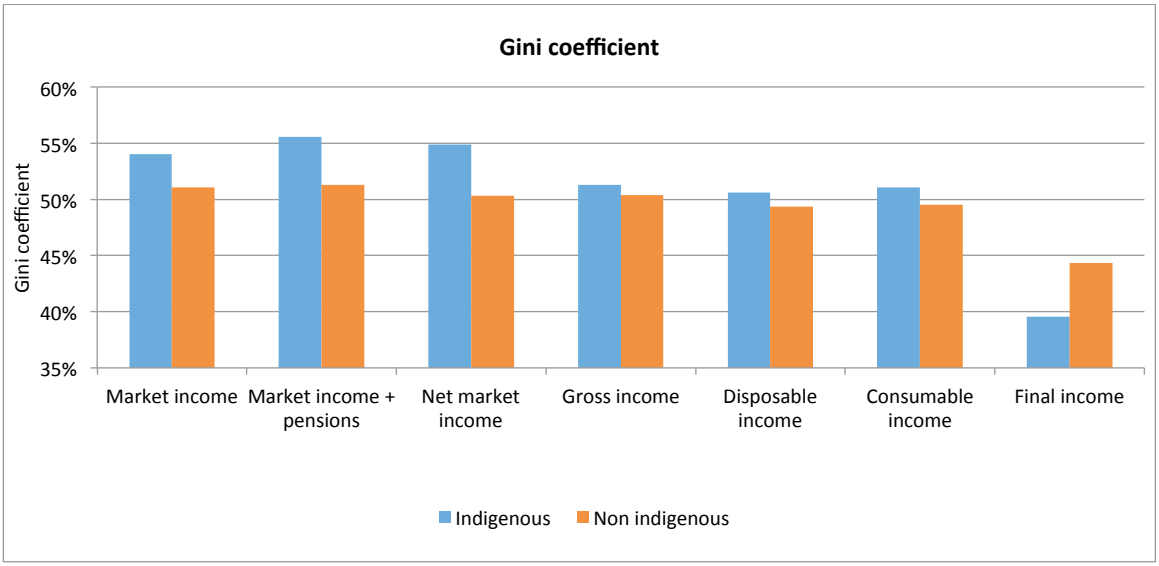
Figure 22: Incidence of net cash transfers (percentage of market income + pensions), 2014



Source: Authors' estimates based on data reported in ENIGH (see INEGI 2014a) and SHCP (2017b).

Figure 23 presents the redistributive effects of the fiscal system on indigenous and non-indigenous populations in 2014. By all measures, the effects on the indigenous population are stronger (with a reduction instead of an increase in consumable income poverty with respect to market income), but so small that they are practically irrelevant in terms of reducing the poverty differences between the two groups.

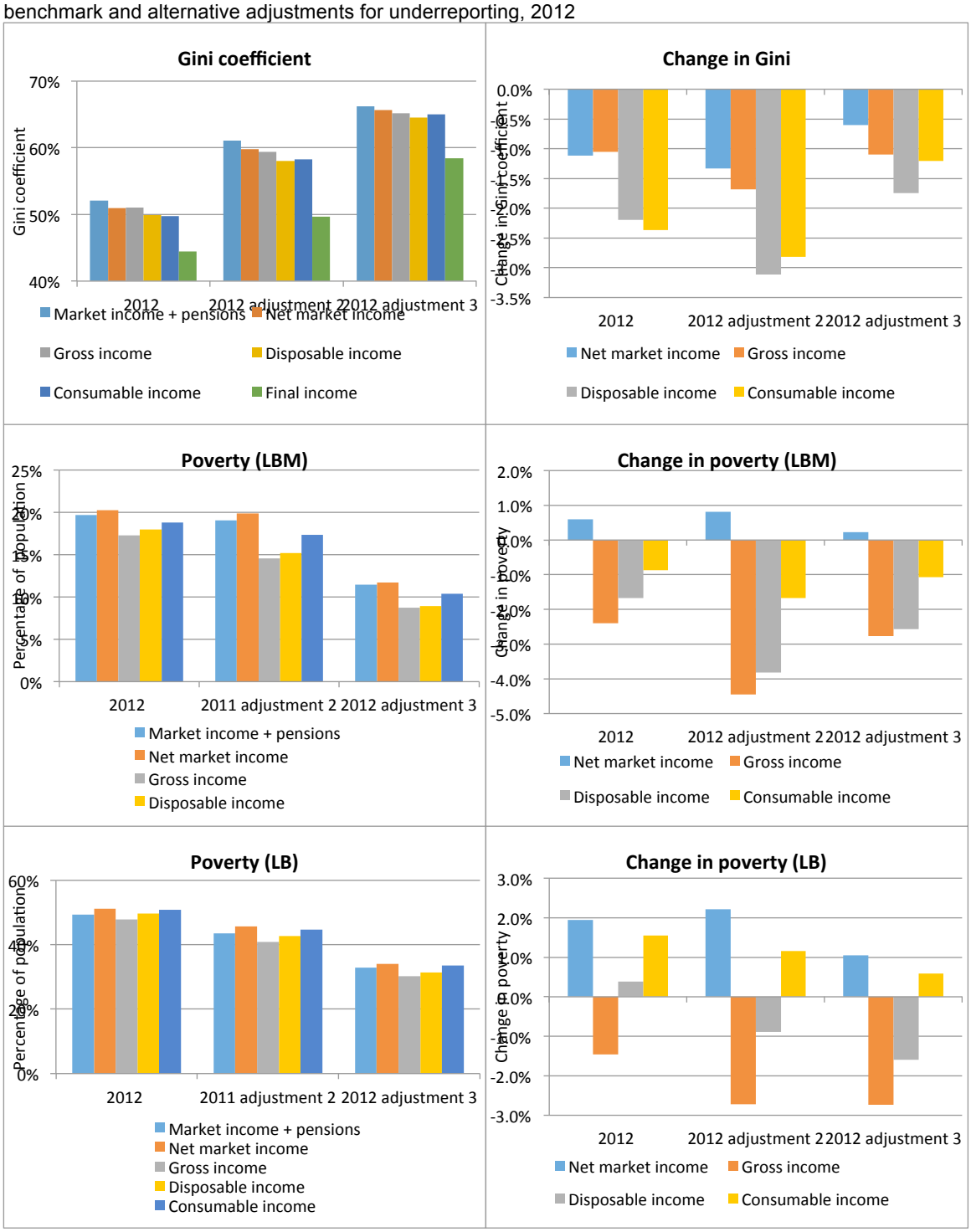
Figure 23: Gini coefficient, poverty, and changes (ppt), with respect to market income (including pensions), indigenous and non-indigenous populations, 2014



Source: Authors' estimates based on data reported in ENIGH (see INEGI 2014a) and SHCP (2017b).

Figures 24 and 25 compare the benchmark results with the two alternative adjustment methods for underreporting. Market income inequality increases significantly in the two alternative scenarios, from a Gini coefficient of 52 in the benchmark to 61 and 66 in adjustments 2 and 3, respectively. The redistributive effect of the fiscal system increases (in terms of percentage points) in adjustment 2, but is reduced in adjustment 3, despite the larger Kakwani coefficients in the latter adjustment. These results reflect mainly the differences in the tax/transfer rates with respect to adjusted market income resulting from the three adjustment methods, as reported in Section 3.3.

Figure 24: Effects on income inequality and poverty (with respect to market income + pensions), in the benchmark and alternative adjustments for underreporting, 2012



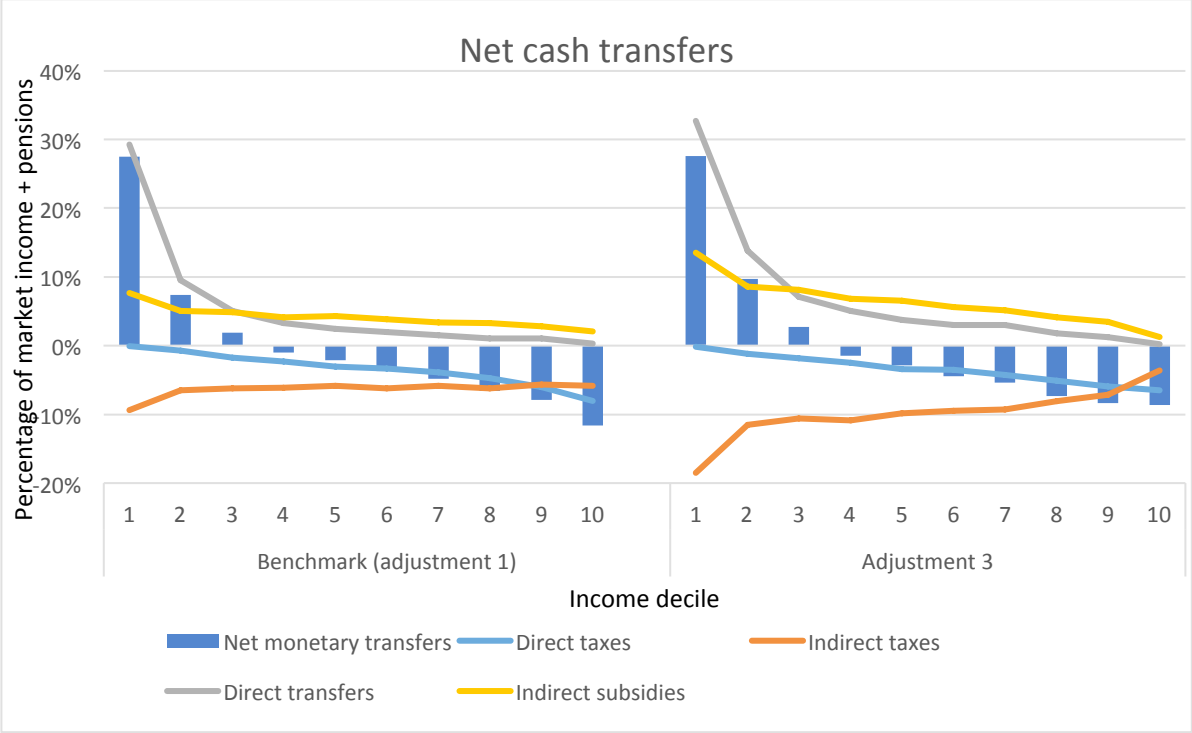
Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012) and SHCP (2017b).

Extreme (market income) poverty is similar in the benchmark and adjustment 2 but significantly lower in adjustment 3, whereas total poverty (LB) is lower under both adjustments. The fiscal reduction in extreme poverty is similar in adjustment 3 and the benchmark but significantly larger in adjustment 2, whereas the reduction of total poverty is significantly larger under both alternative adjustment methods. The impoverishing effect of indirect subsidies relative to the effect of direct transfers is stronger than in the benchmark analysis. The redistributive effect of

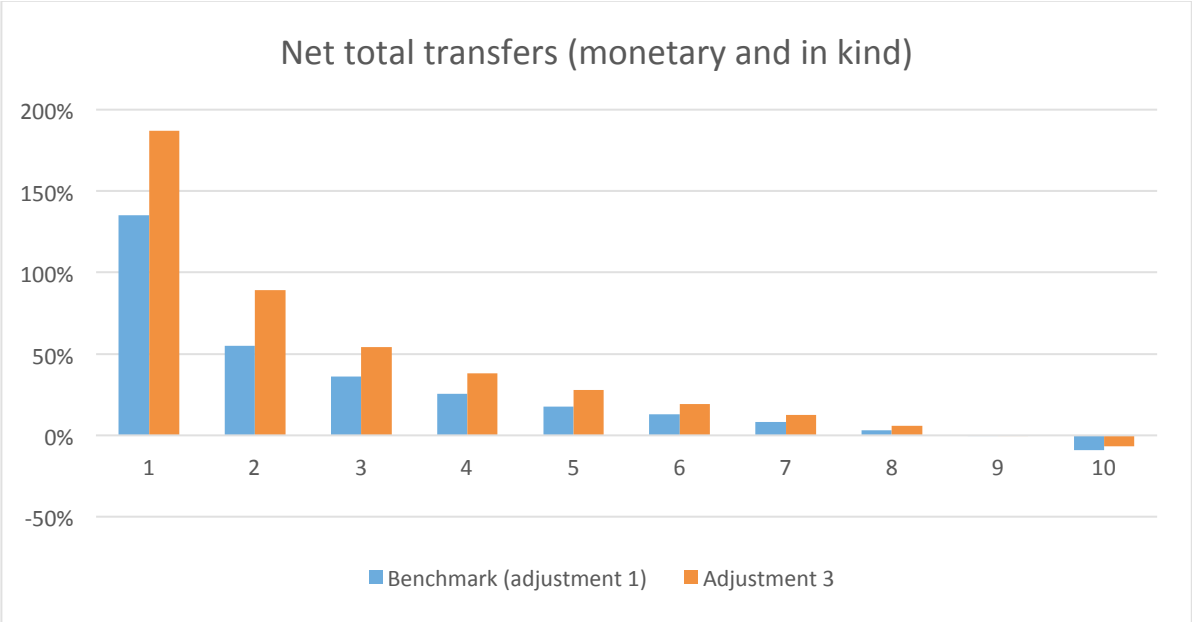
net total transfers (including in-kind transfers) is significantly larger in the adjustment 3 estimate than in the benchmark analysis (Figure 24).

Figure 25: Incidence of net cash (a) and total transfers (b) for the benchmark and adjustment 3 (percentage of market income + pensions), 2012

(a)



(b)



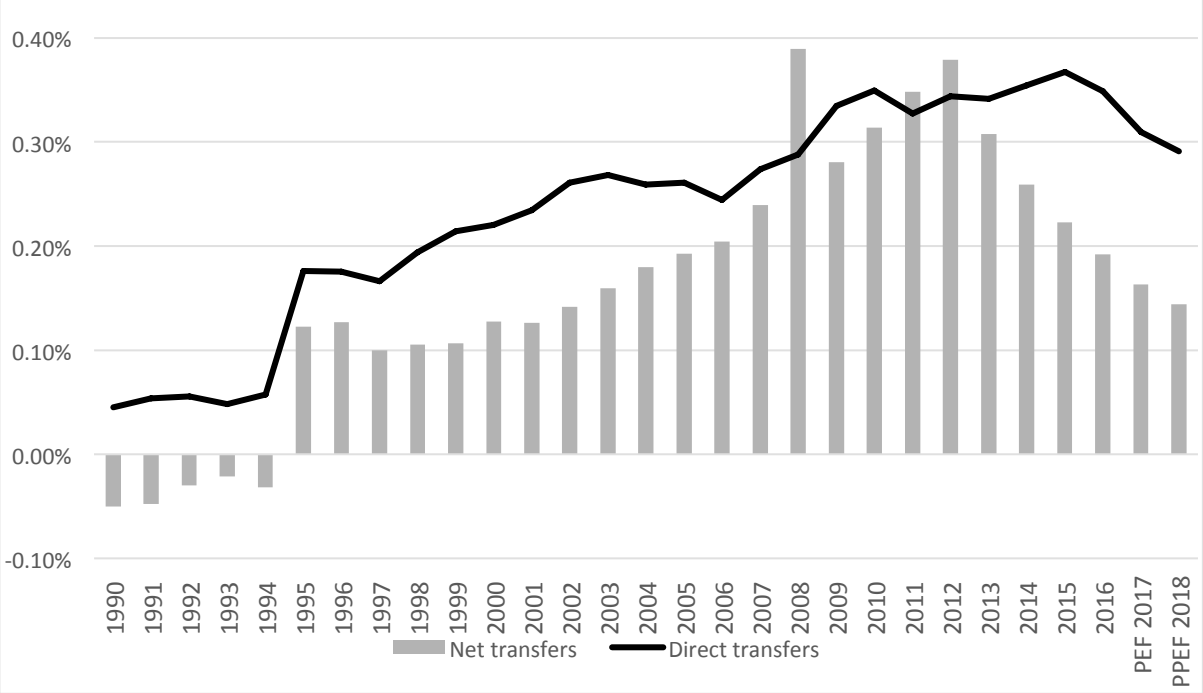
Source: Authors' estimates based on data reported in ENIGH (see INEGI 2012) and SHCP (2017b).

5 Interpretation and policy implications

The main conclusions from the previous analysis can be summarized as follows:

- Despite a significant expansion of social transfers since the 1990s, the introduction of effective and innovative direct transfer instruments, and advances in progressivity for the main in-kind transfers (up to the mid-2000s), the distribution of total social transfers at present does not particularly favour the poor, but is close to neutral (flat) in absolute terms. In the context of Mexico's relatively high market income inequality, this is still highly progressive relative to this distribution and has an important redistributive effect. Direct targeted transfers are mostly targeted on the poorer income groups, but despite their expansion in the last two decades, their effect is limited by their small scale (relative to the fiscal system and to market household income). The fiscal system as a whole has a significant redistributive effect on final income inequality, but a modest effect on disposable and consumable income inequality. These effects have declined significantly in the present decade, as transfers have become less progressive and net indirect taxes have increased.
- Direct transfers reduce extreme poverty by 2 ppt, representing more than 2 million people, but the *uncompensated* expansion of net indirect taxes has reduced this effect significantly since 2010 and in recent years it has reversed it (since 2014): at present, the overall effect of the fiscal system in its cash components (excluding in-kind transfers) is to increase (consumable) income poverty.
- Although the immediate change underlying these results is the recent increase in net indirect taxes, the comparatively 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 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 (roughly corresponding to the extreme poverty headcount in this period). The expansion of net indirect taxes and recent reduction of direct transfers has implied a continuous reduction in net transfers reaching the extreme poor, from 0.38 per cent of GDP in 2012 to 0.19 per cent in 2016, projected to fall further to 0.16 per cent in 2017 and 0.14 per cent in 2018 (based on the approved 2017 federal budget and the 2018 federal budget proposal) (Figure 26). 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 subsidies 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, while pro-poor transfers were reduced.

Figure 26: Share of direct transfers and net transfers (direct transfers – indirect taxes + indirect taxes) benefiting the poorest 20 per cent of the population (percentage of GDP)



Note: Direct transfers include: PROGRESA-*Oportunidades-Prospera*, *Programa de Apoyos Alimentarios* (PAL), PROCAMPO-ProAgro, *Programa de Adultos Mayores*, *Programa de Empleo Temporal* (PET), *Desarrollo Integral de la Familia* (DIF; i.e. integral family development) school breakfast and food baskets, *Diconsa*, and *Liconsa*.

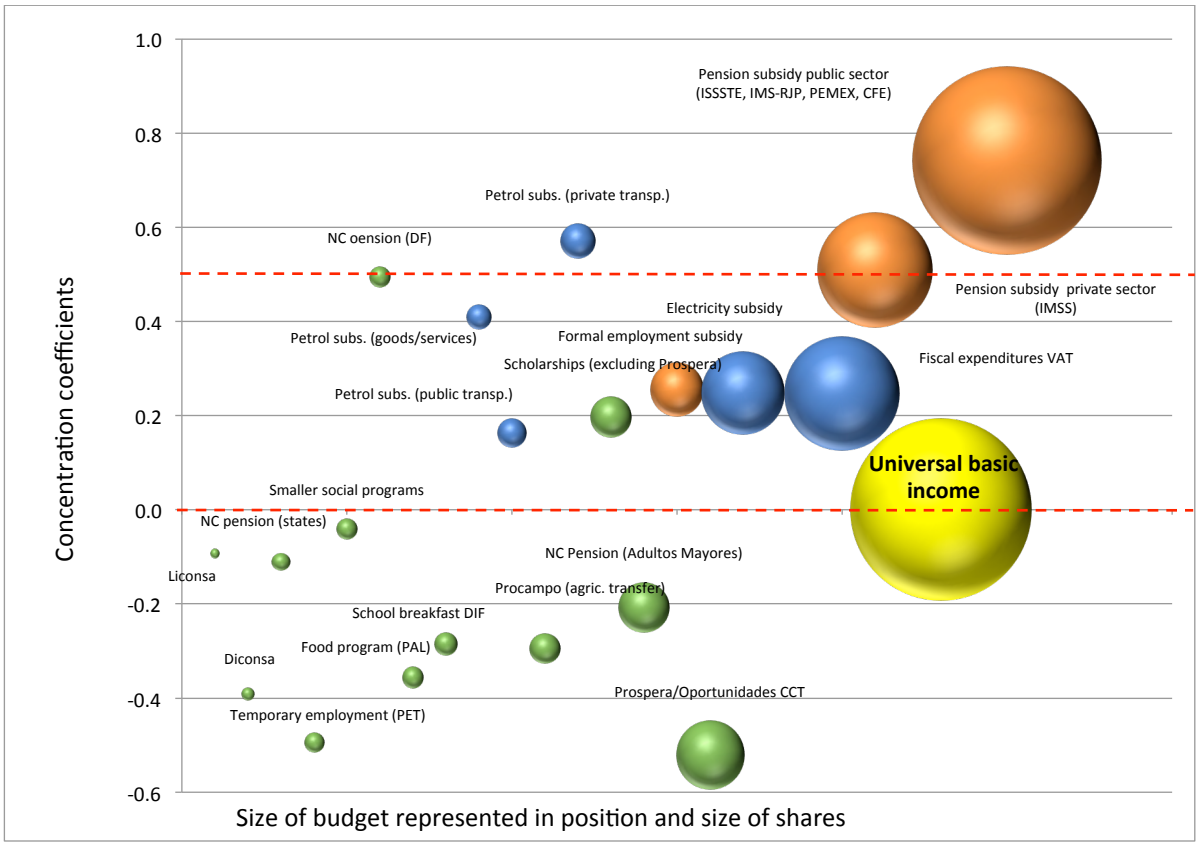
Source: Authors' estimates calculated using the income and expenditure survey (ENIGH) and public account data for the relevant years.

What would be an optimal redistributive fiscal reform for Mexico in this context? An obvious reform would be to increase cash transfers through the *Prospera* CCT programme, which as we have shown is the most effectively targeted transfer instrument available in Mexico (Figures 9 and 27). 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 while preserving 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.

The incidence analysis presented in the previous sections allows us to explore the redistributive effects of an alternative reform path. Instead of considering the expansion of transfers by looking into the most progressive instruments available, we consider 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 informality (for motivations, details, and estimations of this proposal, see Scott 2017a, b). Despite the absence of targeting, this reform would be highly progressive (relative to market income) and redistributive in the context of Mexico's high market income inequality and

low 'redistributive opportunity cost' of current transfers: as Figure 27 illustrates, a universal basic income would still be more progressive than the bulk of public resources allocated to cash transfers—only 8.5 per cent of these resources are progressive in absolute terms, 61 per cent are regressive in absolute terms but progressive relative to market income, and 31 per cent are regressive relative to market income, and thus unequalizing.

Figure 27: Principal cash transfers and subsidies: public spending and concentration coefficients, 2014



Note: Orange represents targeted transfers; red, subsidies to contributory pension systems and formal employment tax credit; blue, indirect subsidies; yellow, basic income.

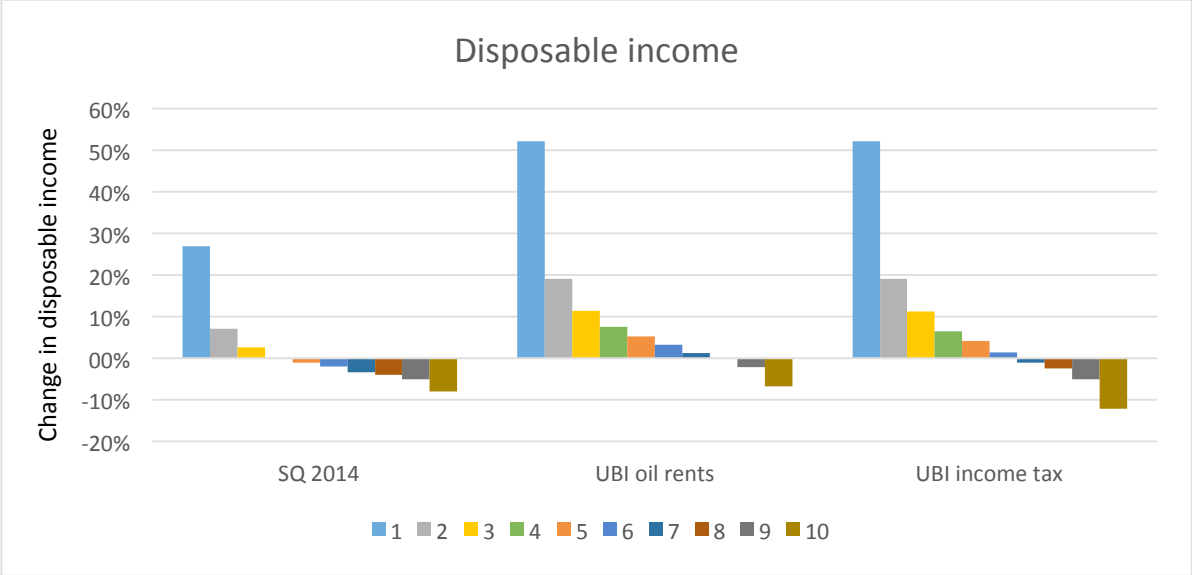
Source: Authors' estimates based on information from ENIGH (see INEGI 2010, 2014a) and SHCP (2017b).

For simplicity, we analyse the redistributive effects of a modest basic income, equivalent to the *average extreme poverty gap* in 2014 (using the equivalence scales and differentiated rural/urban extreme poverty lines used in Mexico's official poverty methodology). This represents a monthly transfer per adult/child of USD 21/8 (urban) and USD 25/6 (rural) (May 2017 exchange rate). 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.

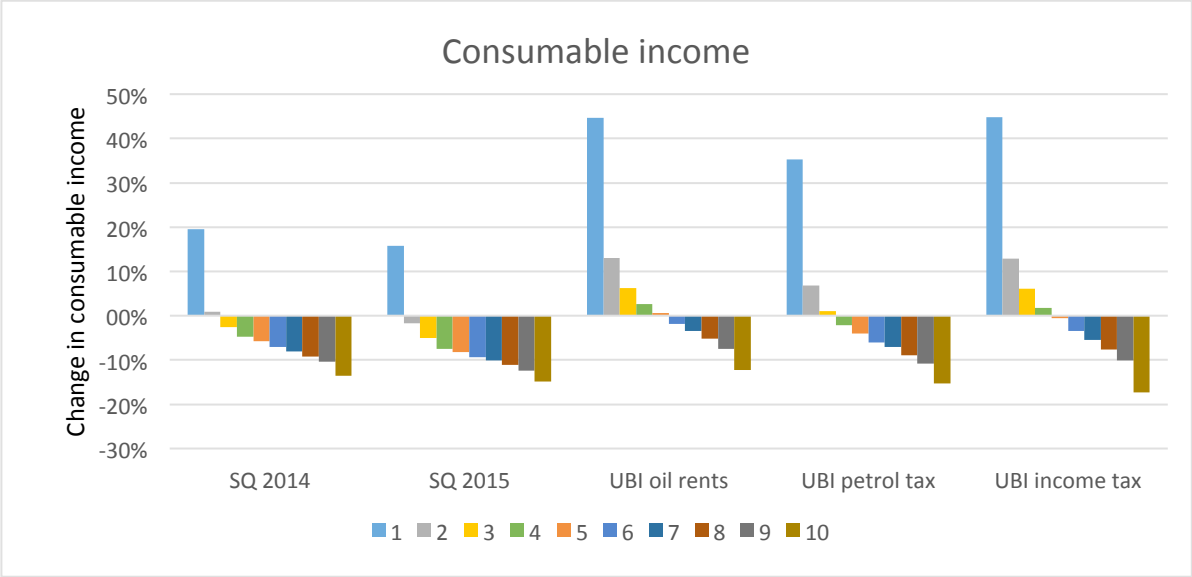
Figures 28 and 29 show the redistributive effect of adding the basic income to the current fiscal system, on disposable and consumable income, under alternative financing scenarios. Adding the basic income (financed through oil revenues or direct taxes) would increase the net incidence of the fiscal system on disposable (consumable) income in the poorest decile from 27 to 52 per cent (19.5–45 per cent).

Figure 28: Effect of adding a basic income equal to the average poverty gap (under alternative financing scenarios) to the current fiscal system: change in disposable (a) and consumable (b) incomes, by income deciles

(a)



(b)

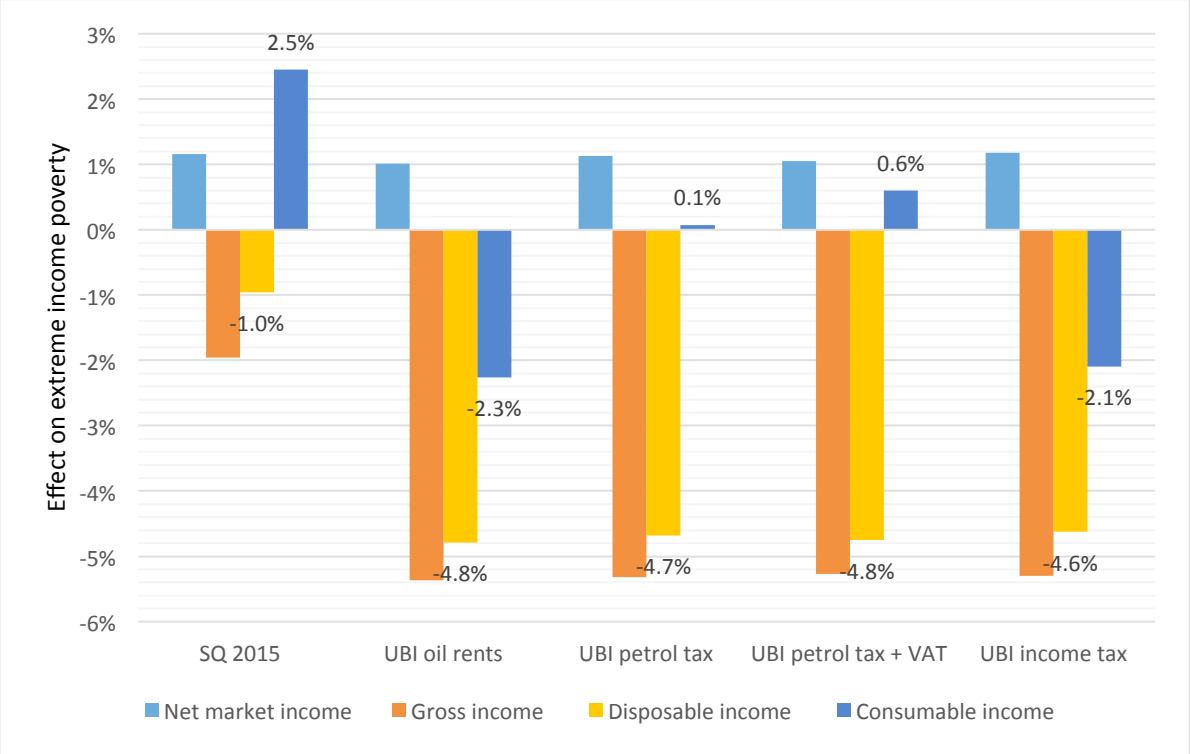


Note: SQ, status quo; UBI, universal basic income (financed through oil rents, petrol tax, or income tax).

Source: Authors' estimates based on data reported in ENIGH (see INEGI 2014a) and SHCP (2017b).

Extreme (disposable) income poverty would be reduced by 5 ppt (in comparison to the 2 ppt reduction achieved in the status quo), taking some 5 million additional people out of extreme poverty. Consumable income poverty would fall by 2 ppt if financed through oil revenues or direct taxes, or remain unchanged if financed through petrol taxes, instead of *increasing* by 2.5 ppt with the current system.

Figure 29: Effect of adding a basic income equal to the average poverty gap (under alternative financing scenarios) on extreme income poverty (ppt)



Source: Authors' estimates based on data reported in ENIGH (see INEGI 2014a) and SHCP (2017b).

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Annex A Imputation assumptions for fiscal incidence analysis, characteristics of principal direct transfers, and changes in the tax system (2007–14)

Table A1: Imputation assumptions for fiscal incidence analysis

Concept	Variable	Assumptions
Direct taxes	Income tax	Income tax is imputed to formal workers aged 14 years or older. Formal workers are those who report affiliation to a contributory social security institution. The income sources included are wages, business and professional activities, property income, and interest income. The tax rate paid is estimated based on the tax bracket corresponding to the worker's reported labour income.
Direct transfers	Cash transfers	For programmes specifically identified in ENIGH/MPS (*Oportunidades/Prospera*, PROCAMPO/ProAgro, PET, PAL, PAM: the total transfer budget as reported in public accounts is imputed to households in proportion to the benefits they report receiving for each programme in ENIGH. In the case of social transfers, which are reported in ENIGH without identifying specific programmes ('other social transfers' and 'scholarships' other than PROGRESA), we adjust the reported amount through the common national accounts factor as applied to all income sources under the adjustment 1 methodology.
Indirect taxes	Value-added tax (VAT)	Using detailed expenditure data by item in ENIGH, we identify those goods and services that pay VAT. We then simulate VAT using the total expenditure reported by the household. We do not take into account goods and services for which there is zero VAT, such as industrialized vegetables and animals, patent medicines and food, water, and fertilizers in agricultural production. For 2014, the fiscal reform eliminates zero VAT on chewing gum and pet food as well. Purchases made outside the country and those made in rural areas in informal businesses are not incorporated into the analysis. In 2012, VAT was 11% in border areas. In 2014, VAT was standardized to 16% across the country. (Examples of VAT exceptions are those individuals who give free services, educational services provided by federal, state and municipal governments, and public transportation.)
	Special tax on products and services (*Impuesto Especial sobre Productos y Servicios*, IEPS)	We use the tax incidence reported by the Ministry of Finance for this tax, which is based on the total household expenditure. We then impute the tax to each decile.
Indirect subsidies	Electricity subsidy	We identify the last electrical bill paid by the household and apply the subsidy incidence by decile reported by the Ministry of Finance. We then impute the subsidy for each income decile.
	LPG subsidy	First we estimate the proportion of total household expenditure in LPG. Then, we assign the total subsidy amount proportional to the expenditure in LPG for each household.
	Fuel subsidies	
	Goods and services	We impute the total amount of subsidy for each household using the proportion of the household expenditure to total national expenditure in goods and services.
	Private transport	We use the reported expenditure on gasoline for households. We then estimate the subsidy by multiplying the total amount of subsidy to the household's proportion gasoline expenditure.
	Public transport	We use the household's reported expenditure on public transportation, and take the proportion of subsidy according to the proportion of the total expenditure in these items to estimate the total amount of subsidy.
In-kind transfers	Health	We identify individuals affiliated with public health institutions such as IMSS, IMSS-*Oportunidades* ISSSTE, PEMEX, Ministry of Health, and *Seguro Popular*. The total amount of in-kind transfers by the institution is imputed to those individuals who receive the benefit.

	Education	We identify those individuals of school age who are enrolled in public schools by level of education: preschool, primary, lower secondary, upper secondary, and tertiary. Once we identify those students, the total transfer amount is applied in proportion to the enrolment at each level of education.
	Pension income	We identify directly those individuals reported receiving pension income from public institutions such as IMSS, ISSSTE, and PEMEX.
Pensions	Subsidy to contributory pensions	We identify individuals affiliated with public institutions such as IMSS, ISSSTE, and PEMEX. We then differentiate between active workers and retired workers. Finally, we impute the total amount of subsidy by work status.
	Non-contributory pensions	We identify separately the beneficiaries of non-contributory pensions as those who receive this benefit by the Mexico City government, in each of the states in Mexico, and the federal programme benefit.

Source: Authors' assumptions.

Table A2: Recent fiscal changes incorporated in the analysis, 2012–14

Tax	2012	2014
Income tax (ISR)	Marginal income tax rate was 30% for individuals earning above 393,000 pesos per year.	The 2013 tax reform increased the maximum income tax rate from 30% in 2012 to 32% for individuals with annual income above 750,000 pesos, 34% for individuals with annual income above 1,000,000 pesos, and 35% for those with annual income above 3,000,000 pesos.
Special tax on products and services (IEPS)	Includes IEPS on beer, alcoholic beverages, cigarettes, telecom services, and energy drinks.	In 2014, three new taxes were added in the analysis: 1 peso per litre to flavoured waters with sugar, 8% to food with high caloric density, and fuel tax consumption.
VAT (IVA)	We consider a differentiated VAT rate of 11% in the border regions and 16% in the rest of the country. To identify border areas, we use as a proxy municipalities that are in the northern and southern borders.	We consider homologated VAT by 16% in the entire country.
LPG	We consider the subsidy to LPG.	The subsidy to LPG was eliminated and therefore no longer considered in the analysis.

Source: Authors' assumptions based on recent changes in Mexico's tax law (SHCP 2012, 2014).

Table A3: Description of principal cash transfers in 2014

Programme name	Target population	Number of beneficiaries (2014)	Year of first implementation	Budget (2014, local currency per year, Mexican pesos)	Targeting mechanism
Prospera (*Oportunidades*)	The target population of the programme is households with socioeconomic and income conditions that impede the development of capacities of its members (in terms of food, health, and education) in accordance with the eligibility criteria and targeting methodology established in the programme's 2014 Operation Rules.	11,736,944 (potential) 6,742,811 (objective) 6,129,125 (attended)[a]	1997	68,547,100,000	In order to identify and quantify the target population of the programme, which is the 7.1 million people living in extreme food poverty (who are the target and potential population o the 'Crusade against Hunger' public policy strategy), criteria are established by the National Council for the Evaluation of Social Development Policy. Once these characteristics are identified, priority will be given to this group of people.
PROCAMPO/ProAgro[b]	The target population is persons who carry out activities in the agro-food sector and improve their productivity through the application of innovations, technological developments, and biotechnologies, which includes conservation, characterization, evaluation, validation, improvement, management, reproduction, and utilization of agricultural genetic resources, livestock, fishery, and aquaculture, as well as the integral use of resources (social mining) at a national level.	1,500,000	1993[c]	13,330,000,000	
Programa de Empleo Temporal (PET, Temporary Employment Programme)	PET provides economic support to people 16 years of age or older who see their income or assets diminished due to adverse social and economic situations, emergencies, or disasters, in consideration for their participation in social projects.	2,140,717 (potential) 425,376 (objective) 1,440,640 (attended)[d]	1995	4,878,880,000	Priority will be given to people who are members of the household group of beneficiaries of *Prospera* and PAL. Also, when coverage allows, the next criterion of priority will be to support people sent by the National Employment Service.
Programa de Apoyo Alimentario (PAL, Food Support Programme)	The target population of the programme is households with socioeconomic and income conditions that prevent the development of the capacities of its members in education, food, and/or	3,758,000	2003	6,271,900,000	Families eligible to enter or re-enter the programme are those whose estimated monthly per capita income is less than the minimum welfare line (LBM). Likewise, families whose estimated per capita monthly

	health, who are not covered by *Prospera*, the social inclusion programme, in accordance with the criteria and requirements of eligibility and targeting methodology established in the Operation Rules.				income is less than the socioeconomic conditions standing line or LVPCS (*Línea de Verificaciones Permanentes de las Condiciones Socioeconómicas*) are eligible to remain in the programme. In all cases, it applies as long as they are not helped by *Prospera*, and subject to the programme's budget constraint, and requiring families to provide information on their socioeconomic and demographic characteristics through a survey established in the Operation Rules.
Programa de Adultos Mayores	It covers people aged 65 years and older who do not receive an old-age pension or disability benefits of more than 1,092 pesos per month. The pension provides financial support of 580 pesos per month from 2015.	5,487,664	2007	36,477,900,000	The most important national non-contributory scheme in Mexico, known as the Pension for Older Adults, is financed with the federal budget. The programme began in 2007 and initially gave a pension to every person '70 years or more' who lived in populations of up to 30,000. In 2012, the old-age pension extended its coverage to the entire country and to all older adults who do not receive a retirement pension from any social security institution, beyond a certain limit. As of 2013, the programme was extended to all people aged 65 years and older. In addition to the federal scheme, some states have their own non-contributory health care scheme. The Pension for Older Adults is a non-contributory social protection programme, subject to verification of resources and financed with the federal budget. Several states have their own social protection programmes for the elderly, although the pension for the elderly is the most important national protection programme.

Notes: [a]Families. [b]PROCAMPO finished in 2013. For 2014, the programme moves from direct transfers linked to income to productivity incentives, which is the main feature of the ProAgro Productive. [c]Arises in 1993 as compensatory support with the commercial opening to North American Free Trade Agreement. It was a response for the producer subsidies given to farmers in the United States and Canada. [d]Individuals.

Source: Authors' description and compilation based in part on CONEVAL (2017b).