



CIEP

Fiscal System v2.0

Achieving Redistribution and Sustainability



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Principles

Setting the Tone

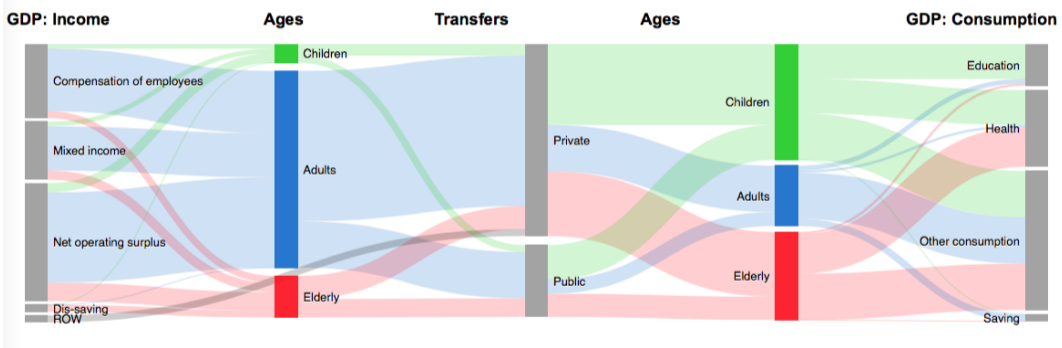
- Systematic economic changes** The economic behaviors of people **systematically change** as they get older and proceed through life (Mason and Lee, 2011).
- Debt as fiscal evaluation** Government spending on goods and services **cannot exceed** the sum of (1) the government's net wealth, (2) current generations' net payments, and (3) future generations' net payments (Auerbach et al., 1992).
- Projections, not predictions** Profiles are **descriptions**, depicted *ex-post*, at a particular point in time, with a particular framework of reference.
- Individual-oriented analysis** The economy and the fiscal system **begin and end** with the people who compose them and who are subject to them.

Thesis

Objectives

- I.1 **Depict**—and, therefore, know—how people compose and construct the Mexican economy, as our case study.
- I.2 **Acknowledge** the systematical changes that individuals could make in their economic behaviors through their lives.
- II **Evaluate** if the Mexican Fiscal System is sufficiently attuned for the demographic changes to come.
- III **Project** the Mexican fiscal sustainability and equality by proposing alternatives to improve and achieve both.

This is the Economy



The Economy through a Household Survey

Income & Consumption Perspective

DB 1 Macro: System of National Accounts (INEGI, BIE, 2014)

DB 2 Micro: Household Surveys (INEGI, ENIGH-MCS, 2014)

Goal 1 Know and understand **who produces what** in the economy.

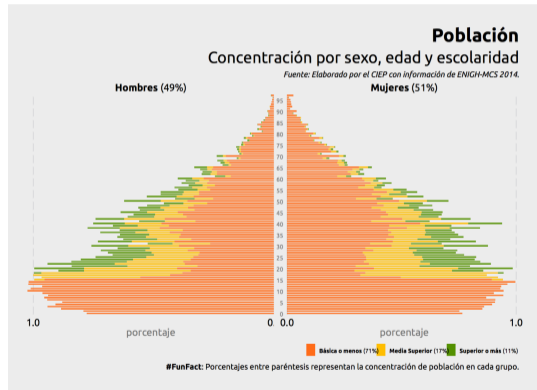
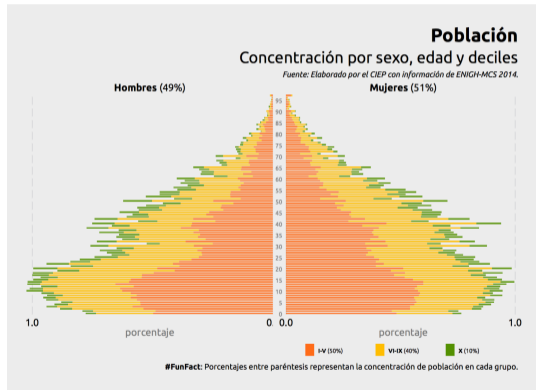
Goal 2 **Accordingly assign** to each observation in the survey its corresponding share of the macro values reported by the SNA.

Assum. 1 **The SNA is the most reliable source** regarding macroeconomic accounts.

Assum. 2 **The ENIGH-MCS 2014 is the most accurate database** for the description of the individuals and households.

Micro Overlook

Demographic Composition

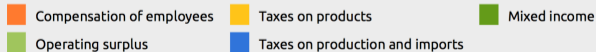
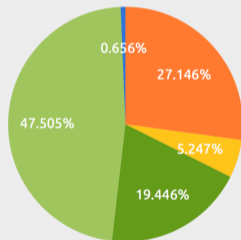


Macro Overlook

Income Perspective

Gross Domestic Product Generation of Income Account 2014

Source: INEGI, BIE.



Notes: Taxes net of subsidies. Operating surplus net of mixed income.

In NTA (Mason et al., 2013):

- **Taxes on production** are proportionately distributed between *Compensation of employees*, *Self-employment labor income* and *Capital income*.
- **Taxes on products** are proportionately distributed between the *Operating surplus of corporations* and of *NPISHs* and the *capital share of mixed income*.

Rearranging the GDP

Income Perspective

Table : Assignment of Taxes on Production

% GDP			
Concept	NoT	Taxes	GoT
Compensation of employees	23.931	0.209	24.140
Social security contributions	3.215	0.000	3.215
Self-employment labor	12.964	0.100	13.064
Capital income (NET)	45.016	0.347	45.363
National Income	85.127	0.656	85.782
<i>Consumption of fixed capital</i>			11.463
<i>ROW</i>			2.755
Total			100.000

- NoT** Net of taxes.
- GoT** Gross of taxes.
- NET** Capital income net of depreciation.
- ROW** Rest of the world.

Table : Assignment of Taxes on Products and Production

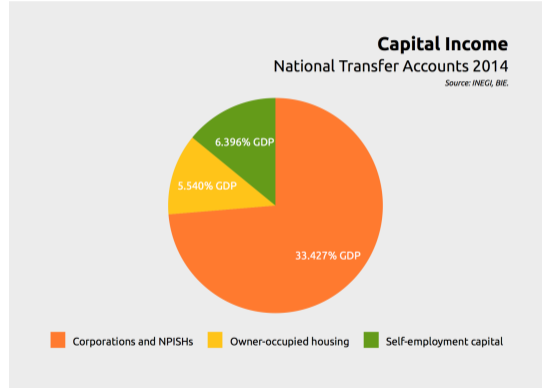
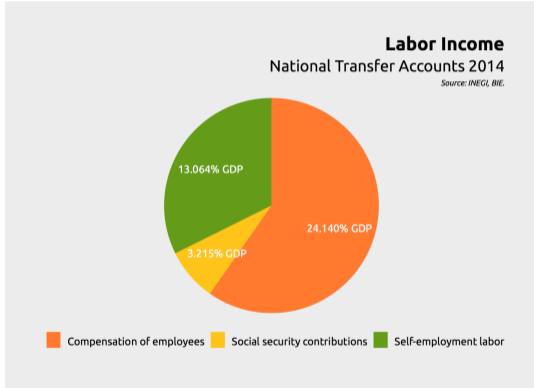
% GDP				
Concept	NoT	Taxes	DEP	GoTN
Corporations and NPISHs	36.823	4.807	8.203	33.427
Owner-occupied housing	7.890	0.000	2.350	5.540
Self-employment capital	6.482	0.787	0.873	6.396
Government	0.037	0.000	0.037	0.000
Capital income	51.232	5.594	11.463	45.363

- NoT** Net of Taxes.
- Taxes** Includes taxes on products (5.247) and capital's share of taxes on production (0.347).
- DEP** Depreciation.
- GoTN** Gross of Taxes and net of depreciation.

Source(s): Own estimations using INEGI, BIE (2014).

NTA Macros

Income Perspective



Macro-micro Harmonization

Income Perspective

Table : Income differences between ENIGH-MCS 2014 and SNA

% GDP			
Concept	ENIGH-MCS	SNA	Diff.
Labor income	20.389	40.419	-49.6%
Earnings	18.990	24.140	-21.3%
Social security contributions	0.000	3.215	-100.0%
Self-employment labor	1.399	13.064	-89.3%
Capital income	4.426	45.363	-90.2%
Corporations and NPISHs	2.533	33.427	-92.4%
Owner-occupied housing	1.193	5.540	-78.5%
Self-employment capital	0.700	6.396	-89.1%
National income	25.801	85.782	-69.9%

Source(s): Own estimations using INEGI, ENIGH-MCS (2014) and INEGI, BIE (2014).

- Step 1** Estimate social security contributions.
- Step 2** Recover gross earnings by computing earning tax retentions.
- Step 3** Reconstruct gross earnings of top incomes households.
- Step 4** Calculate the Altimir coefficients to make the final adjustments to the variables.
- Step 5** Add all incomes and estimate the annual tax.

Step 1: Social Security Contributions

Income Perspective

Description

It is what employers, employees, and the government altogether pay to social security institutions in exchange for retirement, disability, and health services, among others.

Assumption

It is an unreported element, with no questions asked nor information found in the ENIGH-MCS 2014 about its real amount. Individuals are only aware of the income they receive in their pockets or of what they take home.

Variable

Social Security Contributions (SS)

Initial difference

-100.0%

Final difference

-1.7%

Step 1: Social Security Contributions

Income Perspective

Social Security Contributions Formulas

$$SS = \begin{cases} SS_{IMSS} & \text{for IMSS's affiliates} \\ SS_{ISSSTE} & \text{for ISSSTE's affiliates} \\ SS_{IMSS} & \text{for other affiliations} \end{cases} \quad (1)$$

$$SS_{IMSS} = \sum \begin{cases} \text{Insurance} & \text{Employer} & \text{Worker} & \text{Federal Government} \\ \text{Illnesses and maternity} & (5.915+1.050)\%*SBC & (0.438+0.375)\%*SBC & (3.480+0.075)\%*SBC \\ \text{Disability} & 1.750\%*SBC & 0.625\%*SBC & 0.125\%*SBC \\ \text{Occupational hazard} & 1.868\%*SBC & & \\ \text{Daycares and social} & 1.000\%*SBC & & \\ \text{benefits} & & & \\ \text{Retirement and advance} & 5.150\%*SBC & 1.125\%*SBC & 1.692\%*SBC \\ \text{age unemployment} & & & \end{cases} \quad (2)$$

$$SS_{ISSSTE} = \sum \begin{cases} \text{Insurance} & \text{Government Agencies} & \text{Worker} & \text{Federal Government} \\ \text{Disability} & 0.625\%*SB & 0.625\%*SB & \\ \text{Retirement and advance} & 5.175\%*SB & 6.125\%*SB & 1.220\%*SB \\ \text{age unemployment} & & & \\ \text{Occupational hazard} & 0.750\%*SB & & \\ \text{Active workers health} & 7.375\%*SB & 2.750\%*SB & 3.090\%*SB \\ \text{Pensioners health} & 0.720\%*SB & 0.625\%*SB & \\ \text{Cultural and social} & 0.500\%*SB & 0.500\%*SB & \\ \text{services} & & & \\ \text{Housing} & 5.000\%*SB & & \end{cases} \quad (3)$$

Step 1: Social Security Contributions

Income Perspective

- Step 1.1** Identify the social security affiliation of individuals.
- Step 1.2** Take individuals' net annual wage seen in the ENIGH-MCS 2014 and divide it by 360 to have an approximation of their *SBC* and *SB* daily value.
- Step 1.3** Limit *SBC* and *SB* if they resulted larger than their legal limits.
- Step 1.4** Use equations 2 and 3 to produce SS_{IMSS} and SS_{ISSSTE} estimates.

Table : Step 1: Social security contribution estimates

	% GDP		
Concept	ENIGH-MCS	Macro	Diff.
IMSS TP	1.483	1.330	11.5%
ISSSTE TP	0.498	0.356	39.9%
SS	3.159	3.215	-1.7%

TP Includes only employers' and employees' contributions.

SS Includes employers', employees' and federation's contributions for all private and public institutions and *imputed* contributions.

Source(s): Own estimations using INEGI, ENIGH-MCS (2014), INEGI, BIE (2014) and SHCP, EOFP (2016).

Step 2: Gross Earnings and Earnings Tax Retentions

Income Perspective

Description	<i>These are the incomes perceived by subordinated jobs.</i>
Assumption	<i>Observed earnings in the ENIGH-MCS 2014 are net of tax retentions (if any), which employers are obliged to do at the moment of payment. Individuals are only aware of the income they receive in their pockets or of what they take home.</i>
Variable	<i>Gross Earnings (E)</i>
Initial difference	<i>-21.3%</i>
Final difference	<i>-11.5%</i>

Step 2: Gross Earnings and Earnings Tax Retentions

Income Perspective

Earnings and Earnings Tax Retention Formulas

$$E^n = E - I(E) - SS \quad (4)$$

$$I(E) = Q(Tx) + (Tx - LL(Tx)) * \theta(Tx) - S(Tx) \quad (5)$$

$$Tx = \sum_a (E_a - X_a) - SS \quad (6)$$

$$E_a \geq X_a \quad (7)$$

$$E = \sum_a E_a \quad (8)$$

Step 2: Gross Earnings and Earnings Tax Retentions

Income Perspective

- Step 2.1** Identify all earnings sources seen in the ENIGH-MCS 2014 and discount their legal tax exemptions.
- Step 2.2** Substitute equations 5 and 6 in equation 4 and solve for E .
- Step 2.3** Subtract E^n and SS from E and find $I(E)$.

Table : Step 2: Earnings and earning tax retentions estimates

	% GDP		
Concept	ENIGH-MCS	Macro	Diff.
Earnings tax retentions	1.799	2.748	-34.5%
Gross earnings	24.211	27.355	-11.5%

Source(s): Own estimations using INEGI, ENIGH-MCS (2014), INEGI, BIE (2014) and SHCP, EOPF (2016).

Step 3: Top Income Households

Income Perspective

Description	<i>These are the households that perceive and concentrate the largest share of earnings.</i>
Assumption	<i>There is a combination of top income households truncation—i.e. completely missing— and of diffused representation—i.e. low frequency—, present in the ENIGH-MCS 2014's sample.</i>
Variable	<i>Gross Earnings (E)</i>
Initial difference	<i>-11.5%</i>
Final difference	<i>0.0%</i>

Step 3: Top Income Households

Income Perspective

Pareto Interpolation Formulas

$$F(y) = Pr(Y \leq y) = 1 - \left(\frac{k}{y}\right)^\alpha \quad (9)$$

$$f(y) = \frac{\partial F(y)}{\partial y} = \alpha \frac{k^\alpha}{y^{1+\alpha}} \quad (10)$$

$$\frac{E[Y|Y > y]}{y} = \frac{\alpha}{1 - \alpha} = \beta \quad (11)$$

Step 3: Top Income Households

Income Perspective

- Step 3.1 Use estimated gross earnings (E).
- Step 3.2 Sort $y_1 \leq y_2 \leq \dots \leq y_N$.
- Step 3.3 Select a top income distribution (i.e. a β).
- Step 3.4 Estimate G_n^P and g_n^P .
- Step 3.5 Multiply sample weights by probabilities of Step 3.4.
- Step 3.6 Distribute E_a 's as the top 5% income households. Impute **self-employment, capital, and housing** incomes.

Table : Step 3: Top income estimates

	% GDP		
Concept	ENIGH-MCS	Macro	Diff.
Gross earnings	27.356	27.355	0.0%
Earnings tax retentions	2.558	2.748	-6.9%
IMSS TP	1.556	1.330	17.0%
ISSSTE TP	0.604	0.356	69.7%
Total SS	3.409	3.215	6.0%

Source(s): Own estimations using INEGI, ENIGH-MCS (2014), INEGI, BIE (2014) and SHCP, EOFP (2016).

Step 4: Final Adjustments

Income Perspective

Description	<i>It is a linear adjustment of the ENIGH-MCS 2014 variables to match them with the SNA values.</i>
Assumption	<i>There are no more attributable methodological differences between SNA's and ENIGH-MCS 2014's variables, and any remaining gap is assumed to be due to underreporting or to errors of measurement.</i>
Variable	<i>Gross Earnings</i>
Initial difference	<i>0.0%</i>
Final difference	<i>0.0%</i>
Variable	<i>Self-employment</i>
Initial difference	<i>-89.2%</i>
Final difference	<i>0.0%</i>
Variable	<i>Corporations and NPISHs</i>
Initial difference	<i>-92.4%</i>
Final difference	<i>0.0%</i>
Variable	<i>Overseas accounted housing</i>

Step 4: Final Adjustments

Income Perspective

Altimir Formula

$$\text{Adjustment}_a = SNA_a / ENIGH_a \quad (12)$$

Step 4: Final Adjustments

Income Perspective

- Step 4.1** Add up the respective ENIGH-MCS 2014's variable value.
- Step 4.2** Compute the adjustment required to match macro SNA values using equation 12.
- Step 4.3** Multiply ENIGH-MCS 2014's variable with the coefficient computed.

Table : Step 4: Final adjustment estimates

Concept	% GDP			
	ENIGH-MCS	Macro	Adjust.	Diff.
Gross earnings	27.355	27.355	1.000	0.0%
Self-employment	19.460	19.460	6.091	0.0%
Corporations and NPISHs	33.427	33.427	4.728	0.0%
Owner-occupied housing	5.540	5.540	4.523	0.0%
National income	85.783	85.782	N/A	0.0%

Source(s): Own estimations using INEGI, ENIGH-MCS (2014), INEGI, BIE (2014) and SHCP, EOPF (2016).

Step 5: Annual Income Tax

Income Perspective

Description

It is the last estimation needed to examine the annual tax collections differences with their macro control.

Assumptions

Formality—i.e. people paying taxes—are the same ones used in previous steps. Any differences found between the estimates, and the macro controls are assumed to be due an undetermined combination of elusion and evasion.

Step 5: Annual Income Tax

Income Perspective

Income Tax Formulas

For those whose incomes came completely from earnings:

$$I(E) = Q(Tx) + (Tx - LL(Tx)) * \theta(Tx) - S(Tx) \quad (13)$$

For those whose incomes came solely from self-employment or from a combination of earnings and self-employment:

$$I(E) = Q(Tx) + (Tx - LL(Tx)) * \theta(Tx) \quad (14)$$

Income Tax (Article 152)

Tx Lower Limit (LL)	Tx Upper Limit	Fixed Quota (Q)	Tax Rate (θ)	
0.01	5,952.84	0.00	1.92%	
5,962.85	50,524.92	114.29	6.40%	
50,524.93	88,793.04	2,966.91	10.88%	
88,793.05	103,218.00	7,130.48	16.00%	
103,218.01	123,580.20	9,438.47	17.92%	
123,580.21	249,243.48	13,067.37	21.36%	(15)

Step 5: Annual Income Tax

Income Perspective

- Step 5.1 Add primary and secondary jobs' incomes and exemptions.
- Step 5.2 Add all exemptions and limit them according to the law.
- Step 5.3 Use equations 13, 14 and 15 to determine the annual income tax.
- Step 5.4 Compare income tax estimate with its macro value. Find the differences and assume they are due to elusion and evasion.

Table : Step 5: Annual income tax estimates

Concept	% GDP			
	ENIGH-MCS	Macro	E/E (%)	Diff.
Earnings tax	2.748	2.748	-9.229	0.0%
Self-employment tax	0.238	0.238	-90.871	0.0%
Income Tax	2.986	2.986	-47.003	0.0%

E/E Evasion and/or elusion.

Source(s): Own estimations using INEGI, ENIGH-MCS (2014), INEGI, BIE (2014) and SHCP, EOFP (2016).

Economic Inequality

Income Perspective

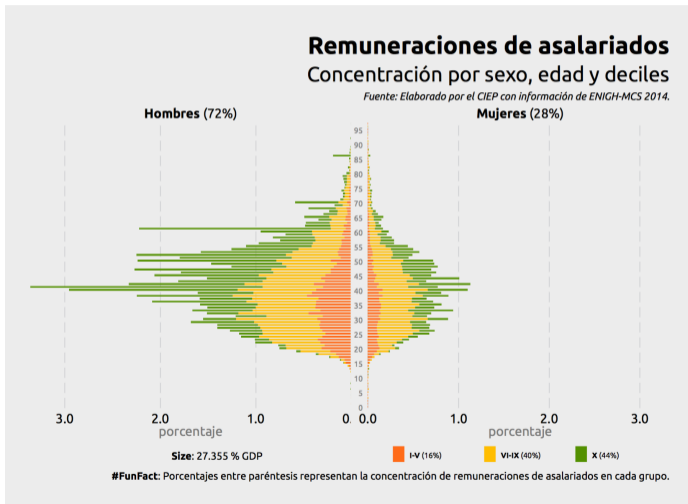
Table : Gini coefficients

Income	Original	Final
Earnings	0.532	0.593
Mixed income	0.686	0.731
Capital income	0.836	0.901
Owner-occupied housing	0.542	0.541
National income	0.515	0.686

Source(s): Own estimations using INEGI, ENIGH-MCS (2014).

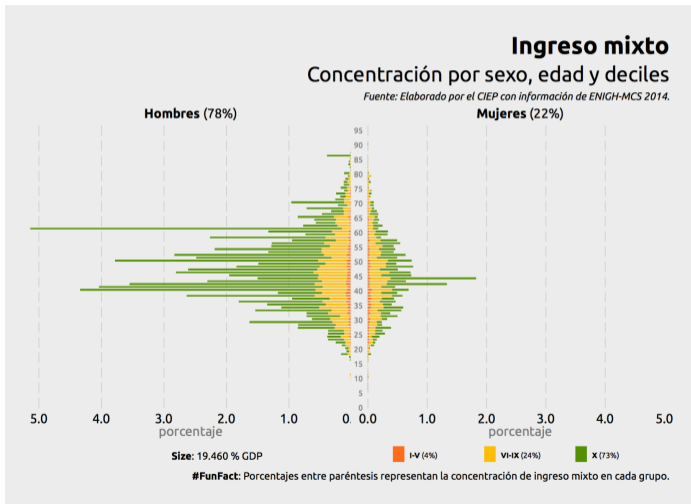
Accounts Distribution

Income Perspective



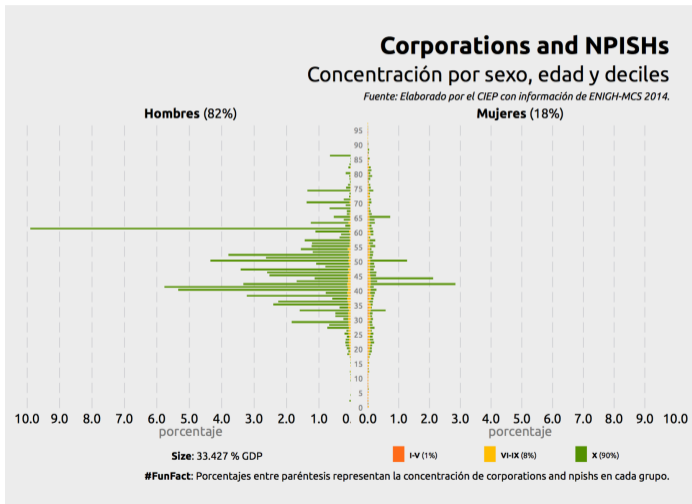
Accounts Distribution

Income Perspective



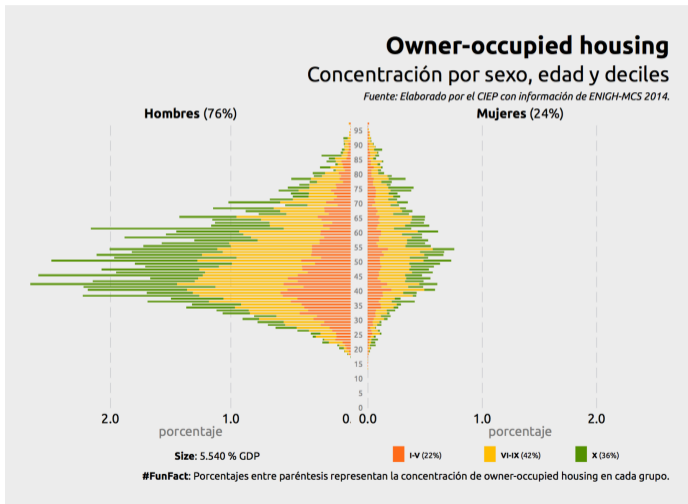
Accounts Distribution

Income Perspective



Accounts Distribution

Income Perspective



Lifecycles I

Figure : Earnings lifecycle

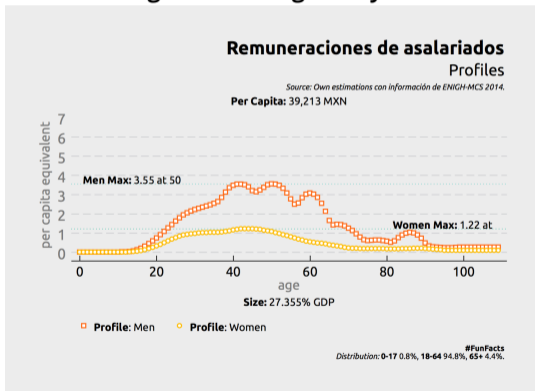
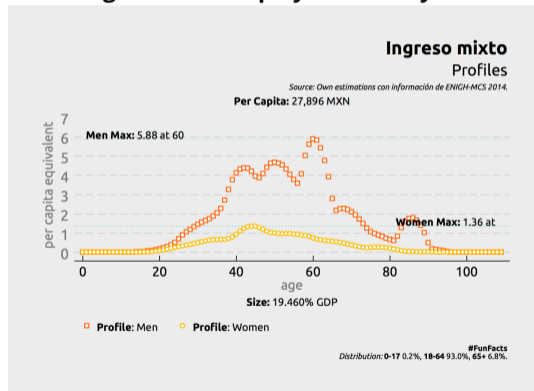


Figure : Self-employment lifecycle



Lifecycles II

Figure : Capital lifecycle

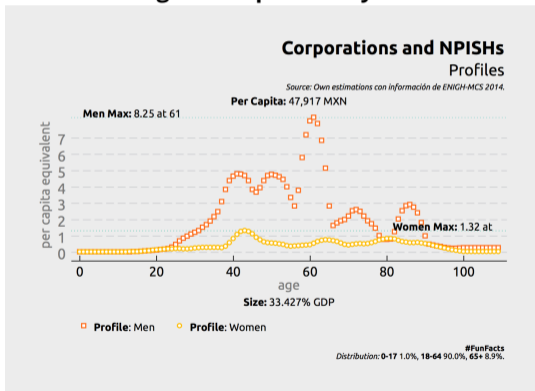
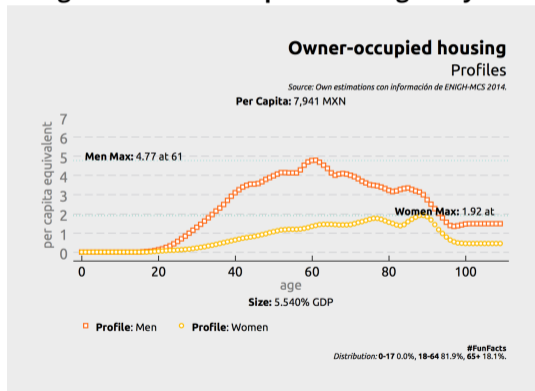


Figure : Owner-occupied housing lifecycle



Fiscal System's Structure

Taxes and Incomes

Taxes 46.2% of LIF 2016. **11.5% of GDP 2016.**

ISR: Income Tax 26.2% LIF. **6.5% GDP.**

IVA: Value-Added Tax 15.6% LIF. **3.9% GDP.**

IEPS (petrolero): Fuel Excise Tax 4.4% LIF. **1.1% GDP.**

State-owned Institutions 20.5% LIF. **5.1% GDP.**

PEMEX: Petroleum company 8.4% LIF. **2.1% GDP.**

CFE: Electric company 6.6% LIF. **1.6% GDP.**

IMSS: Social Security institution 5.5% LIF. **1.4% GDP.**

Oil Revenues 10.2% LIF. **2.5% GDP.**

Others < 1% GDP 10.4% LIF. **2.6% GDP. Debt** 12.8% LIF. **3.2% GDP.**

Efficiency on Resources Taxation I

Table : Income Tax Efficiency

% GDP

Income	2014	Tax	2014	Efficiency
Compensation of employees	24.140	Salary tax	2.748	11.383%
Mixed income	19.460	Mixed tax	0.238	1.223%
Corporations and NPISHs	33.427	Corporation tax	2.407	7.200%
Total	77.027	Social security	1.686	2.189%

Source(s): Own estimations using INEGI, BIE (2014) and SHCP, EOFP (2016).

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