Taxes and Equity in Middle Income countries:

Taxes, Social Insurance, and Incentives to Informality.

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The World Bank - June 10th 2011

Tax and equity in middle income countries:
two case studies and some considerations.

This presentation draws on work from several papers and studies.

- A study of the 2010 Mexico tax reform, financed by the World Bank, with Laura Abramovsky and David Phillips
  - Abramovsky, Attanasio and Phillips: "A tax micro-simulator for Mexico (MEXTAX) and its application to the 2010 tax reforms", 2011.
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- A study of the 2008 pension reform in Chile, financed by the government of Chile, with Costas Meghir and Andres Otero
    - Attanasio Meghir and Otero: "Formal Labor Market and Pension Wealth: Evaluating the 2008 Chilean Pension Reform", 2011

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- Substantive issues in the design of optional tax and benefit systems.
- The political economy of tax reform and design can also be particularly complex.

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  - Existing regulations and the necessity of reform.
- It is important to think of the tax and benefit system as a whole.

The components of the social insurance system

Taxes

- Income (labour) taxes;
- Capital taxes;
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Benefits

- Welfare and social programs;
- Unemployment benefits?
- Pension systems;
- Health systems.

Inequality and its measurement

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- Market imperfections, intertemporal dimensions.

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- Measurement issues:
  - Limited availability of administrative data;
  - Poor quality of survey data;
  - Some phenomena are intrinsically difficult to measure (informality).

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  - Consumption responses to changes in relative prices.
  - Firm behaviour (pass through).
  - Saving elasticities.
  - Participation to formal pension systems.
- Sources of exogenous variation that can identify such elasticities.
- The study of reforms is important.

Two case studies

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- Substantive: we want to discuss the implications of these important reforms.
- Methodology: we want to illustrate some of the issues, limitation and challenges of this type of analysis.

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- The actual reform that was approved was a much reduced version of the proposed one.
- Our purpose is to study the distributional consequences of both the actual and proposed reforms.

Proposed and actual tax reforms

Initially proposed in 2009 (Proposed)

- introduction of 2% expenditure tax (the *CCP*) on all goods and services
- increase in the **IEPS** tax rate
  - on alcohol drinks +20%, modelled as increase in rate from 50% to 53%
  - on beer from 25% to 28%
  - on tobacco, modelled as increase in rate from 160% to 164%
  - on lottery games from 20% to 30%
  - on telecommunications services from 0% to 4%
- increase in the top three rates of income tax (ISR)
  - from 28% to 30%, 21.95% to 23.52% and 19.94% to 21.36%. Reduce 16% threshold
  - Only the part of tax paid on employment income is considered

Approved and implemented in 2010 (Approved)

- increase in **VAT** rate from 15% to 16%, abstracting from differences in border areas
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  - on beer from 25% to 26.5%
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- It allows different options on the treatment of missing values.

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- The main 'solution' is to perform robustness analysis.

The MEXTAX assumptions

We make the following set of assumptions throughout the analysis:

- Members of state government SS schemes face national government SS schedule
- Formal workers comply with tax law on all income
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We make the following set of assumption in the baseline simulations:

- Workers are considered to be formal if covered by an SS health scheme through own work
- Expenditure is considered to be formal (and subject to IVAT and duties) unless the type of vendor is a street market or stall
- IVAT and duties are fully incident on the consumer
- No adjustment is made for under-reporting of income or expenditure

Average gain and losses due to <u>proposed</u> reforms across the <u>income</u> distribution

Average gain and losses due to approved reforms across the income distribution
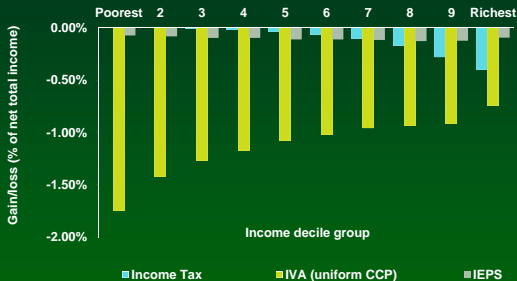
© Institute for Fiscal Studies

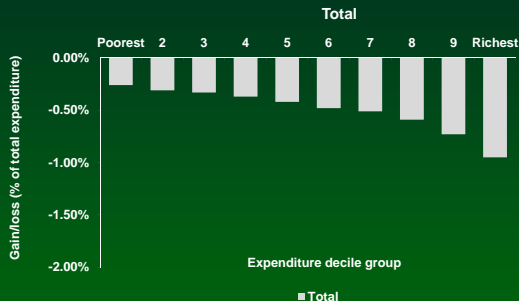Average gain and losses due to proposed reforms across the expenditure distribution

Average gain and losses due to <u>approved</u> reforms across the <u>expenditure</u> distribution

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- The overall impression is that the top of the income distribution is missing from ENIGH.
- We make a variety of assumptions but the result do not change much.

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Formality and pass-through of VAT

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- Vary elasticities by demographic groups and consider different scenarios.

PTR and METR definitions

- $METR = \frac{ISR_{rate}+SocSec_{rate}+AvIndirectTax_{rate}}{1+AvIndirectTax_{rate}}$

- $PTR = \frac{\left(\frac{ISR_{Amt}+SocSec_{Amt}}{GrossInc}+AvIndirectTax_{rate}\right)}{(1+AvIndirectTax_{rate})}$

Change in Income

$$Gross_{new} = Gross_{old} * \left(\frac{1-METR_{new}}{1-METR_{old}}\right)^{IntElast} * \left(\frac{1-PTR_{new}}{1-PTR_{old}}\right)^{ExtElast}$$

Behavioural responses

Indirect tax incidence

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Behavioural responses

Indirect tax incidence

- Standard assumption is that changes in indirect taxes are fully incident on consumers.
    - It assumes either perfectly elastic supply or perfectly inelastic demand.
- Use sensitivity analysis to see how distributional and revenue effects of reforms vary when less than full pass-through
    - 50% or 75% pass through
    - Part not borne by consumers is either 0
    - Rest borne by the owners of capital

Behavioural responses

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- Quadratic Almost Ideal Demand System (QUAIDS)
    - Previous estimates using PROGRESA data to evaluate the welfare effects of food price increases (Attanasio, DIMaro, Lechene and Phillips, 2009)
    - Flexible Engel curves.
    - We use state level and time variability in prices to estimate price elasticities.
    - We allow for non-separability between consumption and labour supply status.

Behavioural responses

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    - Employment effects are by and large important.
    - This has important implications for the 'optimal' rates on VAT.

Table 4 Effect of an employed household head on expenditure shares

Good	Coefficient on Employment	Current VAT Status	Optimal VAT Status
Non-VAT Food	0.0084**	No VAT	+
VAT Food and Food Out	0.0124**	VAT	-
Alcohol and Tobacco	0.0000	VAT	+
Clothing	0.0111**	VAT	-
VAT Household, etc.	-0.0311**	VAT	+
Non-VAT Household, etc.	-0.0041**	No VAT	+
VAT Transport	-0.0079**	VAT	+
Non-VAT Transport	0.0211**	No VAT	-
Non-VAT Health, Education	-0.0068**	No VAT	+
VAT Health, Education	0.0022*	VAT	-
Leisure Goods and Services	-0.0051**	Generally VAT	-
Other Services	0.0002	Generally VAT	-

Notes: ** means significant at the 1% level, whilst * means significant at the 5% level
Source: ENIGH 2008, Bank of Mexico Price Indices and authors' calculations

Other indirect taxation issues

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Other indirect taxation issues

- The analysis ignores other important issues in the design of indirect taxation.
- Compliance, pass through, firm choices, vertical links among firms are all important.
- These can have important consequences for the 'transmission of informality' across firms.
- see De Paula and Scheinckman (2010) for a model and evidence on the Brazilian SIMPLES reform of VAT.

Chile's pension system and its 2008 reform.

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- Chile was one of the first countries to introduce a funded pension system based on private savings.
- The original system contained three tiers.
  - Basic non contributory pension (insurance).
  - Defined contribution pension funded by individual contributions throughout working life
  - Third private tier.

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- The main empirical strategy has been to estimate directly the resulting response to incentives.
- We then use these responses to discuss the way that the pension reform is predicted to change pension coverage, work patterns and poverty

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- In the old system, for those who had no pension entitlement and low income a minimum welfare transfer (PASIS)
- For those with more then 240 months contribution but insufficient funds for a pension above a guarantee (PMG) the pension guarantee.

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    - Sharing of pension on divorce
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    - Sharing of pension on divorce
    - Survivor benefit
    - Compulsory contributions by the self-employed
- The main aim was to improve pension levels and incentives to contribute, especially for women

The Incentive Structure of the Reform

Figure 1

Pre and Post Reform First Tier
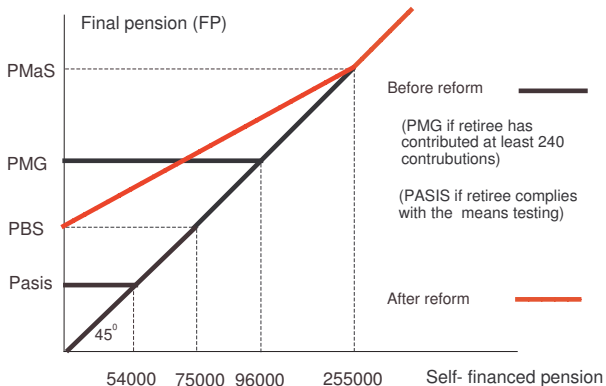
Final pension (FP)

PMaS

Before reform

(PMG if retiree has contributed at least 240 contrubutions)

(PASIS if retiree complies with the means testing)

PMG

PBS

Pasis

After reform

45°

54000   75000 96000   255000   Self- financed pension

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- We estimate the impact of the reform on pension wealth and accrual rates using diff in diff.
- ....and then use theory and regression analysis to establish the effect on informality.

Evaluation strategy.

- This exercise is only possible because of the combination of survey data linked with administrative social security records
  - The Encuesta de Proteccion Social.
  - Waves in 2002, 2004, 2006 and 2009.
  - Linked to administrative data on contribution to the pension system.

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  - Waves in 2002, 2004, 2006 and 2009.
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- We use the timing of the reform and the details of the law to estimate the impact of the reform on:
  - Pension wealth.
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- We then relate the probability of being formal to a set of control variables, pension wealth and accrual rates.

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- The accrual rate is defined as the extra pension to be obtained in the individual works in the current period, everything else being equal.

Evaluation strategy.

- The key equation we will be estimating is

$$Y_{it} = 1[Y_{it}^* > 0] \qquad (1)$$

$$Y_{it}^* = X_{it}\gamma + \beta E_t PW_{iR} + \delta E_t AR_{iR} + \tau_t + \alpha_i + \epsilon_{it} \qquad (2)$$

- Y_{it} is the discrete labor supply taking the value of 1 if individual i is working in the formal sector at year t and 0 otherwise
- X_{it} is a vector of controls including usual socioeconomic and demographic variables
- $E_t PW_{iR}$ is the expected (at time t) pension wealth at retirement (R)
- $E_t AR_{iR}$ is the expected accrual rate at retirement of working the current year t, i.e. the pension benefits accruing due to work in this period;

Constructing pension wealth.

- To construct expected pension wealth we need to predict future life-cycle events:
  1. Working in the formal sector (contributing)
  2. Working in the informal sector
  3. Having Children
  4. Marrying and divorce
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- We construct reduced form models for each of these events and we predict forward for each individual based on their characteristics

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- We exploit the differential effect of the reform on different groups.
- In addition to the basic change we also take into account the changes induced on pension wealth by children subsidies and divorce rules.
- We therefore have to predict, for each individual, number of children and probability of divorce.

Predicted fertility

The subsidy for each child is equal to 1.8 times the minimum wage existing at the time of birth of the child.
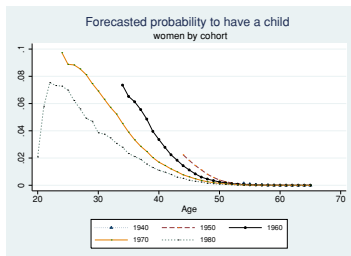
(a) probability of a child
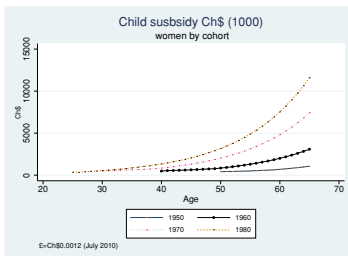
(b) child subsidy

Predicted fertility

- Estimate marriage and divorce probabilities
- Use data to determine who is likely to be worse off
- We assume a compensation fraction equal to 30
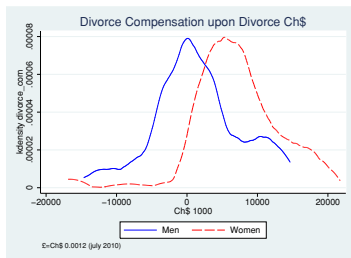
Impacts on pension wealth and accrual rates
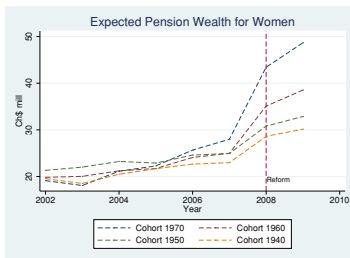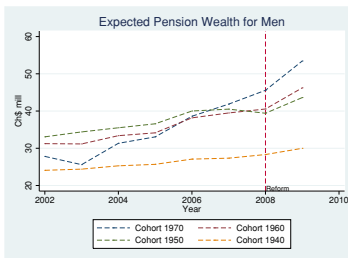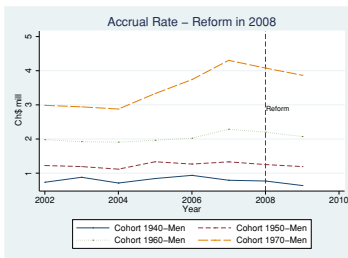

(a) Pension wealth: men   (b) Pension wealth: women

Impacts on pension wealth and accrual rates
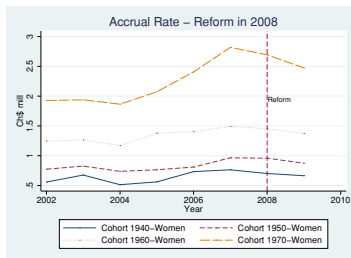
(a) Accrual rates: men

(b) Accrual rates: women

Formality equation: impact of pension wealth and accrual rates

Coefficients on wealth and accrual rates interacted with age.

variable	coeff.	st.err
Pension wealth	-0.025	(0.006)
Pension Wealth $\times$ Age	-0.536	(0.0001)
Accrual Rate	-0.0003	(0.0001)
Accrual Rate $\times$ a	0.03	(0.0012)

Marginal effects

Pension wealth: men and women

Pension Wealth Marginal Effect %
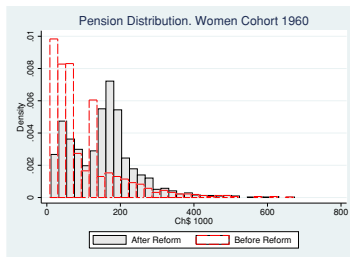Control Function Probit Model

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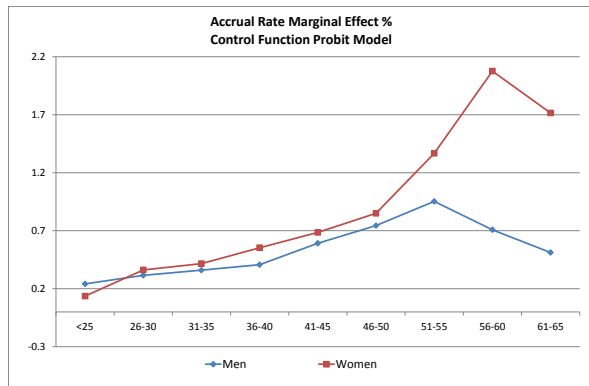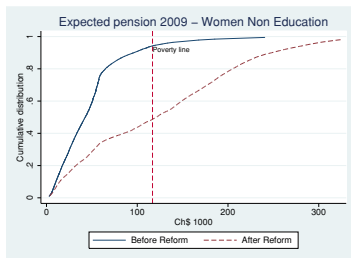
Distributional impacts
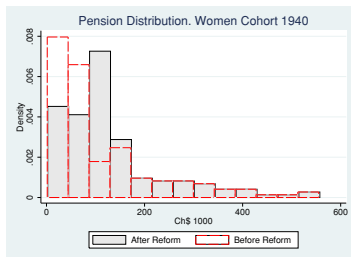
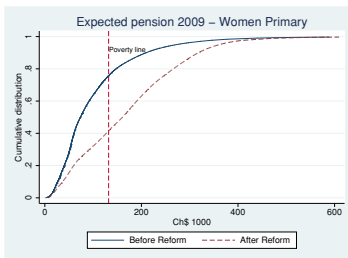

(a) Pension distribution 1040 Co-
hort

(b) Pension distribution 1960 Co-
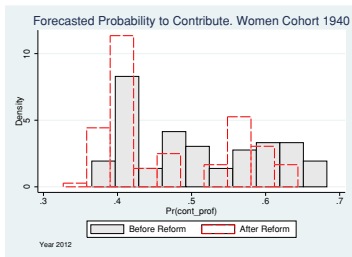hort

Distributional impacts by education
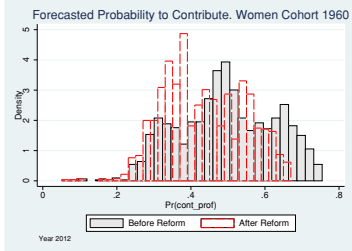

(a) No education

(b) Primary education

Impact on formality

Probability of contributing

(a) Women cohort 1940

(b) Women cohort 1960

Conclusions on the Chilean reform

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- Pension reform redistributed substantially.
- However, the impact of the reform on informality were perverse.
    - This was due to the initial distribution: for some women incentives decreased and for other increased.
- A more sophisticated approach would take into account estimated behavioural responses in estimating pension wealth.

Challenges and Future Research

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- The big difficulty is in identifying the relevant elasticities.

Unanswered questions on large transfer programs (CCTs)

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- do they create disincentives in some sectors?

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- Both example show the importance of good quality data to perform crucial analysis of the reforms impacts.