

## **Social Security Reform in Argentina:**

### **Impact on poverty, income inequality and vulnerability**

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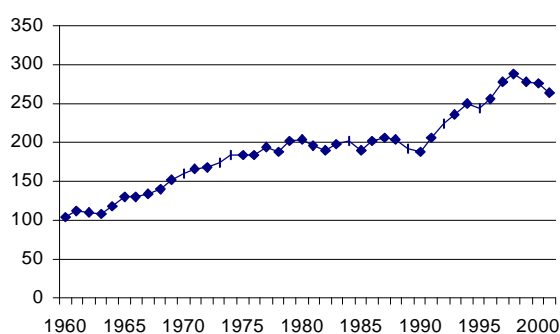
#### **Abstract**

In 1994, Argentina introduced deep reforms to its social security system. Such reforms were part of a major program aiming at modernizing its economy, including establishing a currency board to reduce inflation, a huge privatization program, opening of the economy and deregulation. The results in terms of stabilization and growth were impressive. Capital inflows and investment also grew very fast. However, employment stagnated, poverty augmented and income distribution worsened. While it can be argued that the deterioration of these social indicators was to some extent the result of the economy being hit by external shocks (Tequila crisis, etc.), the transformation of the social security system also had a significant effect over the evolution of social indicators. In this project we will analyze the effects of the introduction of a new individual accounts in Pension System –which is under effect since 1994– over poverty, employment, vulnerability and income distribution. While the macroeconomic effects of a change in the pension system is an issue that is relatively well addressed by the literature, its microeconomic effects are often neglected in the analysis. This project is a first step in conducting a thorough study of the effects of pension reform, and builds on previous work conducted by IERAL and contributes to the design of a new methodology that can be used to test the effect of other policy changes on poverty and income distribution. In the future we aim at developing a dynamic microsimulation model with macro model interaction for prospective analysis.

## 1. Introduction

Argentina is periodically shocked by structural changes. In the early 90's these changes included an stabilization plan (“*Convertibility Plan*”<sup>1</sup>), an increase in openness in trade and capital flows, privatizations of public firms and services, and deregulation of many markets. These reforms were an attempt to break the long history of high fiscal deficits, financed by money printing, inflation and subsequent devaluations. In fact, in many aspects, this plan succeeded. The country registered a period of high capital inflow, low inflation and high (almost unprecedented) rates of growth, increases in productivity and in investment.

**Real GDP - Argentina - 1960 - 2001**



Source: National Accounts

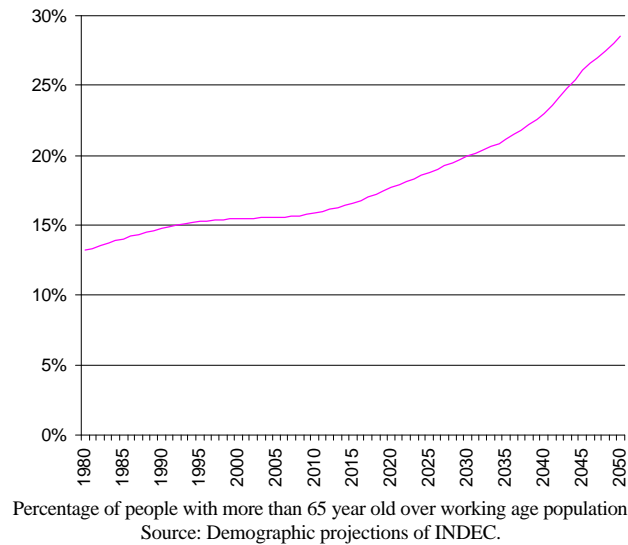
A reform to the existing Social Security System was also part of the above mentioned structural reforms. During the 80's, Social Security was characterized by huge deficits and high payroll taxes, strong regulations in labor market with centralized bargaining processes and some inefficiencies. One particular problem were the multiple sources of litigation related to job accidents: compensation for every accident had to be solved in court, and the amounts of the compensation depended on each particular case. Thus, it was a non insurable risk for employers, with high expected costs. The pension system, in particular, had some additional weaknesses. On the first term, some retired did not contributed to pension system in their working years, and became beneficiaries because of a "*moratoria*"<sup>2</sup>. Other political sensible aspects, like provinces giving high retirement benefits and the impossibility to constitute a contingency fund because of political greediness, also generated uncertainty to the system sustainability. These explained part of the deficit though the high rates of payroll taxes. Furthermore, Argentina had (and still has) one of the most aging population within Latin American countries, what increases progressively the dependency burden and the long run deficit.

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<sup>1</sup> The “Convertibility plan” included a strict currency board, which pegged the local currency to the US dollar. This strict rule aimed at giving predictability to the monetary authority, reducing expectations of high inflation.

<sup>2</sup> A massive “pardon” which allowed people without enough working history to obtain a pension.

## Dependency Burden



A major overhaul to the Social Security System was needed in order to reduce the impact of the increase in the dependency rate, improve efficiency, reduce non-wage labor costs to enhance competitiveness and to increase coverage of displaced workers due to adjustments (privatizations or openness) in the labor markets. The Social Security Reform included the following:

1. Introduction of Unemployment Insurance in 1991.
2. Increase of family allowances on a progressive basis.
3. Some degree of competence was introduced in the health insurance system.
4. Constitution of a “work risks” insurance system through a law that defined the amount for automatic compensations for all accidents and professional illnesses. The Work Risk Administrators (*Administradoras de Riesgos del trabajo or ART*) gave the insurance service, collecting a fixed amount per worker in each firm and covering compensation costs.
5. Implementation of a pension system reform: All workers could opt between continuing in PAY-GO public administered system or joining personal account systems (previous contributions to PAY-GO system were recognized in the definition of benefits) run by private companies known as *Administradoras de Fondos de Jubilaciones y Pensiones*, (*AFJP* -Pension Fund Management Companies). A general and uniform amount was instituted for all the beneficiaries, regardless of the system.

From all these reforms, the pension system one was by far the most important, both from social security and macroeconomic point of view. Huge amounts of transfers were devoted to private pension administrators. The deficit generated by the introduction of such system, was covered with an increase in public debt and, while payroll taxes were reduced, VAT increased over the period.

All these changes to the Social Security System were implemented in the context of a great adjustment at the firm level due to openness, deregulation, privatization and reduction in capital prices, and after the "Tequila"<sup>3</sup> crisis an increase in unemployment.

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<sup>3</sup> When Mexico decided to devalue its currency in December 1994, foreign investors feared Argentina will abandon the currency board, and 18% of private deposits fled the country. Interest rates soared, many small and medium sized banks went bankruptcy. GDP shrank by 4.5% in 1995 and unemployment peaked 18.6%.

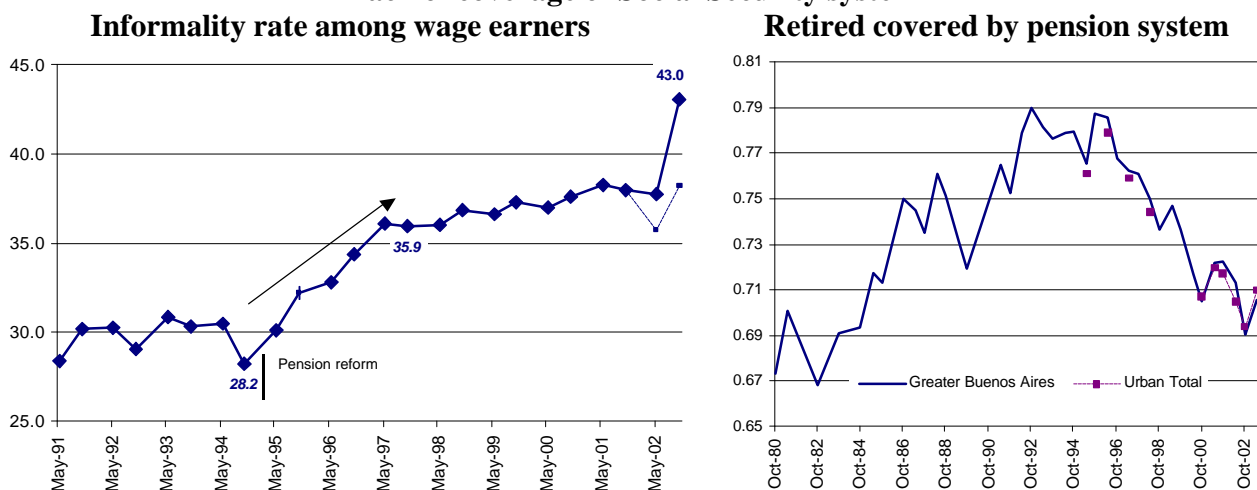
After the success of stabilization plan and the initial reforms per capita GDP grew more than any other period in the last 50 years, while capital stock recovered from the corrosion of the 80's. Technological change, fuelled by renewal of physical capital, new firms and foreign direct investment, increased total factor productivity.

In this context, poverty did not decreased in the same pace that mean income grew. After the first successful stage of the stabilization plan, from 1994 on, poverty started to grow. Inequality also increased significantly: from 1992 to 2001 (the Gini coefficient increased in 9 points). This intriguing evolution of poverty and inequality is explained basically by labor market weaknesses in a context of an increased unemployment and greater labor informality<sup>4</sup>.

Employment level, in fact, did not take part of the favorable context: it only grew at a 0.7% annual rate from 1991 to 1996, with a big drop in 1994-1995. From 1995 to 1998 while GDP grew at a 4.3% annual rate, employment grew at a 3.1% annual rate, though this speed was not enough to reduce unemployment below 12%.

Reforms in pension system were implemented in 1994. After the reform the aim of increasing coverage was far from been reached: labor informality step up from 28% to 36%. Also, the elderlies' coverage was also reduced progressively from the reform, making some households poor and worsening the dependency burden for other households.

### Lack of coverage of Social Security system

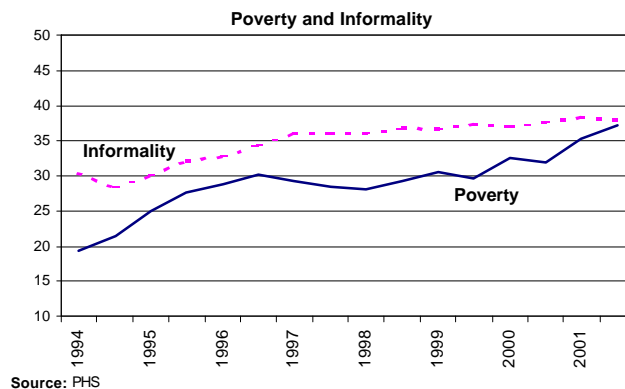


Source: PHS

Percentage of people with more than 65 years old with pension benefits. Source: PHS

Inequality, vulnerability and poverty are strictly linked with social security coverage. Low and instable salaries, lack of allowances and lower tenure in jobs is the primary explanation for income poverty. The household is also more vulnerable to shocks like displacement, accidents and illness. The correlation between poverty and informality have been shown from different points of view. For example, a household without any member in the formal sector has a high probability of being poor. Informality rate and poverty headcount rate are positively correlated both among different Argentine provinces and over time.

<sup>4</sup> Poverty and income distribution indicators worsened even more as a consequence of the devaluation of the currency in January, 2002.



This informality-poverty relationship is also characterized by a vicious circle with short and long run impact, and multiple reinforcing effects. In the first place, low salaries imply low or no savings, specially in large households with unstable work.

Secondly, household opportunities to maintain an acceptable level of health and nutrition are reduced because of lack of health insurance, work risk insurance, family allowances and unemployment insurance. In the eventuality of illness of the household chief, for example, the increase in expenditures and the reduction in earnings must be faced with savings or debt.

Furthermore, the high displacement rates of the informal jobs affect the specific human capital accumulation. This fact, and the high opportunity costs of extending search time due to the urgency of generating income, will increase the probability of accepting an informal and low wage job.

Lack of retirement benefits and low human capital in the family will close the long-term impact of informality over poverty and vulnerability.

Thus, social security reform, the reduction in coverage, the increase in informality and the increase in poverty, inequality and vulnerability seem to be heavily associated. Nevertheless, a complete methodology must be implemented in order to isolate the impact of the social security reform from other macroeconomic shocks, like the reduction of labor demand and high unemployment rates due to demand shocks.

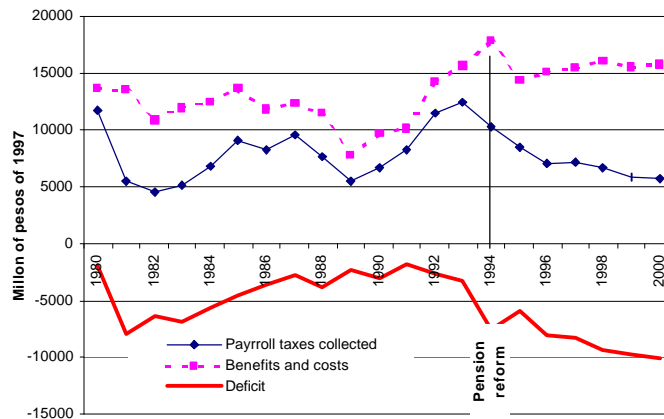
## 2. Research objectives

The main questions that this proposal aims at bringing up are:

1. Which was the impact of social security reform, more specifically we will focus on pension system reform, on inequality, poverty and vulnerability in the 90's? (we will look specifically at the 1994-2001)
2. Are there any differences of such impact between genders, age profile or educational levels?
3. Which are the causes of such impact?

These questions are central for appraising macroeconomic policies impact on poverty in Argentina. The transfer of resources from the public to the private sector implied by the pension reform had significance macroeconomic impacts for the economy. The social security system redistributes an amount equivalent to 10% of GDP, while pension system alone represents a 75% of that total. Pension reform deviated around 1.5% of GDP towards private accounts and increased social security deficit, inducing an increase in general taxes.

## Pension system Deficit



Source: IERAL, Social Security Office.

This reform can be seen as an adjustment policy, as its objectives were to reduce deficit through increasing general taxes for financing individual accounts accumulation that will reduce future deficits. To the success of this type of policy it is central the assumption that the effect of expectation about future fiscal surplus over interest rates and income will overcome the depressing effects of an increase in taxes over production level. Specifically, a pension reform requires that transition burden can be financed without introducing large inefficiencies and implicitly assumes that implicit pension debt (promises to present workers and future retirees) can be replaced with explicit public debt (bonds). Argentina is one of the main and early reformers of its pension system. The result of such reform in terms of macroeconomic variables, poverty and vulnerability must be followed in order to learn some lessons about the nature of effects of reform, the characteristics of the transition burden and the impact over labor market conditioned to different initial conditions. These issues are of central importance for other countries' reform and for the correct diagnosis of social security in Argentina. They will also become a contribution to the forthcoming readjustment (or new reform) of the system.

The first question exposed above is the central issue of this research. The main objective is to isolate the effects of the pension system reform from other macroeconomic shocks. In the introduction, some general relationships between social security reform and poverty incidence were described.

Nevertheless, an exogenous shock (as "Tequila" crisis) took place in 1994 and had important effects on public accounts, labor demand, unemployment and labor informality. In fact, previous research done by this institution shows that labor informality increase is related with the widening of the wage gap between formal and informal jobs, primarily because of the greater incidence of unemployment over informal and flexible workers and not over formal ones. This main relationship is not related to the pension reform, so the analysis must account for this exogenous shock.

We will analyze a counterfactual macroeconomic scenario (without pension system reform), constructed in order to isolate the reform impact. The main differences between both economies would be the changes in labor demand due to reduced payroll taxes and other costs, the labor supply effect of a different worker valuation of social security owed to reform. Further macroeconomic effects will include the decreased production level due to the increased VAT, the savings and investment level and the swap between implicit and explicit public sector debt.

One main issue is the heterogeneity of impact: while a policy can increase growth and income per capita, the differential increase between agents can generate more poverty. In the social security reform case, differences between workers are of main importance. The valuation of social security and, in general, changes in labor supply and demand are not homogeneous, but differ according to the level of education and skills, age and family components, as well as industry and regional characteristics. Thus,

micro impact must explicitly introduce this diversity. Microsimulation departing from observed households is the more explicit way of implementing this.

The final impact in household income distribution will be determined by the level of different effects. The main are related to labor demand and supply. To understand the process, some particular analysis must be done, as the third question remarks. Which is the impact of social security reform over labor supply? Which is the impact of tax increase over production and labor demand? Is there significant effect of labor market segmentation? These and other related questions are important by themselves, while their impact over poverty is the ultimate purpose of the analysis. The sensitivity analysis of final outcome depending on initial conditions, some parameters and other shocks is also important.

The pension system crisis is installed in public opinion and claims for a new reform. Deficit, low coverage and reduced benefits are the main problems. In the near future, a discussion will take place to open the principles for a new reform to the pension system. The focus over poverty and vulnerability, which is the ultimate goal of this research would be a contribution.

In this sense, this project is the first step in conducting a thorough study of the effects on social security reform for Argentina both in terms of micro and macroeconomic impact of changing the pension system and its impact on poverty and inequality. Our ideal goal, well beyond the objectives of the present proposal, is to develop a dynamic micro-simulation model with macro interaction, using micro data from the Permanent Household Survey Data. In order to do that we start with a static microsimulation model with macro scenarios, which is a first attempt to explore some aspects of our broader model.

#### **4. Scientific contribution**

This work intend to contribute in different areas.

Firstly, the pension reform literature seldom faces the micro impact questions. It is profound in macroeconomic effects, like measuring transition costs or the present value of deficit. A conceptual example of macroeconomic approach is Diamond (2000), that analyze alternatives of social security systems and transitional costs. An example for a formal model is Kotlikoff, Smetters and Walliser (2001). They use a dynamic general equilibrium life-cycle simulation model to construct a prospective scenario of social security and to study different changes in this system.

A simpler approach from the Chilean case is Corbo and Schmidt-Hebel (2003) which assess the impact of pension reform over growth rates. The main effects included in this work were the financial channel (compulsory savings in individual accounts are invested in capital markets and produce more financial depth) and labor market channel, through a reduction in payroll taxes. CISS (2002, 2003) also explore these aspects, with a focus on labor market.

Nevertheless, the impact in a segmented labor market, as well as the impact in poverty, distribution and vulnerability is not generally taken into account. Also, models usually constructed for developed countries do not consider the case for a huge informal sector and its consequences in the short and long run.

Secondly, vulnerability is not usually measured in our country, in spite of the partial evidence of its change during the last decade. This growing literature need to be applied to Latin American context and for Argentina in particular.

The relationship between social security, poverty, income distribution and vulnerability is transparent. The workers covered by social security earn regulated and fixed wages that are always over the minimum wage and deregulated/informal wages, they have health, life and labor risk insurance and they are protected from dismissal through severance payment and unemployment insurance. The importance of this issue is generally missed with the aggregate approach, that link social security

reforms with coverage, but do not assess its impact on households income distribution and vulnerability. Here, the microsimulation approach is crucial.

From another point of view, labor informality is generally treated as a fiscal problem related to payroll taxes. Argentina's evidence is against this simple approach: the period when informality step up was the one where payroll taxes were reduced most, even when controlled for other macroeconomic variables such as business cycle, etc.. Thus, further and deeper explanations must be introduced. Labor market segmentation must be a principal tool in this. This literature was originated with Lewis (1954) contribution, and Harris and Todaro (1970) explained the persistence of rural-to-urban migration despite urban unemployment with a labor market segmentation model. There are other examples for Latin America: Edwards and Edwards (2000, 2002) and Marrufo (2001) analyzed the pension reform in Chile and its effects over unemployment and informality. Valdés-Prieto (2002) also assessed the impact of different policies over social security coverage, combining theoretical and econometric models. Garro, Meléndez and Rodríguez Oreggia (2002) emphasize the importance of including a difference between covered and uncovered jobs. The estimation is based in a CES production function with physical capital and two labor inputs: covered and uncovered jobs. Elasticities of demand and supply allow the authors to estimate the substitution effect between both types of jobs, given an increase in payroll taxes.

IERAL have been working with these issues in different research projects. In Mondino and Montoya (2000) a general approach of social security and labor market structure over labor demand is developed. In Butler and Sánchez (2003) the focus in labor dynamics is deepened through a "Constrained Panel Data Near Vector Autoregression" analysis applied to a sample of 20 manufacturing industries for which data on jobs and productivity are available. Different tests for the effect of reforms on job flows and productivity are performed, particularly of financial shocks, labor reforms, trade reforms, and other institutional features that affect the working of the credit, labor and goods markets.

In Brassiolo, Mondino and Ruffo (2003) the impact of social security reform was assessed through the estimation of social security valuation and the relevant parameters to estimate the partial equilibrium model. The parameters are the labor supply elasticity of formal jobs relative to informal jobs with respect to a change in wage gaps, and labor demand elasticity between formal and informal jobs with respect to relative wages. These elasticities determine labor market outcomes, as in the Garro, Meléndez and Rodríguez Oreggia (2002) methodology.

Poverty in Argentina and its relationship with informality was assessed in Sánchez (2003), where poverty and inequality evolution was followed through consecutive periods, and compared with labor market and macroeconomic outcomes. Labor trajectories were also analyzed through transitional matrices and duration models. Some evidence of labor market segmentation between tradables and untradables was found. Macro impacts over labor market and poverty were followed by a microsimulation in two different labor market structures: integrated or segmented labor markets.

In Sánchez, Butler, Flores-Vidal and Ruffo (2003) the relationship between growth, inequality and poverty is followed using Bourguignon (2001) method of poverty decomposition. The research identified the initial conditions and the growth required to meet Millennium Development Goals for Sub-Saharan Africa.

## **5. Policy relevance**

Ten years after the reform, the pension system is still in crisis. The structural problems of short and long run deficit and low coverage are combined with a unprecedented one related to the public debt default. The workers' fear of a reduction in benefits is fuelling the discontent about pension system. From the fiscal point of view, the pension system represents a temptation in a context of scarcity and



financial constraints. This conjunction of opinions could eventually generate a reform with a focus in short run and in fiscal issues, leaving structural problems unresolved.

An objective evaluation of pension and social security reform, with a focus in macro and poverty impact, will contribute to a healthy discussion to policy making process.

## 5. Methodology

Our methodological proposal is based on micro simulation of two scenarios: one with reform (that should reproduce observed data) and one without reform. The impact will be assessed through a detailed simulation of labor market. Although we will not assess the impact over other sources of household income, they are not well measured in the household surveys (underreporting is extremely high), so this will not be a problem for poverty measurement with the usual methodology.

Microsimulations will be based on coherent and complete macroeconomic scenarios that will consist on the estimation of aggregate variables (mean wages, job creation) for each scenario. This variables will be inputs of microsimulations. For the microeconomic part, we will use a modification of the methodology suggested by Robilliard, Bourguignon and Robinson (2001) and then for the macro part we will adapt the methodology of Corbo and Schmidt-Hebel (2003) that they apply for the case of Chile, estimating some ad-hoc parameters that will be used as input in the micro simulation.

The core of the proposal is microsimulation in order to assess the impact over poverty and income distribution. Thus, we will first describe a static micro simulation method and then check consistency with both a down-top and top-down way in order to assess the coherency of micro implications with macro results.

### Microsimulation

The microsimulation part of the problem will be assessed through the adaptation of Robilliard, Bourguignon and Robinson (2001). The main purpose of this microsimulation will be to replicate heterogeneity between households in order to estimate income distribution, poverty and vulnerability. The authors depart from household analysis in order to capture within and between group changes. With that objective we will use real household data for Argentina for the period 1994-2001 (Permanent Household Survey databases) in a micro-simulation model that describes real income generation behavior among a sample of households. Such micro-simulation is based on econometric reduced form equations for earnings in the formal, informal sector and self employment, labor supply decisions and conditional on being active occupational choice.

We will define three different groups for earnings equations for the individuals: self employed, employed in the formal and informal sector:

$$W_i^f = \mathbf{a}_m + \mathbf{b}^f Z_i + u_i^f \quad (1)$$

$$W_i^i = \mathbf{a}_m + \mathbf{b}^i Z_i + u_i^i \quad (2)$$

$$W_i^s = \mathbf{a}_m + \mathbf{b}^s Z_i + u_i^s \quad (3)$$

where  $W_i$  are the (log) labor earnings of worker  $i$ ,  $Z_i$  is a vector of personal characteristics,  $\mathbf{a}_m$  is a dummy for household member (head of household, spouse, other),  $f$ ,  $i$  and  $s$  stand for formal, informal and self employed respectively and the  $u$ 's correspond to unobserved heterogeneity. Earning functions will be defined separately on "segments" of the labor market defined by gender and skill. Furthermore, we will use the adequate econometric techniques in order to correct for selection bias if relevant.

We will define total family income as the sum of earnings for each household in the survey.<sup>5</sup>

$$Y_m = \sum_{i=1}^k W_i^j, \quad (4)$$

where  $k$  are the number of members in the household, for  $j=f, i, s$ .  $W_i$  is total labour earnings, positive only for employed members and zero otherwise.

Then we move on to estimate labor supply: where we estimate a nested multinomial logit (NMNL) with two sequential decisions, one is labor force participation, followed by occupational choice (in the self-employed, formal and informal sector and unemployed, conditioned on participating in the labor force).

We define the two stages of the NMNL as follows:

$$P(y \in S / x) = \frac{\left\{ \mathbf{a}_s \left[ \sum_{j \in G_s} \exp(\mathbf{r}_s^{-1} x_j \mathbf{b}) \right]^{r_s} \right\}}{\left\{ \sum_{r=1}^S \mathbf{a}_r \left[ \sum_{j \in G_r} \exp(\mathbf{r}_r^{-1} x_j \mathbf{b}) \right]^{r_r} \right\}}, \quad (5)$$

where  $S= I, O$  corresponds to the decision to be “In” or “Out” of the labor force, and

$$P(y = j / S = I, x) = \frac{\exp(\mathbf{r}_s^{-1} x_j \mathbf{b})}{\left[ \sum_{hj \in I} \exp(\mathbf{r}_h^{-1} x_h \mathbf{b}) \right]}, \quad (6)$$

where  $j=$  self employed, formal, informal or unemployed.

The response probability  $P(y = j / x)$  is the multiplication of (5) and (6) for the different options.

$X' \mathbf{b}$  is a vector that includes personal, household characteristics, social security valuation and other macro controls (job creation, destruction, unemployment, etc.).

Thus, the parameters of equations (1) to (3), (5) and (6) will characterize the labor market and income generation process of the households. They will be estimated for the base case scenario and changed for the simulated scenarios, accordingly with simulated macroeconomic variables, particularly job creation and destruction and mean wages for each segment of labor market. Each macroeconomic change would alter parameters and simulated outcomes in household labor and income.

### Poverty and income distribution

Once microsimulations are implemented, descriptive statistics for assessing differences between groups of workers or households are relatively simple to generate. Workers will be divided in age, sex and skill groups, and statistics of employment and wages would be constructed for both scenarios and observed data. In the same way, indicators of income mean and distribution will be calculated, as well as poverty (FGT) measures.

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<sup>5</sup> Prices are not included in the model. We use this simplification to the Bourguignon et al. (2001) model because the impact on prices of changes in social security are assumed to be negligible.

## Impact on poverty

Thus, impact on poverty will be measured departing from macro scenarios, simulating impact on households and calculating poverty. The impact of social security reform over poverty and vulnerability can be followed through a diversity of channels. We will focus on those that are particularly important for the case of Argentina pension system reform. The main channels are the following:

- National Savings: Pension Funds not necessarily implies a one by one increase in public deficit, because of a change in public expenditure and in tax rates to finance transition. This effect would reduce production and formality, affecting labor market and household through the proportion of formal and informal workers and level of wages. In the case of Argentina, an increase in VAT took place, while Social Security taxes were reduced and other public expenditure also changed.
- Capital markets: the individual accounts system generates financial resources that increases investment. Furthermore, pension funds promote financial depth, which proved to affect positively total factor productivity. The impact on poverty can be followed through capital-labor intensity and the level of wages. In Argentina, this was a main issue, as financial markets developed with pension reform.
- Debt: while national savings increase, the transition is generally financed partly by public debt, with the consequences of interest payments on public expenditures, amplifying the required fiscal pressure. Moreover, public debt is also diverged to pension funds, reducing their impact over capital markets. In Argentina, public debt was a main factor for both effects.
- Labor demand: the physical capital change and increment in taxes will modify total labor demand. Also, the composition of labor demand will be modified, both between formal and informal contracts and between skill levels.
- Labor supply: social security valuation is modified by reform and will change both total labor supply and its composition. In Argentina, the changes in Social Security must have affected valuation.

While there are other relevant channels that can be analyzed, our aim is to concentrate on microsimulations that can explain a direct impact in poverty. Thus we will not treat some effects like:

- (i) Retirement conditions and benefits. Age and other conditions to obtain pensions changed with the pension reform, affecting pension system coverage. Nevertheless, we will not concentrate on this aspect, as these changes would also occur if PAY-GO system would be unchanged. On the other hand, the pension benefits of capitalization system are clearly different from PAY-GO system, but only 3% of benefits are financed by pension funds nowadays, what converts the benefit calculation a main issue for prospective analysis but not for the present proposal.
- (ii) Private consumption response to changes in public savings and pension system reform. This effect, though important in theory, was negligible in empiric work. The case of

Argentina we will analyze the national savings increase from pension funds and public savings.

- (iii) Impact of public debt on interest rates and product variability. While these effects can be relevant and important, they will not be a main issue in our proposal, mainly because microsimulations will be based on macroeconomic scenarios, not in a complete CGE or macroeconomic model, in order to simplify the aims of the project. Nevertheless, we will not analyze this issue in this proposal directly. Any impact of this channel can be assessed ad-hoc through results in total debt, interest paid, pension fund accumulation, etc.

This effects could be included in future research or extensions of the present project.

### **Macroeconomic variables**

Macro scenarios will be estimated based on some parameters. We will follow a simple framework based on Corbo and Schmidt-Hebel (2003), since the construction of a CGE model as the one present in Robilliard, Bourguignon and Robinson (2001) would not be possible in the time allotted to the project. However, our macro approach represents a first step in a broader project related to Social Security reform in Argentina. Brassiolo, Mondino and Ruffo (2003) is a precedent of IERAL's work based on Garro, Meléndez and Rodríguez Oreggia (2002), which is also a relevant reference. A production function for three sectors (self employed (s), formal (f), informal (i)) will be used. Elasticities of substitution between capital and labor, and between kinds of labor will be estimated. Also, tax incidence will affect production level, composition and factor utilization. Two taxes will be analyzed: product taxes (VAT, mainly) and Social Security Tax (SST) over labor. The specific form of production function will be developed in order to estimate substitution elasticities between capital and each kind of labor, also differentiated between human capital groups. Thus, production function can be noted:

$$Y = f( A , K , L_s , L_i , L_f , VAT , SST )$$

Job creation and destruction will be calculated using labor demand level and introducing cost of accession and separation of workers:

$$JC = c(L, cc)$$

$$JD = d(L, dc)$$

Labor supply will include same labor markets that production function. That is to say, labor would be differentiated between skills and self employed and formal and informal wage earners. Own wage and cross elasticities will be calculated. A labor market segmentation, due to a restriction in formal sector, will be introduced. The elasticities of substitution between markets will be related with job creation rates (or Beveridge cuve). Social security valuation (SSV), calculated independently, will also affect formal-informal substitution.

$$L^s = g(W, JC , SSV)$$

Taxes will be calculated in order to maintain public deficit constant (with given public expenditures). An alternative, in the other extreme, would be to keep same taxes and reduce public deficit what will reduce debt incidence. These simplifications will be especially useful to construct the scenario without pension reform (PAY-GO).

The increase in national savings will be calculated using the assumptions about public expenditure and taxes. The additional savings will be channeled towards investment.

Additionally, we will analyze total productivity as dependent on financial depth. Corbo and Schmidt-Hebel (2003) will be a reference for estimating this relationship.

The inputs in our macro framework are the initial levels of the following variables: (i) public debt; (ii) public expenditures, (iii) social security expenditures, (iv) taxes collected and tax rates, and (v) social security taxes collected and tax rates.

Macroeconomic scenarios is, thus, completed, after considering the reactions of the agents (firms, households and public sector). While some ad-hoc assumptions are used in the sake of simplicity, this would be relaxed and completed in future research. Furthermore, we think that this kind of analysis will be useful and sufficiently accurate, and the implementation of research project will give clues for adapting this framework if necessary in a learning by doing scheme.

### **Macro-micro consistency**

A main issue in macro-micro simulation is the consistency between variables. For example, total level of employment and wages should be the same in macro data and in micro aggregation. Consistency will be implemented in a two-fold way:

1. Down-top way: through labor supply elasticities and cross elasticities, and Social Security Valuation levels. These parameters and variables will be calculated using microdata and the estimations presented in microsimulations.
2. Top-down way: through changes in parameters of models in such a way to replicate total level of labor and wages. Robilliard, Bourguignon and Robinson (2001) explains the methodology that consist on altering the level of constant parameters.

### **Scenarios and exercises**

Micro simulation and macroeconomic framework will be used to analyze impact of policies and initial conditions over poverty. The base case scenario will be the actual evolution of economy with pension system reform. Counterfactual scenarios will be:

Case 1: PAY-GO: without Pension System Reform.

Case 2: Pension System Reform but with lower Public Deficit

Case 3: Pension System Reform but with lower Public Debt

Case 4: Pension System Reform but with lower informal sector

Case 5: more progressive Pension System Reform

Also, some sensitivity analysis for formal / informal elasticities or social security valuation levels can be implemented.

## **6. Data requirements and sources**

The methodology will be data-intensive for micro simulations while macro scenarios can be constructed using time series at industry level. The period of analysis will cover the 90's, particularly from 1993 onwards.

The National Account System will be the main source for the construction of alternative macroeconomic scenarios. Also, fiscal authority statistics of tax and social security collection are important. The variables will be GDP by industry, investment level, taxes level, fiscal deficit and social security finance. Labor market variables will be constructed using the Permanent Household Survey (PHS). Job creation, job destruction and wages are the main ones.

Another source will be the Integrated System of Retirement and Pensions Benefits (ISRPB). This data base will be used for generating statistics of the evolution of wages and jobs in the formal sector. ISRPB covers employees elder than 18 years old, which work on either private or public activity. The coverage excludes military authorities from the Armed Forces, Police Forces and any person younger than 18 years old. The information in ISRPB allow a calculation for each worker or firm of total wage paid and each social security contribution item (pension, work risks system, unemployment insurance, family allowances, health insurance and others). In other words, non wage labor costs can be calculated for any aggregation.

For microsimulations, the PHS will be used. The PHS, developed by the National Institute of Statistics and Census (INDEC), is a two stage random sample of households that contains an array of personal, demographic and economic information on individual household members. Since the beginnings in 1974 it was conducted twice a year (in May and October) in the main urban centers of Argentina<sup>6</sup>. The files record information on each respondent's labor market status and living arrangements during the survey week as well as the retrospective data on labor market activity during the previous month. In terms of personal, demographic, and economic information on individual household members, the PHS provides the following information: labor market status (employed, unemployed or non labor force), relation to household head, age, sex, marital status, hours worked in the survey week, occupation, firm size and sector of activity, social security coverage, non labor income, schooling, number of children, hourly wage. It is not difficult to join personal and household files and to create variables related to the household than can influence individual behavior towards the labor market. The original PHS had a rotating sample design, with households (addresses, strictly speaking) in the survey for four waves (two years) renewing the sample for each wave. The continual survey has a rotating sample design. Households on a determined area are included in the sample during four consecutive waves. In this way, we can gather information from a household for about two years.

## 7. Dissemination strategy

The Mediterranean Foundation is a nonprofit, nonpartisan organization supported by Argentine private sector interested in improving the study, discussion and design of economic policies in Argentina. An affiliated yet autonomous think-tank established in 1977 with 6 regional offices, IERAL conducts policy studies and short-term economic analyses.

At IERAL we understand that a transparent disclosure of everyone's actions is fundamental to strengthen the democratic system. In consequence, every task IERAL researchers embark on implies dissemination of the outcomes. This project will not be the exception, since we understand the necessity of generating awareness about the urgent need for a pension reform due to the adverse long run effects in terms of poverty, inequality and vulnerability of the current system.

The results of the project will be disseminated among three different groups: academia, general public and media and government officials. It is safe to mention some of the activities we carry on at IERAL and how they are disseminated to give an idea of how we will proceed with the current project.

- Academia: IERAL researchers often present their work at internationally well known meetings (Econometrica, LACEA, etc.) and local ones (Asociación Argentina de Economía Política) and in seminars in the most prestigious Economic Departments of Argentine Universities (Di Tella, CEMA, University of La Plata, Universidad Empresarial Siglo 21, etc.)
- General public and the media: IERAL is probably the Argentine organization with more presence in the mass media. During 2003, IERAL published 55 articles in the main newspapers and held 27

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<sup>6</sup> Considering the total sample is about 80% of Argentina's urban population. It must be remembered that about 15% of Argentina's population lives in rural areas (defined as villages of less than 5000 persons).

work-meetings (5,902 participants) to discuss its projects and the socioeconomic and political situation of Argentina and the rest of the world. Additionally, IERAL periodically publishes the results of its research and articles of informed opinion at its public web page ([www.ieral.org](http://www.ieral.org)) and its two online magazines, to know: *Novedades Económicas* (Economic News) y *Estudios* (Studies).

- a) *Novedades Económicas Magazine*: Publication in Spanish, distributed countrywide to subscribers. It focuses on the study of the national economic situation, and on providing specially prepared own statistical series. Its purpose is to divulge the Institutes ideas through short articles written in lay terms and directed at a wide spectrum of readership including businessmen, public officials, academics, university students, political leaders, etc.
- b) *Estudios Magazine*: This is a quarterly publication in Spanish. It includes the final versions of papers prepared by Institute members or their collaborators on the most important current topics. Being a product issued at the highest academic level, it is targeted mainly for specialists.

IERAL also publishes books on a regular basis (a detailed list is available upon request).

- **Government officials**: IERAL researchers periodically hold meetings and workshops in which they interact with policy makers at the local, provincial and national levels. For example, during 2003 IERAL held meetings with the most important presidential candidates (including President Kirchner, then a candidate). All of IERAL's economic proposals were delivered to them at such meetings. In the past, IERAL has delivered books with policy recommendations to all Argentine presidents in the last decade. IERAL is also unique in its regular interaction with top Argentine business leaders since they are members of the Mediterranean Foundation. Finally, IERAL is a very respected institution by its long tradition in public policy analysis.

For the specific dissemination strategy of this project, IERAL will:

- a) Regularly distribute reports to the mass media (written press, radio, TV).
- b) Periodically appear on economic and political TV shows with physical presence of IERAL researchers and authorities to promote the policy recommendations resulting from this research.
- c) Invite media agents, policy makers, businessmen and trade union leaders to the conferences, seminars and workshops, in order to disseminate the project's results.
- d) In order to increase the awareness of this project at a national level IERAL will distribute research reports on a regular basis through its six branches located in different Argentine provinces (IERAL Cordoba, IERAL Buenos Aires, IERAL Comahue, IERAL Cuyo, IERAL Litoral and IERAL NEA).
- e) Publish the project findings and outcome on its two online magazines.
- f) Publish a research document that will be spread throughout the country, and distributed by mail and e-mail to the Argentine policy makers (including the President, Minister of Economy and Minister of Work), congressmen and other think tanks.
- g) Design a project-specific web page with the purpose of disseminating the ongoing results of the project and obtaining feedback from interested agents.
- h) Submit the result of the project in order to present them in academic meetings both at the national and international level.
- i) Present the results of the project at seminars in the most prestigious Economic Departments of Argentine universities.
- j) Submit the results of the project for publications in policy related journals.

## **8. Team members**

**Gabriel Sánchez's** (male, 39) areas of research include international trade, industrial policies, job and productivity dynamics, industrial restructuring, and economic development.

He has significant experience of research in the areas of the costs of complying with standards and regulations for Argentine firms (he currently leads a research project sponsored by UNIDO that deals with measuring the supply and demand of public goods related to trade capacity building in Argentina). Under the sponsorship of UNIDO, he has also led a research project on the benefits of the US' African Growth Opportunity Act (AGOA) and the EU's Everything but Arms (EBA) initiatives for Sub-Saharan African countries, and on the erosion of those of benefits cause by China's entry in the WTO. He has also led research projects that measure the costs of benefits for Mercosur countries of entering trade agreements with the EU, the NAFTA countries, and the FTAA countries, under the sponsorships of Mediterranean Foundation and the Argentine Ministry of Foreign Affairs. In the area of industrial restructuring, he has led an IDB-sponsored project that uses microdata to analyze how gross and net job flows and productivity at the firm level respond to different macroeconomic, price and policy shocks, and how institutions affect these responses. He has also led in this area a WB-sponsored project that analyzes firm demographics and employment dynamics in Argentina. Also under the sponsorship of the World Bank, he has led a research project on growth, poverty and inequality in Argentina during 1991-2003, looking at the links between structural change, labor market institutions, external shocks and investment behavior.

**Maria Laura Alzua** (female, 31) has joined IERAL as researcher earlier this year. Her main research interests are labor, applied econometrics and political economy. She holds a Ph.D from Boston University and a Master's degree from Universidad Di Tella .

**Pablo Brassiolo** (male, 31). IERAL researcher since 1998. He is involved in research projects related to labor economics, social security and poverty. He is familiarized with several micro econometric estimation techniques. He also has received training in impact evaluation techniques. He worked in social security reform evaluation and implemented microsimulations for poverty analysis for different research projects. He studied the dynamics of the urban labor market based on the utilization of duration models, evaluating the determinants of the flows of workers among the different job statuses.

**Hernán Ruffo** (male, 30). IERAL researcher since 2002 have been working in the research projects related to labor economics, social security and poverty. He is familiarized with micro econometric and income imputation techniques. He worked in social security reform evaluation, studied gross job flows, and implemented some simple microsimulations for poverty analysis for different research projects.

## **9. Research capacities building**

While research regarding Social Security issues had been conducted by IERAL researchers in the past, additional capacities will be developed throughout the execution of this project.

Macroeconomic analysis, public finance, social security, labor economics, inequality and poverty are fields in which IERAL researchers have vast experience. The main aspects of labor market dynamics have been analyzed by different sources and methodologies. Some references are Mondino and Montoya (2000) and Butler and Sánchez (2003). Both are econometric models that explain job flows (net job creation in the first case and gross job flows in the second), labor demand and their link with output and labor market regulations. In Butler, Ruffo and Sánchez (2002) and Felcman et al (2004) simple statistics describe job and firms dynamic. Job creation and destruction and firm entry and exit are main statistics that are followed through business cycle.

Social security impact over labor market are the main aspects of Mondino and Montoya (2000) and Brassiolo, Mondino and Ruffo (2003). In both cases cross sectional (PHS) estimations of labor supply are combined with panel or time series estimation of labor demand characteristics. This approach is



relevant to estimate the impact of a change in social security over labor market equilibrium. In fact, Brassiolo, Mondino and Ruffo (2003) concludes with a partial equilibrium exercise, very relevant for this research.

Fiscal analysis is also a strength in IERAL. The estimation of fiscal burden, in legal and effective terms, is one of the main research fields. For example Argañaraz et al (2004) is an estimation of this issues to labor market and payroll taxes. Several research have been conducted in order to analyze the evolution of tax evasion through business cycle and the existence of Laffer curve in Argentina for the 90's. IERAL (2001) is one of the main works on fiscal issues in the institution.

As far as the present proposal is concerned, it includes issues that constitute a challenge for researchers as well as an introduction to new analysis in some aspects. For example:

- o The measurement of economic vulnerability of households has not been frequently measured for Argentina and will certainly be a new development for the research team. In this case, the learning process will include new methodological knowledge and computational skills, that will be applied to the available source (PHS). This field is extremely important in the case of Argentina, as some existing research shows (De Ferranti et al., 2000), and will open new perspectives for future research and development of alternative methodologies. The ample business cycle, the structural reforms, the speed of adjustment and a significant informal and flexible sector seem to be important relationships with vulnerability that deserves to be addressed.
- o The macro impact of social security reform has not been completely assessed in previous work. Some articles and internal seminars have introduced this approach, and the World Bank and macroeconomic models have been discussed. Nevertheless, a complete and rigorous model must be developed. Particularly, the models must be calibrated to Argentina's economy and must be developed to account for a segmented labor market with high informality. This will allow IERAL to improve the diagnose of social security and to evaluate the future changes in the system. Given the relevance of this issue this is one of the most important concerns of the institution. The importance is related to the current policy making and the urgency that government have demonstrated to introduce some reforms in the system, as well as the need of valid institutions that may discuss it. A development of a complete model will allow IERAL to participate in the reform discussion and to propose some alternatives coherent with the main objective of increasing social security coverage and reducing poverty, vulnerability and inequality.
- o The micro-macro model has been a powerful tool for analyzing inequality and poverty in other countries. Macroeconomic shocks, particularly financial and trade shocks, have been simulated in a complete set of macro-micro simulations interaction. Though some work have been made in this area, the formalization of this methodology for the Argentine case with the guide of a well known reference like Robilliard, Bourguignon and Robinson (2001) will be a significant improvement. Furthermore, this development will leave IERAL researchers with capabilities to adapt this methodology for other policy impact analysis over poverty, inequality and vulnerability. Given the poverty level and the claimed objective of reducing it, this would allow IERAL to discuss these matters with policy makers and to disseminate this methodology to other relevant institutions.

The team work will be done with the direction and coordination of Gabriel Sánchez. He will develop the relevant macroeconomic models and the design and adaptation of general methodology.

The construction of macro scenarios will be the work of María Laura Alzúa. In this approach, many parameters estimation is needed. Pablo Brassiolo will work in this field through micro and time series econometric analysis. Hernán Ruffo and Pablo Brassiolo will implement microsimulation methodology

through STATA or other program. They would eventually adapt the methodology to introduce further segmentation and social security issues.

Conceptual framework and main conclusions will be discussed by the whole team. Also, the team will capitalize IERAL's internal seminars with other researchers of the institutions.

## **11. Issues or risks**

There are no ethical, social, gender or environmental risks which should be noted in this project.

## **12. Research projects of IERAL**

**2004 - 2005. "Digital inclusion and employment policies".** Nahirñak, Paula, Pablo Brassiolo, Hernán Ruffo, Rosario Flores Vidal and Eliana Miranda. 2004-2005. Pending project. Financed by FRIDA - Regional Fund for Digital Innovation in the Latin American and Caribbean.

**2004. "Estimation of the fiscal burden in Argentina".** Argañaraz, Nadin (Coordinator), Marcelo Capello, Juan Manuel Garzón, Pablo Brassiolo, Hernán Ruffo, Jorge Oviedo, Diego Gauna, Néstor Grión, Victor Poma, Maximiliano Dvorkin. Project financed by Argentine Firm Association.

**2003 - 2004. "Growth, Structural Change and the MDGs for Sub-Saharan Africa. Some Lessons from Recent Fast Growers".** Sánchez, Gabriel, Inés Butler, Rosario Flores-Vidal and Hernán Ruffo. Contribution to UNIDO Industrial Development Report 2004. Financed by UNIDO.

**2003. "Argentina: Policies for Economic Recovery and Sustainable Growth. Trade Report."** Gabriel Casaburi, Inés Butler, Mathew Beam and Rosario Flores Vidal. Project financed by World Bank.

**2003. "Firm and employment dynamics in formal sector in Argentina".** Ruffo, Hernán and Gabriel Sánchez. Prepared in cooperation with National Account Office. Research work financed by World Bank, Firm dynamic project.

**2003. "Growth and Inequality in Argentina".** Sánchez, G., Pablo Brassiolo and Hernán Ruffo. Financed by World Bank.

**2003. "Social Security reform and labor market structure."** Brassiolo, Pablo Guillermo Mondino and Hernán Ruffo. Financed by Inter-American Conference on Social Security.

**2003. "Socio-economic impact of trade agreements in the North-East of Argentina."** Gabriel Casaburi, Paola Dieguez, Inés Butler, Rosario Flores Vidal and Hernán Ruffo. Financed by International Relations Bureau (Centro de Estudios Internacionales).

**2002 - 2003. "Market Institutions, Labor Market Dynamics, Growth and Productivity: Argentina".** Butler, I., G. Sánchez and Hernán Ruffo. Financed by Inter-American Development Bank.

**2001. A fiscal reform for growth.** Gabriel Casaburi, Guillermo Mondino, Carlos Sánchez and Gabriel Sánchez. 2001. IERAL de Fundación Mediterránea. Financed by Fundación Mediterránea.

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