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Policy Analysis with a Simple Model with Oligopoly, Increasing
Returns, and a "Dual Role" Agricultural Sector.

An Application to the Argentine Experience.

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ABSTRACT

The main goal of this paper is simple: to emphasize the ambiguities of policy analysis when we depart from the standard competitive model as a point of reference.

After reviewing the most salient features of the fiscal history of Argentina's industrial development, a simple static model is used to analyze the possible effects of a reversal in traditional fiscal policies, that is, a change from industry subsidies and industry protection to subsidies reduction and economic openness.

By working with a model that incorporates some basic features of the Argentinean economy -oligopoly and increasing returns in a protected and subsidized industrial sector, and an agricultural sector producer of the main export-goods which are, at the same time, the principal components of the consumption bundle of the labor force- the ambiguities in net outcomes that have to be expected from the policy reorientation above mentioned are briefly analyzed.

1) Industrialization Strategy in Argentina

Since 1930, Argentina reoriented its model of development towards an "inward looking" strategy (Diaz Alejandro, 1970; Mallon and Sourrouille, 1975). In a first phase, this change was viewed as a short-term reorientation based in the use of **protection instruments** because of the adverse change in the international economy since the 1929 crisis. Recession in central countries as well as increasing protectionism and interruption of international capital flows seemed to leave Argentina with the only option of reorienting its way of development waiting for better times.

In 1943 the short-term strategy was decidedly transformed in one of import substitution industrialization (ISI) having long term goals such as the industrialization of the country. This strategy, using **distributive instruments** as a way of widening the local market, gave an important impulse to industries producing for massive consumption. However, this "light" ISI strategy found its limits in 1952 because of the well known problems of balance of trade gap -relatively stagnated exports of primary products versus increasing imports required by an industry oriented towards the local market-.

After a period of crisis of the model, in 1959 the Argentine government encouraged a second phase of the ISI strategy: the "complex" phase using **direct promotion instruments** to encourage investments in industries producers of intermediate industrial inputs and capital goods. In spite of achieving a period of considerable positive investment effects, this strategy became obsolete at the end of the 1960s: gap problems in the balance of payments caused, not only by commercial disequilibriums, but also

by current account problems derived from profit repatriation of multinational firms and interest payments abroad.

Despite some efforts to gradually transform the productive structure in one more oriented towards industrial exports, Argentina's economy continued basically closed and following short-term stop-and-go cycles as a way of dealing with its chronic balance of payment problems. After mid 1970s, its performance worsened considerably because of a hard desestabilizing inflationary shock in 1975, disastrous policies of financial liberalization and economic openness from 1977 to 1980 and, later on, because of the heavy burden it has derived from de debt crisis since 1982. Finally, since 1989 a radical change began to take place: the complete reversion of the ISI strategy was established as the new goal of economic policy. As a consequence of the new policy, the traditional instruments of promotion of private investment -tariffs and subsidies- began to experience a process of reduction leading, in most cases, towards elimination.

2) Protection and Subsidies for Industrial Investment: a quick review of Argentina's fiscal history

(Note: All data in this section are from: Argentina, Seretaria de Estado de Hacienda, 1989)

Since 1930, the Argentine State began to play an increasing role in promoting private investment. It has done this through **price transfers** (mainly by fixing the rate of exchange between local and foreign currency), **budgetary transfers** (taxes and subsidies), and **"extra-budgetary" transfers** (lending at an interest rate below the market. The inner logic of the macroeconomic model determined this behavior. The industrial expansion was financed appropriating surplus from the rural sector and, then, transferring it to industry and its labor force.

One of the mechanisms for operating such transfers were control over both rural prices and foreign trade. Sometimes this was done by means of tariffs on exports, or, more simply, by fixing a relatively low price for the foreign currency. These mechanisms implied a diminution of the relative price of the primary products -thus, a penalization of the rural sector- and a benefit for the industrial sector -cheaper imports and cheaper meals for the labor force, then reducing its relative cost.

But that was not the only way of financing industrialization. There were also another -budgetary and "extra-budgetary" means- more directly connected with the fiscal mechanism of State intervention. Along several decades the State was progressively increasing its direct subsidies for the private investment and, at the same time, developing diverse financing mechanisms. Let's quickly review that institutional history.

From 1930 to 1943, the public sector experienced important changes: new institutions and economic policy tools were developed. Among them we can mention the creation of the Central Bank, the "Keynesian" use of the fiscal budget in order to regulate aggregate demand, and the implementation of controls on foreign exchange, trade and production. Public sector expenditure grew faster than GNP, particularly because of public investment programs, reaching a 19.4% of the GNP in 1941-43. Taxes on local activities financed it in a growing proportion. New taxes -direct taxation-, taxing centralization and taxes co-participation between the National State and Provincial States were implemented.

In the period from 1943 to 1955, the State expenditure increased notably in all its items reaching a maximum of 29.4% of the GNP in the years 1945 to 1949. The public banking system was expanded (the Banco Industrial was created), the foreign exchange control system was intensified and the foreign trade was

monopolized under the IAPI (Instituto Argentino para la Promocion del Intercambio).

This significant State expansion was financed by means of: the international reserves accumulated during the war and immediate post-war period, the "consumption" of the existing public capital -because of the subsiding tariffs- and the surplus that resulted from in the recently created social security system.

In 1952 such a way of expansion -correlated with the "light" phase of ISI- was exhausted. Then, from 1952 to 1959, a period of transition and relative austerity took place. But, in 1959, the implementation of the "complex" phase of ISI began encouraging investment in production of basic inputs, capital goods, transportation materials and cars. Since then, a new way of promoting investment began to generalize: the direct promotion through fiscal incentives. All the previous ways of promotion seemed to be insufficient to encourage private investment for developing complex industrial processes.

However, by 1962, the international reserves did not exist anymore, the social basic capital was deteriorated and the social security system became equilibrated because of the increasing number of beneficiaries. Then, in order to continue with the ISI strategy, the government incurred in foreign debt.

At the end of the 1960s, the State incorporated a new way of intervention: private enterprises rehabilitation. In order to maintain employment and economic activity, the State took in charge broken enterprises giving to them financial assistance and debts pardons. Later, the State used to return them back to the private sector or to maintain them as public enterprises.

Since 1970 the direct State support to the private sector was notably intensified. It focused on wide direct subsidies to private

investment and increased activity of hiring private capital for public works. Let's enumerate the main institutional innovations.

--In 1971, the Ley de Compra Nacional -that obliges the public sector to preferentially acquire goods in the local market- was widened. As a consequence of this, relative prices paid by the public sector began to increase.

--The Industrial Promotion Regime (Law 14.781 of 1958) began to show its fiscal cost but it was also extended (Ley de Promocion de Tierra del Fuego from 1971 and Ley de Promocion de La Rioja, San Juan, San Luis y Santiago del Estero from 1980).

--Special helps for regional economies were implemented -such as wine, sugar and tobacco production- generating overproduction.

--Fiscal Resources Affectation was widened: for energy and roads (Fondo Chocon-Cerros Colorados, Fondo Nacional de Grandes Obras Electricas, Fondo Nacional de Infraestructura del Transporte), for house building (Fondo Nacional de la Vivienda) and for regulating tobacco production (Fondo Especial del Tabaco), then giving "marked safety" to private firms working for the State.

--Exports Promotion System was implemented in order to encourage non-traditional exports by means of mechanisms of pre-financing and financing or operations at preferential rate of interest. Selective Industrial Imports Promotion System implemented in order to support, by means of tax exemption, imports of specific capital goods and industrial inputs. Strong "rent-seeking" and corruption characterized these systems.

--Government guarantees were given to the private sector borrowing to finance its participation in public works or its own investment projects (paper production, steel, petrochemicals), thus, forcing the State to pay for broken promises of the private sector.

The resulting growing expenditure was increasingly financed by means of expansion of the money supply, by selling public debt in the local market, by borrowing from the local banking system and by notoriously accruing the public foreign debt (this one increased from 4.000 million dollars in 1975 to 14.500 million dollars in 1980).

In 1980, because of the experiment of financial liberalization and economic openness' failure, some major bankruptcies of national private banks and important economic holdings occurred (Grupo Greco, Grupo Oddone and Banco de Intercambio Regional -the latter was the major private bank in Argentina). This implied that many enterprises went to State hands provoking a huge State expenditure to prevent a general bankruptcy of the financial system.

Finally, in 1982, in a situation of recession, increased inflation, high level indebtedness in the private and public sector and unfavorable conditions in the international trade and financial markets, the State accomplished the greatest transfer of resources ever made to main private firms. By means of an inflationary shock with low interest rates, the private local debt was "liquidated", and using "swaps" and "seguros de cambio" mechanisms the private foreign debt was totally transferred to the State.

The liquidation of the private local debt implied a transference of income of 13% of the GNP; the amount of the private debt transferred to the State was approximately 7,000 million dollars. Therefore, by 1983, the public sector expenditure reached 50.7% of the GNP and the "extra-budgetary" expenditure (the operative losses of the Central Bank) also endured a huge increase.

Since then, the State had both to reduce expenditure and to increase resources. It did so by means of growing taxes and improving its tax collecting, by imposing compulsive savings on the

private sector or directly by expropriating banking deposits as ways of managing a fiscal situation totally overwhelmed by the circumstances.

By 1987, the government estimated the annual amount of the public sector subsidies: (the figures are in million of Australes average 1987 with an approximated relation of 2 Australes by 1 Dollar)

1. Impact of Industrial Promotion Regimes.....	2,770
2. Impact of Non-Traditional Exports Promotion System....	460
3. Impact of Selected Imports Promotion System.....	1,157
4. Industrial Promotion for Tierra del Fuego Province..	1,456
5. Interests Private Foreign Debt taken by the State....	910
6. Subsidies and Tax exemptions in electr. consumption...	203
7. Tax Avoidance due to "Bankruptcies System".....	535
8. General Budgetary Subsidies.....	1,157
Total.....	8,505

This estimation is not exhaustive (i.e. it does not take into account several "extra-budgetary" subsidies) but it is indicative of the heavy burden imposed on the State finances. The total estimated amount (8,505 million Australes per year, approximately 4,000 million dollars) was equivalent to two thirds of the total public sector deficit by 1987.

3) Possible Effects of Policy Changes

The peculiar fiscal history just reviewed helped to create a significant industrial sector (Canitrot, 1983). But, as can be expected for the case of Argentina -a relatively small market of approximately 30 million people at the beginning of the nineties- that industry was characterized by both highly concentrated oligopolist structures and unexploited increasing returns to scale (Azpiazu and Kosacoff, 1989). And it is that kind of industry the one that will experience the consequences of the changes in public policy which began in 1989 and that, as I said before, are focused on the reduction of tariff and subsidies.

To account for the possible impacts of the new policies, I have chosen to base my work on a formal model developed by Dani Rodrik (Rodrik, 1988) that includes both oligopoly and increasing returns as key features. To account for peculiar characteristics of the Argentinean economy, I added to that model a primary sector with constant returns to scale in production which carries the double duty of producing the main exportable goods which are, at the same time, the principal components of the consumption bundle of the labor force. I also included in the model a classical - in Arthur Lewis fashion- mechanism of wage determination. I think that this kind of "departures from the standard models" (Atkinson and Stiglitz, Chapter 7, 1980) are particularly suited for economies like that of Argentina.

The model's basic assumptions are:

--the consumer side of the economy can be represented by an expenditure function of the form: $E(p, W)$, where p stands for "domestic" prices and W is a welfare index. As usual, the derivatives of this function with respect to prices yield the Hicksian demands:

$$(1) \quad c_i = \frac{\delta E(p, W)}{\delta p_i}$$

--each industry i is made up of n_i identical firms. Firm and industry levels of output are denoted, respectively, by x_i and X_i . Therefore:

$$(2) \quad n_i x_i = X_i$$

-- $c_i(w, x)$ are unit cost functions, where w denotes factor prices. The inclusion of x_i accounts for the possibility of increasing returns to scale. To summarize the scale characteristics of the technology, we define:

$$(3) \quad \theta_i = \frac{c_i}{\delta(c_i x_i) / \delta x_i}$$

which is the ratio of average cost to marginal cost.

--for simplicity, let's assume that homogeneous labor is the only relevant input. Then, labor demand is obtained from c_i by applying Sheppard's lemma. Assuming full employment, we get:

$$(4) \quad v = \sum_i X_i \left(\frac{\delta c_i(\cdot)}{\delta w} \right)$$

where \mathbf{v} denotes (fixed) labor supply and \mathbf{w} is the uniform wage

--wages are assumed to be determined in a classical way, that is, as a "subsistence minimum". They are also assumed to be a positive function of the level of exports (Z). This is a typical feature of the Argentinean case, where primary products are both the main exportable commodity and the main component of the consumption bundle of the labor force. Therefore:

$$(5) \quad \mathbf{w} = f(Z, .)$$

--imports are given by:

$$(6) \quad M_i = C_i - X_i, \quad \forall_i$$

where M_i are imports, C_i and X_i are consumption and production of good i

--exports are given by:

$$(7) \quad Z_k = L_k - C_k, \quad \forall_k$$

where Z_k are exports and L_k are exportable goods (primary products based on land use) produced under constant returns of scale in a competitive way with unit costs given by l_k . Let's assume that, as it is the case in Argentina, labor costs in the agricultural sector are negligible (therefore, l_k will be a

constant and independent of w)

--finally, let's assume that world prices are exogenous, which is reasonable for a small economy like that of Argentina

The initial equilibrium of the economy is given by the following income-expenditure equality (in domestic prices):

$$(8) E(p, W) = Y(\Pi, \omega, T_m, R)$$

where p are prices, W is welfare, Π are monopoly profits, w is labor income, T_m is government revenue from tariffs on imports, and R is "landowners rent" or, conversely, government revenue from tariffs on exports. By making use of all our previous equations, the initial equilibrium can be re-written as:

$$(9) \quad E(p, W) = \underbrace{\sum_i (p_i - c_i(w, x_i)) X_i}_{(1)} + \underbrace{wv}_{(2)} + \underbrace{\sum_i (p_i - p_i^*) M_i}_{(3)} + \underbrace{\sum_k (p_k^* - l_k) Z_k}_{(4)}$$

where p_i and p_i^* are, respectively, domestic and world prices, and where: (1) accounts for "pure" oligopoly profits, (2) for labor income (3) for revenues from tariffs on imports and (4) for revenues from tariffs on exports (or landowners rent).

By totally differentiating this expression, taking into account that, from equation 2:

$$X_i = n_i x_i$$

and, from equation 3,

$$\frac{\delta c_i}{\delta x_i} = - \left(1 - \frac{1}{\theta_i}\right) \frac{c_i}{x_i}$$

and setting dp^* , dv and dp at zero (world prices and employment were assumed fixed, and oligopoly prices can be considered as fixed for small changes X and x), we end up with:

$$(10) \quad \left(\frac{\delta E}{\delta W}\right) dW = \underbrace{\sum_i (p_i - p_i^*) dM_i}_{(a)} + \underbrace{\sum_k [(p_k^* - 1_k) + v \frac{\delta w}{\delta Z_k} - \sum_i \frac{\delta c_i}{\delta w} \frac{\delta w}{\delta Z_k} X_i]}_{(b)} dZ_k \\ + \underbrace{\sum_i (p_i - c_i) dx_i}_{(e)} + \underbrace{\sum_i n_i c_i (1 - (1/\theta_i)) dx_i}_{(f)}$$

where:

$$\left(\frac{\delta E}{\delta W}\right)$$

being the inverse of the marginal utility of income, translates the real-income effects on the right side into welfare units. It can clearly be seen, then, that an increase in aggregate welfare can come from four main sources:

..dM: (see term "a" in equation 10) an expansion in imports of goods produced under protection (these are the usual consumer's gains from trade)

..dx: (see term "e" in equation 10) output expansion of oligopolies -this means that it will always be desirable -ceteris paribus- a reallocation of resources to sectors with "excess" profits (those with p_i greater than c_i) in order to drive those profits down and therefore increasing efficiency

..dx: (see term "f" in equation 10) output expansion in those

industries with increasing returns to scale (θ_i greater than one), in order to drive costs down

..dZ: (see terms "b", "c", and "d" in equation 10). In this case, it can be observed that an ambiguous effect on welfare is intermixed with a distributive conflict. Indeed, an increase in exports (dZ) would cause an increase in welfare through both an increase in aggregate income for exports producers (term "b" in eq. 10) and an increase in total labor income (term "c" in eq. 10) but, at the same time, it would have a negative impact on welfare through an increase in labor costs of industrial production (term "d" in eq. 7). Therefore, the net welfare effect of an increase in exports is theoretically indeterminate.

Of course, the relevant issues for policy analysis are the signs and magnitudes of dM, dZ, dX and dx to be expected from changes in subsidies and/or tariffs, and those effects will be a function of the specific nature of the oligopolist behavior embedded in the model, the ease of exit and entry into the industrial sector, the features of the trade restrictions under consideration, and the relative magnitudes involved in the distributive conflict above mentioned.

However, even within that range of indeterminacy, a qualitative analysis can be attempted. If we assume -as it is the case of Argentina- that the protected and subsidized industries are oligopolies with increasing returns to scale in production, the conflictive nature of the current policies -subsidies reduction and trade liberalization- will become apparent.

Lower tariffs on imports or bigger quotas will bring about an increase in M and therefore in consumer's welfare but, at the same time, those imports are likely to negatively affect the protected industries. Therefore, X and x are likely to fall, decreasing aggregate welfare. Lower tariffs on exports will imply

an increase in Z thus having, as we saw above, ambiguous effects on welfare. Which one will be the prevalent effect it is hard to say without sufficient and reliable information to perform a serious empirical analysis.

Subsidies' reductions would probably cause a reduction in levels of production and firm's size, that is to say, a decrease in the values of X and x , therefore negatively affecting aggregate welfare. By the same token, M (imports) are likely to grow, increasing aggregate welfare. The precise magnitude of these effects is, once again, hard to say without empirical knowledge of prevalent market structure and sectoral production functions allowing for increasing returns. However, what has to be stressed here is the relative indeterminacy of policy effects, in contrast with the straightforward predictions that could be made if we based our analysis on the assumptions of perfect competition.

4) Final Comments

By applying a simple static model, I have tried to obtain general predictions for the possible effects of the new policies in Argentina. Even at such an elementary level of analysis, the problem of identification of expected outcomes and adjustment paths seemed far from simple. No easy answer can be given in connection with the costs and benefits of the whole process.

My analysis did not take into account the existence unemployment and underemployment -a relevant feature in "dual" economies such as that of Argentina-. Neither I approached the implied process of structural adjustment within a dynamic framework of sectoral and aggregate growth. I only considered marginal changes in policy, but the analysis performed could not be robust when facing big discrete changes -a complete removal of tariffs and subsidies-.

BIBLIOGRAPHY

- Atkinson, S. and J. Stiglitz: Lectures on Public Economics (London-New York, McGraw-Hill Book Co., 1980).
- Azpiazu, D. and B. Kosacoff: La Industria Argentina: desarrollo y cambios estructurales (Buenos Aires, Argentina, Centro Editor de America Latina - CEPAL, 1989).
- Canitrot, A: Orden Social y Monetarismo (Buenos Aires, Argentina, Centro de Estudios de Estado y Sociedad, 1983).
- Diaz Alejandro, C.: Essays on the Economic History of the Argentine Republic (New Haven, Yale University Press, 1970).
- Mallon, R. and J. Sourrouille: Economic Policymaking in a Conflict Society: the Argentine case (Cambridge, Mass., Harvard University Press, 1975).
- Rodrik, D.: "Imperfect Competition, Scale Economies, and Trade Policy in Developing Countries" in Trade Policy Issues and Empirical Analysis, Robert E. Baldwin (ed.) (Chicago, The University of Chicago Press, 1988).
- Argentina, Secretaria de Estado de Hacienda: Politica Para el Cambio Estructural en el Sector Publico: mensaje de los proyectos de Leyes de Presupuesto Nacional (Buenos Aires, Argentina, 1989).