

Capital Mobility in a Dynamic Structuralist CGE

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Abstract

What effect does variability in the export price have on workers? This issue is examined with a 2 sector, 5 social class structuralist CGE model. Two simulations are run, the first illustrating the effect of a change in the export price. The second simulation examines the effect of imposing a tax on capital. Both simulations are run with two circumstances, one in which capital is highly mobile and the other where it is relatively immobile.

1 Introduction

Does the effect of trade volatility on the income of workers and the distribution of income depend on the degree of openness? Stiglitz [16] notes, “[v]irtually every major meeting of the International Monetary Fund, the World Bank, and the World Trade Organization is now the scene of conflict and turmoil”. While mainstream economist argue that globalization and free trade stimulate economic growth, many argue that globalization has caused, among other things, the divergence of wages between skilled and unskilled workers in what is sometimes referred to as a “race to the bottom”.¹

The effects of globalization have implications for policy makers in the developing world, many of whom see free trade as the key to higher economic growth. Conversely, many are skeptical of opening their markets, having witnessed what can happen when there is a mass exodus of capital, in cases such as East Asia and Latin America. In the last decade, the world has witnessed

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¹For a further explanation of this theory, see [2] and [20].

major economic crises in Asia, Russia, and Latin America, often attributed to globalization.² The main concern of economists and policy makers is whether the costs of openness outweigh the benefits. Most argue that they do and it is this issue that inspires this paper. The effects of globalization have implications for policy makers in the developing world, many of whom see free trade as the key to higher economic growth. Conversely, many are skeptical of opening their markets, having witnessed what can happen when there is a mass exodus of capital, in cases such as East Asia and Latin America. In the last decade, the world has witnessed major economic crises in Asia, Russia, and Latin America, often attributed to globalization.

Rodrik [11] provides a theoretical model examining the relationship between volatile export prices and the income of workers. This paper examines this question empirically by way of numerical simulations using a structuralist CGE for Chile. We study both the effect of volatile export prices, as well as the use of a tax on capital as policy measures to counteract negative effects, such as decreased worker income. What we discover is that while export price volatility has a detrimental effect on workers, imposing a tax on capital also has a negative effect. The outcome of this tax is for capital to flee, which, again has negative consequences for workers via lowered worker income. The results presented in this paper have important policy implications for developing countries, particularly those that are moving from a relatively closed economy to an open one.

The paper is organized as follows: Section 2 of this paper discusses the importance of the topic by outlining some issues surrounding liberalization. Section 3 describes the principal mechanisms of the CGE used in the simulations. Section 4 presents the simulation results. Section 5 discusses some possible policy options, while the sixth section concludes. The complete model along with the social accounting matrix (SAM) is included in the appendices.

2 Structural Reform in Chile

The international context of the 1970s was a surge in technological innovation in communications coupled with a growth in knowledge-intensive industries, both of which led the way to liberalization, expansion of world trade and a transformation of capital markets. During the last several years it has become clear that the world economy is moving even further towards global integration.³ Part of this has resulted in controversy surrounding the IMF and the World Bank. In what became known as the “Washington Consensus”, the IMF and the World Bank “encouraged” countries to open their markets.⁴ These institutions failed,

²For a discussion of these crises see [10].

³NAFTA, European integration, and President Bush’s recent idea to cut all tariffs on industrial and consumer goods by 2015 are just a few examples of our move towards a more integrated global economy.

⁴Stiglitz [16] defines the Washington Consensus as the “consensus between the IMF, the World Bank, and the U.S. Treasury about the ‘right’ policies for developing countries” (p. 16). Although the IMF cannot *force* a country to open its doors, per say, it often provides

however, to note the potential risk of opening capital markets too quickly. In fact, in 1997, the IMF sought the ability to place increased pressure on countries to liberalize their capital markets[16]. Several economists, however, have acknowledged the danger in rapid capital market liberalization. Even Bhagwati [1], one of the most prolific writers and staunch defenders of free trade, cautions against opening capital markets too quickly. He points out that “[c]apital flows are subject to what the economic historian Charles Kindleberger of MIT has called ‘panics, manias and crashes’” (p. 22). Furthermore, Stiglitz [16] dismisses rapid liberalization as “bad economics”, while arguing, with the case of East Asia, that “capital account liberalization was the single most important factor leading to the crisis” (p. 99). Although the effects of liberalization are important and ought to be studied, the concern here is with the effect of having an economy, which is already open.⁵

The Latin American response to this revolution was a pro-market structural reform. From the mid-1970s throughout the 1980s many Latin American countries underwent reform and Chile, in 1974, was one of the first to do so under the direction of the University of Chicago. This began when Pinochet, through a military coup, rose to power. The regime lowered tariff barriers, reduced restrictions on capital mobility and began privatizing publicly owned enterprises.⁶

The effects of liberalization have had a positive impact on some countries and a negative impact on others. While certain countries have experienced long periods of growth, others have witnessed increasing inequality and slow growth.⁷ Chile is cited frequently as a success story of liberalization. During the last decade, Chile was successful in attracting foreign direct investment (FDI). Although FDI in Chile was just under three percent of GDP in 1992, it continued to rise until it peaked in 1999 at approximately 13.5 percent.⁸ This has helped contribute to Chile’s impressive growth rate, an average of 6.6 percent per year since 1985 [21]. We take up the details of how this process can be modeled in the following section.

In terms of poverty reduction, Chile has done remarkably well relative to Latin America. As of 1998, the amount of the population living in poverty and extreme poverty was only 17% and 4%, respectively [21]. While the rate of poverty is not high by international standards, income inequality has worsened over the past decade [21].

debt relief contingent to a country liberalizing. This is known as “conditionality”, which Stiglitz [16] defines, as a “condition that turns [a] loan into a policy tool” (p. 44).

⁵For a look at the effect of liberalization on income distribution in a CGE framework, see [22].

⁶For a look at the economic history of Latin America for the last century, see [18]. For a detailed history of the liberalization of Chile, from 1975 - 1989, see [15].

⁷For an interesting explanation as to why liberalization has had different effects for different countries, see [8].

⁸Source: Central Bank of Chile Foreign Investment Committee, available at (www.foreigninvestment.cl).

3 A Computable General Equilibrium Model

The model is based on a structuralist CGE framework described by Taylor [17]. Structuralist models incorporate idiosyncracies specific to the modeled economy and describe how endogenous and exogenous variables interact with one another.⁹ The properties discussed here refer to a model of a small open economy (SOE), which implies that changes in the domestic variables have no impact on world markets. This is crucial to some of the results and will be discussed further below. Goods are produced using primary factors and intermediate inputs. Primary factors consist of capital and two types of labor, skilled and unskilled. The model assumes constant returns to scale and imperfect competition, which implies that firm output is determined by demand. All markets in the model are thus quantity clearing; price is determined by a fixed and given mark-up on costs which include labor as well as domestic and imported intermediate goods. Output is divided into goods for domestic and export markets, shown in the SAM as *agricultural* and *nonagricultural* goods respectively.

In certain models final household demand use constant elasticity of substitution (CES) utility functions. This, however, ignores Engel’s law, which explains the relationship between income level and spending on various goods at a given price. Because of the incongruity between actual behavior and that modeled by CES functions, the linear expenditure system (LES) is used. The LES is calculated by maximizing a utility function subject to the budget constraint [17] and has the particularly useful feature that the sum of expenditure adds up to total income.[17]

The government levies consumption taxes, taxes on firms, value-added taxes, and import tariffs. Government consumption, on the other hand, is exogenous. The government purchases goods and services domestically, as well as imports goods. The government also pays out transfers to households, government wage payments and interest.

Exports are determined exogenously, with the foreign price fixed as a dynamic parameter. The model allows for changes in prices, as well as the exchange rate. This will be used in simulations below.

3.1 The Chilean Model

The model is based on a 1992 SAM for Chile. The SAM provides a general overview of an economy and shows the interactions among the agents at a particular point in time. The rows represent the income received from the different agents, while the column represent the expenditures. The Chilean SAM has two goods, represented by i , and two sectors, identified by j , which are agricultural and non-agricultural. There are two categories of labor, defined by l , skilled and unskilled, and five income classes, with h identifying the households by income category with households divided by quintiles. The five income classes, together with the population, allow a Gini coefficient to be calculated. The

⁹For an explanation on structuralist CGE models, as opposed to neoclassical models, see [6] and [17].

complete model and SAM is provided in the appendix. Here we will look at the variables that are pertinent to the simulations.

At any time, t , P is the price, given by the equation:

$$P_i(t) = [1 + \tau_i(t)][1 + t_i(t)] \sum_j P_j(t) a_{ij} + [1 + t^*(t)] m_j^n(t) e(t) + \sum_l w_l(t) l_{il}(t) \quad (1)$$

for $i = 1, 2$ and where τ_j is a mark-up calculated from the base SAM, t_j is the indirect tax rate, a_{ij} is the input-output coefficient, e is the exchange rate, and m_j^n is the intermediate noncompetitive import coefficient t^* is the tariff rate, w_l is the wage rate and l_{il} is the labor coefficient. Gross value of production, X_i , is defined for each sector by

$$X_i(t) = \sum_j a_{ij} x_j(t) + \sum_h C_{ih}(t) + I_i(t) + I_i^g(t) + G_i(t) + E_i(t) \quad (2)$$

for $i = 1, 2$ and where $\sum_j a_{ij} x_j(t)$ represents intermediate demand, C_{ih} is the household consumption, I_i and I_i^g represent private and public investment, respectively, G_i is government consumption and E_i is exports. For both the agricultural market and nonagricultural markets, equations 2 determine the level of output, X_i .

Household income is given by:

$$Y_h^h(t) = \sum_l \{Y_l^L(t)[1 - \sigma^{l*}(t)]\sigma_h^l(t)\} + Y^k[1 - t^f(t)]\sigma^{k*}(t) + T^g(0)\sigma_h^t(t) + T^{g*}(0)\sigma_h^{t*}(t) \quad (3)$$

where Y_l^L is the income from labor, σ_h^l is the share of labor, t^f is income tax on firms, σ^k is the share of capital, T^g is transfers and σ_h^{t*} is the share of transfers. In each case the asterisk denotes foreign.

Consumption is defined by:

$$C_{ih} = \theta_{ih} + \frac{\mu_{ih}}{P_i(t)} \{Y_h^d(t)[1 - s_h(t)] - \sum_i P_i \theta_{ih}(t) + [e(t)p^*(t)\theta_h^*(t)]\} \quad (4)$$

where θ_{ih} is the frisch parameters, μ_{ih} is the marginal propensity to consume, Y_h^d is household disposable income, and s_h is the savings rate. Household disposable income is given by

$$Y_h^d(t) = Y_h^h(t) - [Y_h^h(t)t^h(t)] \quad (5)$$

with t^h the tax rate on households.

Government consumption is given by

$$C_i^g = \sum_i P_i(t) G_i(t) + T(t) + e(t) G^* \quad (6)$$

Imports are defined by

$$M(t) = e(t) \left[\sum_i m_i(t) X_i(t) + G^*(t) + I^*(t) + I^{g*}(t) + \sum_h C_h^*(t) \right] + \Psi^l(t) + F^*(t) \quad (7)$$

where G^* is government consumption of the imported good, I^* is foreign private investment, I^{g*} is foreign public investment, C_h^* is household consumption of the imported good, Ψ^l is income from foreign labor, and F^* is foreign factor payments.

The 7 equations 1 through 7 determine the 25 variables of the static model. We next turn to the savings-investment balance in the static model.

The savings-investment balance is used to insure that there are no errors in the model. Household savings is given by

$$S^h(t) = s_h(t)Y_h^d(t) \quad (8)$$

Government savings is defined by

$$\begin{aligned} S^g(t) = & \sum_i \frac{P_i(t)X_i(t)t_j(t)}{1+t_j(t)} + \sum_i t^*(t)e(t)m_i(t)X_i + \sum_h t_h(t)Y_h^h \\ & + t^*(t)Y^k + t^*(t) - \sum_i C_i^g(t) \end{aligned} \quad (9)$$

where t_j is the indirect tax rate. Foreign savings is given by

$$S^*(t) = M(t) - \left[\sum_i P_i(t)E_i(t) + T^*(t) + t^*(t) + \Psi^{k*}(t) \right] \quad (10)$$

where M equals imports, E_i is exports, T^* is foreign transfers, t^* is foreign taxes paid directly to government.

Total investment is given by

$$I(t) = \sum_i P_i(t)I_i(t) + \sum_i P_i(t)I_i^g(t) + e(t)I^* + e(t)I^{g*} \quad (11)$$

Since, by definition, savings equals investment, the savings-investment balance is defined by

$$[S^h(t) + S^g(t) + S^*(t)] - I(t) = 0 \quad (12)$$

Equation 12 should always equal zero. This ensures that there are no errors in the model. We next turn to the equations that make the model dynamic.

To make the model dynamic we must take into account the dual role of investment, first to increase aggregate demand and second to accumulate capital sock. The following equations are based on the process of dynamic calibration described by Gibson [7]. The growth rate of investment by destination is defined by

$$\hat{I}_i(t) = \alpha_0(t) + \alpha_1 u_i(t) + \beta_1 \frac{i(t)}{r_i(t)} + \gamma_1 \frac{I_i^g(t)}{GDP} + \lambda[r(t) - r^*(t)] \quad (13)$$

where α_0 is an arbitrary constant, α_1 is the accelerator, β_1 is the elasticity with respect to the interest rate, i , and the rate of return, r_i , γ_1 is the elasticity with respect to the level of public investment (or crowding out), u_i is capacity utilization, defined by equation 17 below, λ is the level of capital mobility,

which will be addressed below, and r and r^* are the domestic and international rates of return. This equation takes into account the various factors affecting investment. A change in the interest rate, the rate of return, capacity utilization and public investment all effect the growth of investment. This has an effect on the capital stock, which is defined by

$$K_i(t) = K_i(t-1)[1 - \delta + \hat{I}_i(t)] \quad (14)$$

where δ is depreciation. An increase (decrease) in the rate of depreciation and/or a decrease (increase) in the growth of investment in the previous period, time $t-1$, will decrease (increase) the capital stock available in the current period.

Capacity growth is defined by

$$\hat{Q}_j(t) = \frac{\hat{Q}_j(0)k_j^m(t)[I_j(t) - \delta K_j(t-1)]}{Q_j(t-1)} \quad (15)$$

where $\hat{Q}_j(0)$ is the constant and k_j^m is the marginal capacity-output ratio.

Total capacity is given by

$$Q_i(t) = Q(t-1)[1 + \hat{Q}_i(t)] \quad (16)$$

Lastly, capacity utilization is defined by

$$u_i(t) = \frac{X_i(t)}{Q_i(t-1)} \quad (17)$$

The Gini coefficient is calculated from population and household income. Population was given for the base year and calculated for subsequent years as follows:

$$n_h(t) = n_h(t-1)[1 + \phi_h \hat{n}_h(0)]$$

where the growth rate for each household is assumed to be greater in poorer households and ϕ is an error term found by the difference between the calculated and the actual population. The population data is available in appendix B.

The model was designed to run in Excel. It is calibrated to the 1992 base SAM in the sense that if the parameters are unchanged, the model reproduces the data of the base SAM. Simulations can then be done on any subset of the parameters, leading to a change in the endogenous values of the variables with respect to a change in the given parameter values.

3.2 Rodrik's Model

Rodrik presents a simple analytical model of the process of globalization. He does not attempt to estimate or calibrate his model using actual data, but is content to base his conclusions on the inherent plausability of the model structure and its results. The CGE model described above is far more realistic than Rodrik's own and it will be of great interest to see how the Rodrik effect plays out in a more complex environment in the continuation.

The purpose of Rodrik's model is two-fold. The first is to show the relationship between openness and worker's wages and the second is to show the effect of increasing the tax on capital. He reaches two conclusions. The first is that increased openness magnifies the fluctuations in real wages at home [11]. He argues that this results in an increased demand on the government to provide social insurance and he shows the effect of increasing the tax on capital to subsidize the increased transfers, which, in the case of high capital mobility fails [11].

There are four equations taken from Rodrik [11] that influenced this model. The first defines the domestic return to capital as:

$$r = \frac{\sum_j \pi_j^u X_j}{P^k \sum_j K_j} - \tau^k \quad (18)$$

where π_j^u is equals unit profit, X_j is the gross value of production, P^k is the price of capital, K_j is the capital stock and τ^k is the domestic tax on capital. The second equation illustrates the relationship between the domestic and foreign rates of return:

$$r = r^* - \lambda[k^{total}(t-1) - k^{total}(t)] \quad (19)$$

or rearranged

$$\frac{r - r^*}{\lambda} = k^{total}(t) - k^{total}(t-1) \quad (20)$$

with r^* as the international return, λ the degree of capital mobility (a high λ represents relatively mobile capital), and k^{total} or total capital, as defined by equation 14 below. In equilibrium the domestic rate of return, r , is equal to the international rate of return, r^* , and the *change* in total capital, Δk^{total} is zero. Since we are analyzing an SOE any change in the domestic rate of return would have not effect the international rate of return. Therefore, if the domestic rate of return decreases (increases), capital would flow into the country, represented by a decrease (increase) in k^{total} in time t to return the equation to equilibrium.

Third, the average wage, \bar{w} , is given by:

$$\bar{w} = \frac{\sum_i w_i l_i X_i}{\sum_i l_i X_i} \quad (21)$$

where w_i is the nominal wage and l equals the labor coefficient. This equation is different from the one used in Rodrik [11]. Rodrik sets the domestic wage equal to the marginal value product of labor. The main difference is that wages are taken exogenously and changes in productivity are not taken into account in equation 21. Therefore, changes in the capital stock do not have an effect on the wage in the simulations used here. This may underestimate the effect of changes in the export price in the simulations used here. Lastly, we examine the effect on workers total income, Y^l , by the equation:

$$Y^l = \bar{w} + \tau^k k^{total} \quad (22)$$

As noted above, Rodrik’s model is theoretical and the simulations that follow use the 4 equations, 18, 20, 21, and 22, listed above, to empirically analyze the effects of a change in the export price.

In the calibrated CGE, we first decrease the export price to determine the change in the capital stock. We also examine the effect on worker income, through equation 22. For the second simulation we maintain constant export prices, but increase the tax on capital and look at the effects on worker income. Income and consumption levels are usually the most common indicators for measuring living standards. While poverty and inequality may not be the only indication of the welfare, it is certainly a strong indicator. Other factors, such as education, health, safety, etc. are also important.¹⁰

4 Simulations

The simulations described in this section investigate the effect of increasing the price of exports on the income of workers and the flow of foreign capital. We also analyze the distributional effects, by looking at the Gini coefficient. The simulations are run over an eleven year period, 1992-2002. No attempt to calibrate the dynamic behavior of the model to the actual data is made, however; thus, relative changes could be viewed as predictions for any eleven year period. For the simulations, we look at the effect of a change in the price of exports both in the case of a high level of capital mobility and a low level of mobility. We then look at the effect of increasing the tax on capital on workers incomes.

4.1 A worsening of the terms of trade

As an open economy, Chile is subject to fluctuations in the international terms of trade. There are a number of reasons why a change in the price of the exported good could occur. Events in the world market would affect Chile’s export prices. A situation where this could happen would be for a large country to dump a good on the world market, which would lower the world price. Since Chile, as an SOE, has no influence on the world price, in order to remain competitive it would have to follow suit and lower its price as well.

In the Rodrik augmented CGE, we would expect that a change in the export price would have a number of effects, both statically and dynamically. At any given time t , a drop in export prices in the model is equivalent to lowering E in equation 2 above since the same amount of physical exports equates to lower earnings. Let \bar{E} be the physical amount of exports and p^* the export price. The real value of the exports in equation 2 above is:

$$E_i = \frac{ep^*}{p_i} \bar{E}_i$$

¹⁰For a compelling look at various ways to determine individuals advantage in society, see [13] and [14].

for $i = 1, 2$. A reduction in E_i amounts to a drop in aggregate demand, output and employment in the economy as a whole. But there is more. As the level of effective demand falls, so too does the rate of profit. This causes capital to flow abroad and to reduce the level of capital in equation 14. This will cause capacity utilization to follow an ambiguous path. If aggregate demand, X , is reduced by more than capacity Q falls, then u will decline and *vice-versa*.

The first simulation involves decreasing the export price and ascertaining the effect on workers measured, as noted above, in terms of household income and the Gini coefficient. This is slightly different from the method employed by Rodrik [11]. While Rodrik examined the level of capital outflow, this model looks at the total amount of capital in the economy. We use equation 14 above, which defines domestic capital stock. The growth rate of investment, important for this simulation, is defined as:

$$\hat{I}_i = a + \alpha u_i - \beta \frac{i^r}{r_i} + \gamma I^g + \lambda(r - r^*)$$

where a is autonomous growth of investment, u_i is capacity utilization, i^r is the real interest rate, r^* is the international rate of return, α , β , and γ are elasticities, and λ represents the degree of capital mobility. The international rate of return is the rate of return of the model in the base state.

We now run the simulation with a 5% decrease in the price of exports. The results of the effects of the simulation on the capital stocks of the agricultural and nonagricultural sectors are given in Figures 1 and 2.

Figures 1 and 2 provide data for the base state, with the price of exports remaining constant, as well as two situations with a decrease in the export price, one in a highly integrated economy and the other with a less integrated economy. These figures demonstrate a remarkable difference between a relatively open economy versus a relatively closed one with respect to the capital mobility parameter, λ . The economy that is more integrated witnesses a lower rate of total capital than the relatively closed economy. Moreover, in the case of the agricultural sector, Figure 1, the capital stock appears to be declining at the end of the time period, which suggests that the capital stock may continue to decline well into the future. With a lower level of capital mobility, the capital stock seems to be approaching a new equilibrium and, although it is significantly lower than during the base period, it does appear to be leveling off. It is also interesting to note the substantial difference between agricultural versus non agricultural sectors. Looking at the relative difference between Figures 1 and 2, the capital stock of agricultural sectors is remarkably lower than the stock of non agricultural sectors.

What effect does this have on workers? Equation 22 tells us that, as the capital stock decreases, total income will decrease, although this depends on the tax on capital, which will be discussed further below. The results are presented in Figure 3, which shows us that, again, there is in fact a substantial difference between an open economy and one that is not. In both cases worker income is significantly lower than the base state. However, as time progresses, the disparity increases, which again suggests that in later time periods, workers in

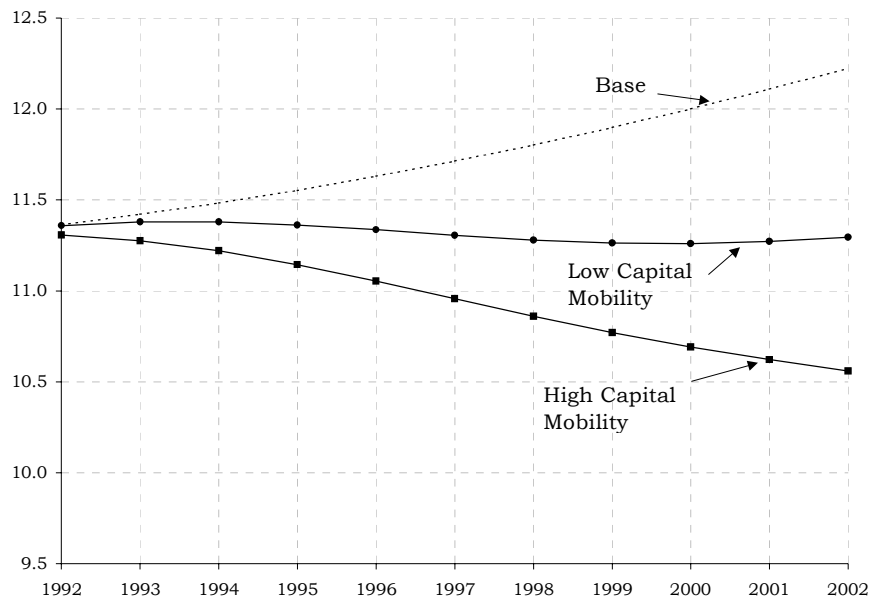


Figure 1: Capital stock of the agricultural sector with a 5% decrease in the price of exports.

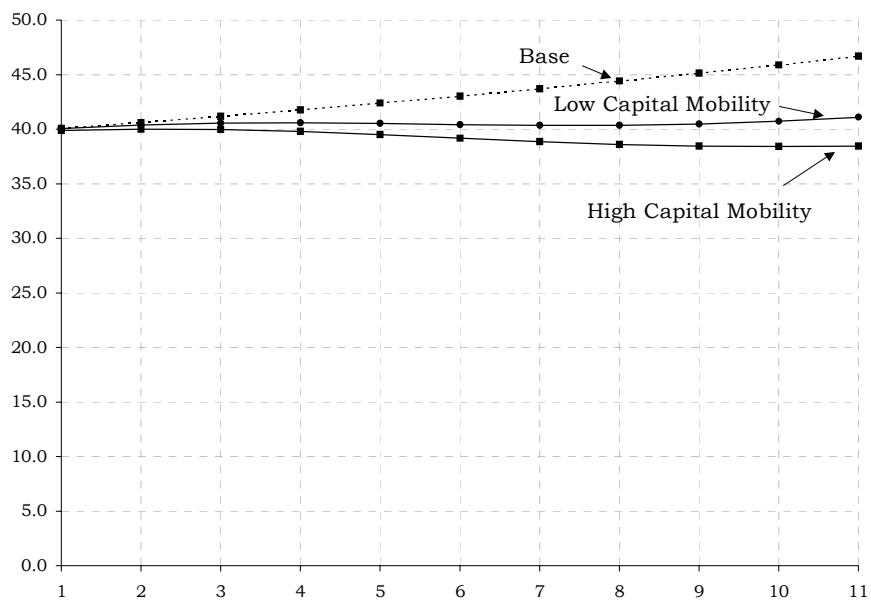


Figure 2: Capital sock of the non agricultural sector with a 5% decrease in the price of exports.

a highly open economy will receive lower wages than those in a less integrated economy.

The table below offers more detail with respect to this simulation. Note the distributional effects of the change shown in figure 4. Household income decreases for each household and much more so for *wealthier* households. As a result the Gini coefficient decreases, although not by a large amount. There is, however, an important point that ought to be made regarding the distributional effects. Figure 3 only tells us the effect of the average wage, not the wage of skilled workers versus unskilled workers, since wages are determined exogenously in this CGE. Therefore, the distributional effects may be underestimated in this model.

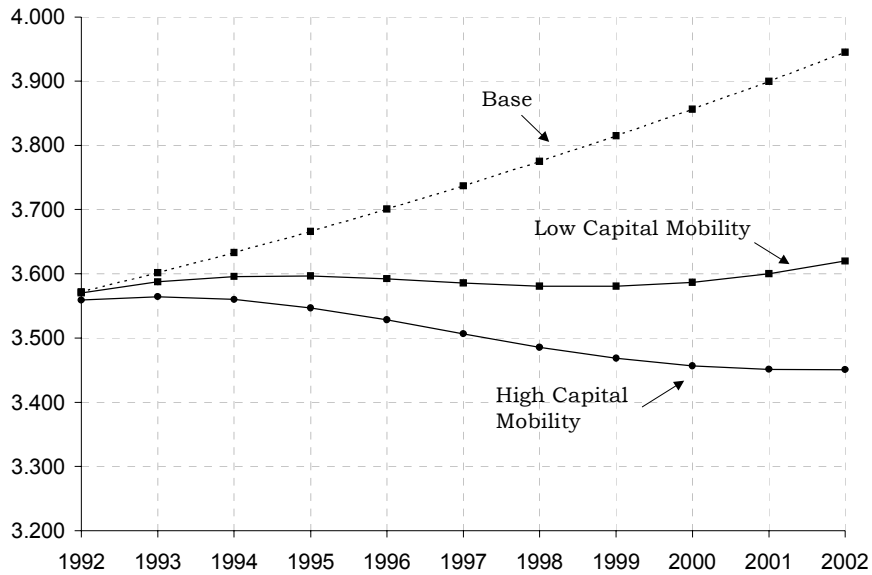


Figure 3: Total worker income with a 5% decrease in the price of exports

To summarize the effect of lower exports in this simulation, we can say the following: in SOE demand led models, demand is obviously important. A reduction in demand produces an immediate reduction in income for all. But this model is more complex than a typical demand led structure: supply also matters with respect to the growth of capacity. Since capacity depends on capital and capital depends in part on DFI, a rise in the domestic rate of return, r , will increase capacity. If the investment multiplier is strong and the marginal (capacity) output-capital ratio is small then the economy will take an upward track to the extent that investment is driven by the accelerator (i.e., with a large α). On the other hand, a weak multiplier and strong marginal output-capital

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
GDP-real											
Base	13294.73	13814.03	14359.30	14931.83	15532.98	16164.20	16826.97	17522.89	18253.60	19020.84	19826.45
SIM	13294.73	13635.68	13795.54	13742.57	13447.94	12898.91	12116.06	11166.76	10161.30	9224.34	8453.89
change	0.0%	-1.3%	-3.9%	-8.0%	-13.4%	-20.2%	-28.0%	-36.3%	-44.3%	-51.5%	-57.4%
Gross Value of Production X1											
Base	8271.5	8635.5	9017.8	9419.1	9840.5	10283.0	10747.6	11235.5	11747.7	12285.5	12850.3
SIM	8271.5	8658.4	9085.3	9549.7	10043.5	10550.0	11040.7	11475.5	11812.4	12024.4	12116.5
change	0.0%	0.3%	0.7%	1.4%	2.1%	2.6%	2.7%	2.1%	0.6%	-2.1%	-5.7%
Gross Value of Production X2											
Base	24319.5	25218.1	26161.6	27152.4	28192.6	29284.9	30431.8	31636.0	32900.4	34228.1	35622.1
SIM	24319.5	25387.8	26688.6	28242.5	30059.7	32120.3	34350.9	36610.4	38711.6	40488.8	41876.0
change	0.0%	0.7%	2.0%	4.0%	6.6%	9.7%	12.9%	15.7%	17.7%	18.3%	17.6%
Household Incomes:											
First Quintile											
Base	722.9	754.6	787.9	822.9	859.6	898.2	938.7	981.3	1025.9	1072.8	1122.1
SIM	722.9	753.2	783.8	815.3	848.5	883.9	921.5	960.5	999.8	1038.0	1074.8
change	0.0%	-0.2%	-0.5%	-0.9%	-1.3%	-1.6%	-1.8%	-2.1%	-2.5%	-3.2%	-4.2%
Second Quintile											
Base	1131.4	1178.1	1227.3	1278.9	1333.0	1389.9	1449.6	1512.3	1578.1	1647.3	1719.9
SIM	1131.4	1175.1	1218.6	1263.2	1310.4	1361.4	1416.0	1472.1	1526.5	1576.1	1619.8
change	0.0%	-0.3%	-0.7%	-1.2%	-1.7%	-2.0%	-2.3%	-2.7%	-3.3%	-4.3%	-5.8%
Third Quintile											
Base	1537.2	1598.8	1663.5	1731.4	1802.7	1877.6	1956.2	2038.7	2125.4	2216.4	2312.0
SIM	1537.2	1592.4	1645.0	1697.1	1751.7	1810.8	1874.6	1940.3	2003.1	2058.4	2104.6
change	0.0%	-0.4%	-1.1%	-2.0%	-2.8%	-3.6%	-4.2%	-4.8%	-5.8%	-7.1%	-9.0%
Fourth Quintile											
Base	2281.7	2371.0	2464.8	2563.3	2666.7	2775.3	2889.3	3009.0	3134.7	3266.6	3405.2
SIM	2281.7	2357.1	2424.1	2486.6	2549.9	2618.4	2693.3	2771.3	2845.6	2909.3	2960.1
change	0.0%	-0.6%	-1.7%	-3.0%	-4.4%	-5.7%	-6.8%	-7.9%	-9.2%	-10.9%	-13.1%
Fifth Quintile											
Base	5851.0	6076.9	6314.1	6563.2	6824.7	7099.3	7387.7	7690.4	8008.3	8342.1	8692.6
SIM	5851.0	6030.1	6176.7	6302.4	6423.1	6553.1	6698.3	6852.4	6999.4	7122.6	7216.3
change	0.0%	-0.8%	-2.2%	-4.0%	-5.9%	-7.7%	-9.3%	-10.9%	-12.6%	-14.6%	-17.0%
GINI Coefficient											
Base	0.3959	0.3987	0.3996	0.4003	0.4011	0.4020	0.4028	0.4035	0.4039	0.4045	0.4053
SIM	0.3959	0.3977	0.3966	0.3947	0.3925	0.3902	0.3881	0.3861	0.3838	0.3818	0.3797
change	0.0%	-0.3%	-0.7%	-1.4%	-2.2%	-2.9%	-3.6%	-4.3%	-5.0%	-5.6%	-6.3%

Source: Model Simulation

Figure 4: Effect on household income of a 5% decrease in the price of exports.

ratio would cause the economy to sink if the accelerator effect is strong. Since the model is calibrated to actual data, the factors that determine the response are beyond the control of the investigator; in this way the model derives true empirical content. Note that here the multiplier is relatively weak compared to the effect of investment on capacity; a decline in exports reduces capacity utilization, investment falls, and with it capacity. Eventually capacity declines to the point that capacity utilization rises once again and the economy begins to recover. With higher capital mobility the accelerator effect is stronger (since r depends on the level of Y) and the swings are more exaggerated.

4.2 An increase of the tax on capital

As we have seen in the first simulation, in an SOE, export price variability has a significantly negative effect on workers' income. The question now becomes, how will the government increase its income in order to pay for the increased transfers to households? According to Stiglitz [16], externalities require interventions. The type of intervention that is sometimes recommended [11] and what we are examining here, is to impose a tax on capital. Therefore, for the second simulation, we maintain constant export prices, but increase the tax on capital.

Equation 18 shows that as the tax increases, the domestic rate of return declines. This drives out capital and lowers the total capital stock, *via* equation 19. Again, this would have a complex effect on worker income as discussed at the end of the previous section. Equation 22, however, tells us that an increase in the tax on capital would raise worker income, since part of worker income is derived from the tax on capital. The effect of an increase in the tax on capital is illustrated symbolically below:

$$\overset{\uparrow \text{or} \downarrow}{Y_t^l} = \bar{w} + \overset{\uparrow}{\tau^k} \overset{\downarrow}{k^{total}} \quad (23)$$

$$\overset{\downarrow}{Y_t^l} = \bar{w} + \overset{\uparrow}{\tau^k} \overset{\downarrow \downarrow}{k^{total}} \quad (24)$$

Equations 23 and 24 show what we would expect to happen in the case of low capital mobility and high capital mobility, respectively. In both cases, an increase in the tax on capital would cause capital to flee, however, the amount of capital flight with low mobility may be small enough that the total worker income could be unaffected, or perhaps rise. As equation 24 shows, however, in the case of highly mobile capital, a large amount of capital would leave the country, represented by the double arrow, causing worker income to unambiguously fall.

To examine the effect, we will maintain fixed export prices, but increase the tax on capital by 5 percent per year. The results are presented in figures 5 and 6.

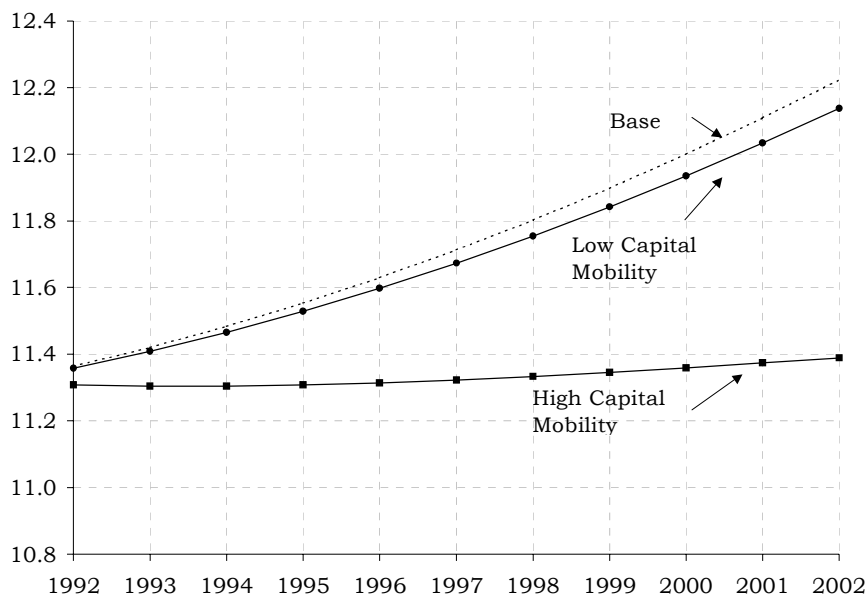


Figure 5: Capital stock of agricultural products with a 5% increase of the tax on capital

Figures 5 and 6 show that in both cases the capital stock does decrease. While the capital stock is lower in both circumstances than the base state, the difference between the case of highly mobile capital is significantly different than the situation where capital is immobile. This signifies capital leaving the country, which is what we would expect in this situation. The increased tax on capital would lower the domestic rate of return via equation 18. Since we are looking at an SOE, the international rate of return would remain unchanged, causing it to be higher than the domestic rate. The result is that capital would leave the country seeking higher rates of return elsewhere, thereby lowering the capital stock. As we witnessed in the first simulation, there is a significant difference between the effect for agricultural products versus non agricultural products. Of course, capital could flow into the country as quickly as it left if the domestic rate of return were to rise. Although capital inflow is typically viewed as positive, rapid inflow is not necessarily good as it creates an artificially positive environment, which is subject to a crash. This is discussed further in section 5.

Figure 7 shows the effect on worker income, which is lower in both cases, albeit more noticeably lower in the situation with high capital mobility. This outcome is consistent with the expectations of equations 24 and 23. In the case of high mobility, the tax increase drove out a significant amount of capital

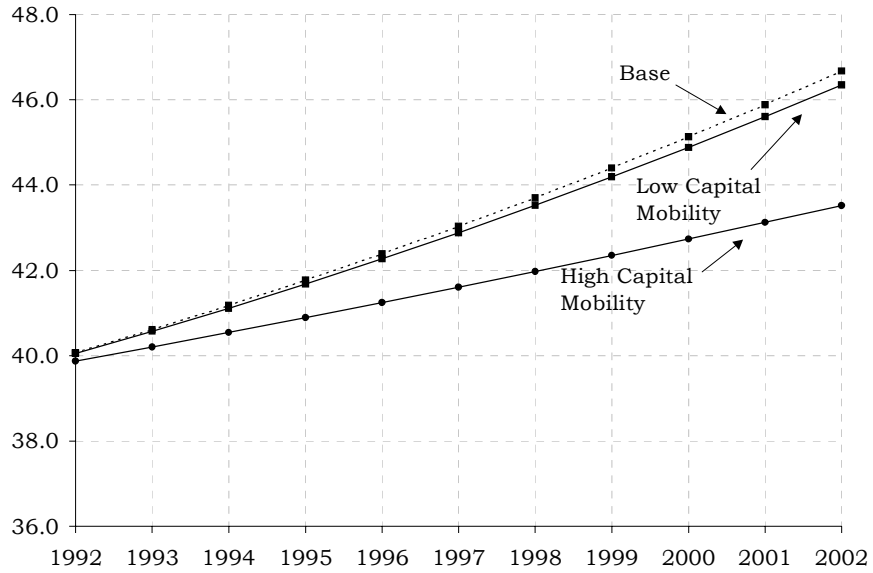


Figure 6: Capital stock of non agricultural products with a 5% increase of the tax on capital

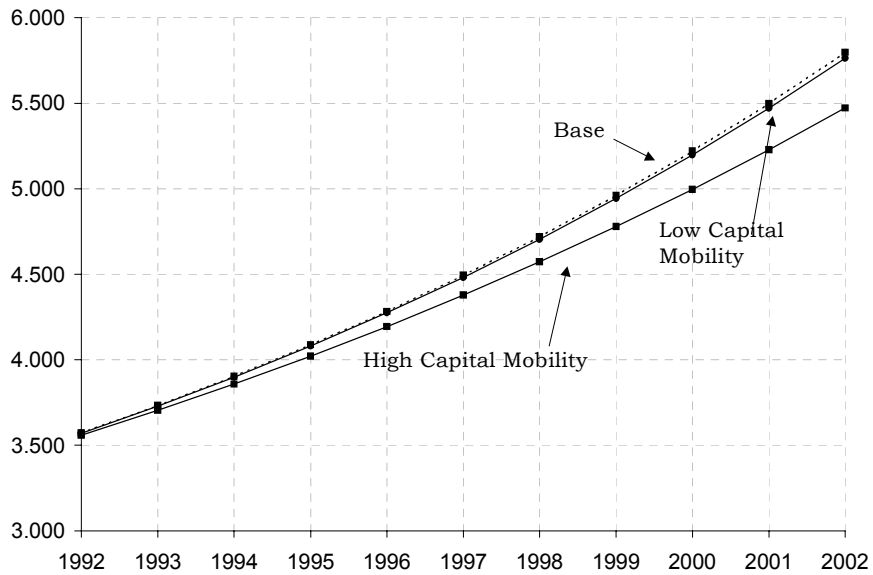


Figure 7: Total worker income with a 5% increase of the tax on capital

to result in a noticeable decline in worker income, whereas it did not decline significantly in a less integrated economy.¹¹

Summing up the conclusions from the second simulation, we notice a remarkable difference in the relatively open economy and a similar effect to the one mentioned above would occur. Namely, the increased tax would essentially lower the domestic rate of return, which would in turn cause investment to fall, thereby reducing capacity. Eventually capacity utilization would begin to rise and when this occurs, capacity would then increase until the economy reaches a new equilibrium. When capital is relatively mobile, the peaks and troughs of capacity utilization will be much more pronounced, resulting in a more volatile economy with larger lags.

5 Policy Options

The two simulations have demonstrated, as Rodrik [11] notes, that “globalization...results in increased demands on the state to provide social insurance while reducing the ability of the state to perform that role effectively” (p. 53). Indeed we have just witnessed that a tax on capital, in the case of a highly integrated economy, does in fact cause capital to leave the country. Therefore, it does not appear that this would be an appropriate solution. The question then becomes, what is an appropriate response? One possibility might be capital controls.

Mainstream economists tend to view capital controls as interventionist and, therefore, bad policy. Dornbusch [4] argues that ex-post capital controls are “the worst kind of system, [because] *ad hoc* capital controls in one country would immediately cause contagion not only to the usual suspects but even beyond.” Another common concern is that countries will abuse capital controls. A report from the Cato Institute [19], for instance, argues that countries that impose capital controls “will likely use those restrictions to delay or stop necessary policy changes” (p.4). Chile had a fair number of controls but some argue that its success has been the exception rather than the rule [4].¹²

In the case of a crises, however, something needs to be done and capital controls should not be dismissed so readily. For example, Stiglitz [16] suggests an exit tax on capital leaving the country, which worked in the case of Malaysia. He suggests that this could be removed when the economy is stable. Krugman [9] suggested this as well, also in the Malaysian circumstance, stating that he would advocate “temporary restrictions on the ability of investors to pull money

¹¹Another way to demonstrate the effect of altering the tax on capital, taken from Rodrik [11], is the equation:

$$\frac{dl}{d\tau_j} = \sum_j k_j + k^* - \frac{\tau_j k_j + w}{\lambda - w}$$

As λ decreases, signifying increased globalization the effect on worker income is greater. In other words, the effect on an increase in the tax on capital, $\tau_j k_j$, depends on the degree of globalization. In a situation with a high degree of globalization, workers’ income would decrease. Note that this equation has assumptions not present in this model.

¹²For an examination of the effectiveness of the Chile’s capital controls, see [5].

out of crises economies...as part of a recovery strategy,” This may not be as simple as it sounds, however. What would the effect be if investors take the exit tax into account when deciding whether or not to invest in an economy? What if investors have, for lack of a better expression, a type of Ricardian equivalence¹³? The idea here is that investors may be aware that, in the event of a shock, they will have to pay a tax to remove capital from the economy and, because of the potential future risk, may not invest in the current period. Of course, this depends on whether or not investors are risk-averse. Furthermore, this would also be more plausible in the case of less developed countries, which may be inherently more unstable and, therefore, viewed as risky to foreign investors. It is merely mentioned here as a possibility. The most important factor, it is generally acknowledged, is that an economy has to be internally stable and this ought to be a priority of policy makers. Indeed, the Foreign Investment Committee for Chile, whose mission is to “consolidate Chile’s position as an attractive destination for foreign investment”, lists under reasons to invest in Chile “stable external accounts.”¹⁴ Therefore, capital controls, aimed at reducing volatility, may actually improve foreign investment by making the country a more attractive destination. The goal being to have a steady flow of capital entering the country, opposed to wide fluctuations.

The above discussion concerns potential responses to a crises situation. The effect of uncertain prices in the export market are a separate issue and ought to be further investigated. Countries that small and highly open have risks and these risks should be weighed against the potential benefits of free trade. It is difficult to assess the potential awards as well as the risks, as many economists greatly disagree on these issues. Many argue that free trade ensures steady growth and economic independence, while others simply point to the East Asian crash to illustrate the potential risks. Like many issues in economics, it is likely that there is some truth to both sides of the argument.¹⁵

6 Conclusion

The simulations presented here have given empirical weight to the arguments addressed in Rodrik [11]. We have seen that in the case of Chile, increased

¹³Ricardian equivalence refers to the notion that individuals’ savings behavior is affected in the same way by government debt. It stipulates that individuals know that taxes will have to be increased in the future to pay for current government debt and, therefore, individuals will increase their savings in the current time period. David Ricardo was the first to articulate this theory even if he had doubts about some of the theorem’s assumptions.

It should be stressed that G represents government purchases of goods and services and should be distinguished from total government outlays, which include transfer payments. In our notation, transfer payments are deducted from taxes to give net taxes T .

The public debt must be carefully distinguished from the external debt, although in some instances the public debt is held by foreigners and represents the bulk of the external debt. This lecture assumes that the public debt is held by domestic residents. Ricardo first formulated this idea, but came to view skeptically. See the discussion in [12], p. 201.

¹⁴See www.foreigninvestment.cl

¹⁵A reminder about President Truman’s yearning for a one handed economist seems appropriate.

economic integration has the potential to hurt workers, particularly when there are fluctuations in the prices of exports. While a combined simulation, of both a decrease in the export price as well as an increase in the tax on capital, was not run here, it should be noted that this would produce highly undesirable results, for workers as well as for the economy as a whole. The simulations of this paper show that a tax on capital is not an adequate policy response. As we have seen above, it causes capital flight, which can have a devastating effect on a country. A suggestion here has been made that an exit tax may not be effective either.

It should be noted that, before any possible policy response is explored, a more fundamental acknowledgment must be made, particularly by countries who are looking to open their capital markets. That acknowledgment, according to Stiglitz [16] is the “[a]cceptance of the dangers of capital market liberalization, and that short-term capital flows...impose huge externalities” (236-7). The most obvious externality would be for a massive exodus of capital, resulting in a similar experience to the East Asian crash. Furthermore, countries should be aware of the potential risks and view free trade skeptically. This is a crucial first step for countries that are being pushed towards liberalization. Countries that are not currently open must recognize the potential danger in opening before the country is stable.

References

- [1] Bhagwati, J. (2000), *The Wind of the Hundred Days: How Washington Mismanaged Globalization*, Cambridge, Massachusetts: MIT Press.
- [2] Brecher, J. and T. Costello (1994), *Global Village or Global Pillage*, Cambridge, Massachusetts: South End Press.
- [3] Central Intelligence Agency (2001), *The World Factbook*, Washington, D.C.
- [4] Dornbusch, R. (1998), “Capital Controls: An Idea Whose Time is Gone” Massachusetts Institute of Technology, Cambridge, MA. (available at <http://econ-www.mit.edu/faculty/dornbusch/papers.htm>)
- [5] Gallego, F., L. Hernandez, and K. Schmidt-Hebbel (1999) “Capital Controls in Chile: Effective? Efficient?” Central Bank of Chile Working Paper No 59 (available at www.bcentral.cl)
- [6] Gibson, B. (2002a), “An Essay on Late Structuralism” University of Vermont, Burlington, VT. (available at www.uvm.edu/~wgibson)
- [7] Gibson, B. (2002b), “Dynamic Calibration of a CGE” University of Vermont, Burlington, VT. (available at www.uvm.edu/~wgibson)
- [8] Gibson, B. (2002c) “The Transition to a Globalized Economy: Poverty, Human Capital and the Informal Sector in a Structuralist CGE Model” University of Vermont, Burlington, VT. (available at www.uvm.edu/~wgibson)

- [9] Krugman, P. (1999), "Capital Control Freaks: How Malaysia Got Away With Economic Heresy" *Slate*, September 28th (available at slate.com)
- [10] Krugman, P. (1999), *The Return of Depression Economics*, New York, NY: W.W. Norton & Company
- [11] Rodrik, D. (1997), *Has Globalization Gone Too Far?*, Washington D.C.: Institute for International Economics.
- [12] Sachs, J. and F. Larrain (1993) *Macroeconomics in the Global Economy* New York: Prentice Hall.
- [13] Sen, A. (1992), *Inequality Reexamined*, Oxford: Oxford University Press.
- [14] Sen, A. (1999), *Development as Freedom*, Oxford: Oxford University Press.
- [15] Souther, Sherman (1998), "An Analysis of Chilean Economic and Socio-economic Policy: :1975-1989" University of Colorado at Boulder (available at csf.colorado.edu/students/Souther.Sherman/)
- [16] Stiglitz, J.E. (2002), *Globalization and Its Discontents*, New York: W.W. Norton and Company.
- [17] Taylor, L. (1990), *Socially Relevant Policy Analysis: Structuralist Computable Equilibrium Models for the Developing World*, Cambridge, Massachusetts: MIT Press.
- [18] Thorp, R. (1998), *Progress, Poverty and Exclusion: An Economic History of Latin America in the 20th Century*, Baltimore, Maryland: John Hopkins University Press.
- [19] Vasquez, I. (1998) "The Irrationality of Capital Controls" The Cato Institute, Washington, D.C (available at www.cato.org)
- [20] Wood, A. (1994), *North-South Trade, Employment and Inequality: Changing Fortunes in a Skill-Driven World*, Oxford: Oxford University Press.
- [21] World Bank (2001), *Chile: Poverty and Income Distribution in a High-Growth Economy - 1987-98*, Report No 22037-CH, August 30, Washington D.C.
- [22] Yang, Y., and Y. Huang (1997), "China Economy: The Impact of Trade Liberalisation on Income Distribution in China", Australian National University, Research School of Pacific and Asian Studies (available at <http://ncdsnet.anu.edu.au>)

7 Appendix A: Equation Listings and SAM

7.1 Sets

t	Time
i, j	Goods and sectors: agricultural and non-agricultural
l	Labor skill categories: skilled, unskilled
h	Household classes: quintiles
k	Capital

7.2 Equations

1. Unit Price

$$P_i(t) = [1 + \tau_i(t)][1 + t_i(t)]c_i$$

2. Intermediate Demand

$$A_i^d(t) = \sum_j a_{ij} X_j(t)$$

3. Unit Costs

$$c_j(t) = c_j^l(t) + \sum_i P_i(t) a_{ij} + [1 + t^*(t)] m_j^n(t) e$$

4. Unit Labor Costs

$$c_i^l(t) = \sum_l w_l(t) l_{il}(t)$$

5. Unit Profits

$$\pi_i^u(t) = \frac{P_i(t)}{[1 + t_i(t)]} - c_i(t)$$

6. Income from Labor

$$Y_l^L(t) = w_l(t) \sum_i l_{il} X_i(t)$$

7. Income from Capital

$$Y^k(t) = \sum_i \pi_i X_i(t) + Y^{k*}$$

8. Household Income

$$\begin{aligned} Y_h^h(t) &= \sum_l \{Y_l^L(t) [1 - \sigma^{l*}(t)] \sigma_h^l(t)\} + Y^k [1 - t^f(t)] \sigma^{k*}(t) \\ &\quad + T^g(0) \sigma_h^t(t) + T^{g*}(0) \sigma_h^{t*}(t) \end{aligned}$$

9. Household Disposable Income

$$Y_h^d(t) = Y_h^h(t) - [Y_h^h(t)t^h(t)]$$

10. Household Expenditure

$$E_h(t) = Y_h^d(t)[1 - s_h(t)]$$

11. Subsistence Consumption

$$C_h^s(t) = \sum_i P_i \theta_{ih}(t) + [e(t)p^*(t)\theta_h^*(t)]$$

12. Household Consumption - Includes Imports

$$C_{ih} = \theta_{ih} + \frac{\mu_{ih}}{P_i(t)} [E_h(t) - C_h^s(t)]$$

13. Gross Value of Production

$$X_i(t) = A_i^d + \sum_i C_{ij}(t) + I_i(t) + I_i^g(t) + G_i(t) + E_i(t)$$

14. Firm Savings

$$F_h^s(t) = Y^k(t) - \sum_h \{Y^k(t)[1 - t^f](t)[1 - \sigma^{k*}(0)]\sigma_h^k(0)\}$$

15. Foreign Factor Payments

$$F^*(t) = Y^k(t) - F_h^s(t)$$

16. Capacity Output Growth

$$\hat{Q}_j(t) = \frac{\hat{Q}_j(0)k_j^m(t)[\hat{I}_j(t) - \delta K_j(t-1)]}{Q_j(t-1)}$$

17. Capacity

$$Q_i(t) = Q(t-1)[1 + \hat{Q}_i(t)]$$

18. Capacity Utilization

$$u_i(t) = \frac{X_i(t)}{Q_i(t-1)}$$

19. Capital Stock

$$K_i(t) = K_i(t-1)[1 - \delta + \hat{I}_i(t)]$$

20. Price of Capital

$$P^k(t) = \frac{\sum_i P_i(t)[I_i^g(t) + I_i(t)]}{\sum_i [I_i^g(t) + I_i(t)]}$$

21. Profit Rate

$$\pi_i(t) = \frac{\pi_i^u P_i(t)}{P^k K_i(t)}$$

22. GDP Deflator

$$GDP^D = \frac{\sum_i P_i(t) X_i(t)}{\sum_i X_i(t)}$$

23. Non-competitive imports

$$M(t) = e^* \left[\sum_j m_j X_j(t) + G^*(t) + I^*(t) + I^{g*}(t) + \sum_h C_h^*(t) \right] + \Psi^s(t) + \Psi^u(t) + F^*(t)$$

24. Exports

$$E(t) = \sum_i E_i P_i(t) + T^*(t) + t^*(t) + Y^{k*}(t)$$

25. Tariffs

$$t_j^{t*} = t_j^*(t) e(t) m_j(t) X_j(t)$$

26. Income from foreign labor

$$\Psi^l(t) = \sigma^{l*}(t) Y^l(t)$$

27. Arbitrage condition

$$r = r^* - \lambda [k^{total}(t-1) - k^{total}(t)]$$

28. Average wage

$$\bar{w} = \frac{\sum_l w_l l_i^f X_i}{\sum_i l_i^f X_i}$$

29. Worker income

$$Y^l = \bar{w} + \tau k^{total}$$

30. Total capital

$$k^{total} = \sum_j k_j + \sum_j k_j k^*$$

7.3 Definitions

$A_{ij}(t)$	Intermediate demand
$a_{ij}(t)$	Input output coefficient
$C_{ih}(t)$	Household consumption - includes imports
$C_h^s(t)$	Subsistence consumption
$c_i(t)$	Costs per unit
$c_i^l(t)$	Cost of labor per unit
δ_j	Depreciation
$E_i(t)$	Exports
$E_h(t)$	Household expenditure
$e(t)$	exchange rate
$e^r(t)$	real exchange rate
$F_h^s(t)$	Firm savings
$F^*(t)$	Foreign factor payments
$G_i(t)$	Government consumption (* denotes foreign)
$I_j(t)$	Private investment (*denotes foreign)
$I_j^g(t)$	Public investment (* denotes foreign)
$K_j(t)$	Capital Stock
$L_j^f(t)$	Labor force
l_j^l	Labor coefficient
$\bar{M}(t)$	Imports
$m_{ij}(t)$	Marginal propensity to consume
$m_j(t)$	Non-competitive import coefficient
$P_i(t)$	Price per unit (* denotes foreign)
$\pi_i^u(t)$	Profit per unit
$Q_j(t)$	Capacity
$\dot{Q}_j(t)$	Capacity output growth
$s_h(t)$	Household savings rate
$\sigma_h^k(0)$	Share of capital (* denotes foreign)
$\sigma_h^l(0)$	Share of labor (* denotes foreign)
$\sigma_h^T(0)$	Share of transfers from government (* denotes foreign)
$T(t)$	Total transfers (* denotes foreign)
$t(t)$	Tax on firms
$t^*(t)$	Foreign taxes paid directly to government
$t_j(t)$	Indirect tax rate(* for tariff)
$t_j^{t*}(t)$	Tariffs
$t_h(t)$	Tax rate on households
$\tau(t)$	Mark-up
$\theta_{ih}(t)$	Frisch parameters
$u_j(t)$	Capacity utilization
$X_i(t)$	Gross value of production
$Y_h(t)$	Household income
$Y_h^d(t)$	Household disposable income

$Y^l(t)$ Income from labor
 $Y^k(t)$ Income from capital (* denotes foreign)
 $w_l(0)$ wage rate
 $\Psi^l(t)$ Income from foreign labor

7.4 Appendix B: Population

Table B.1 Population - in millions of persons

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2001
Growth Rate												
2.0%	First Quintile	2.67	2.80	2.86	2.91	2.97	3.02	3.08	3.13	3.17	3.22	3.28
1.8%	Second Quintile	2.67	2.78	2.84	2.88	2.93	2.98	3.04	3.08	3.12	3.16	3.21
1.5%	Third Quintile	2.67	2.77	2.81	2.85	2.89	2.93	2.97	3.01	3.04	3.07	3.12
1.2%	Fourth Quintile	2.67	2.75	2.78	2.81	2.84	2.88	2.91	2.94	2.96	2.99	3.02
0.8%	Fifth Quintile	2.67	2.72	2.74	2.76	2.79	2.81	2.83	2.85	2.86	2.88	2.90
	Error term - f		2.38	1.05	0.89	1.00	0.95	0.94	0.90	0.61	0.78	0.88
	Total	13.35	13.81	14.03	14.21	14.42	14.62	14.82	15.02	15.15	15.33	15.53

Source: Population Statistics, available at (www.library.uu.nl/wesp/populstat/populhome.html)

Appendix C: Social Accounting Matrix Chile 1992		Factors of Production				Institutions					Investment			Foreign		Total		
	Ag	Non-Ag	Skilled Labor	Unskilled Labor	Capital	Households-Quintiles					Firms	Govt	Private	Public	Factor Receipts		Transfers	Net Exports
						First	Second	Third	Fourth	Fifth								
Goods	3734.7	11197.8				625.8	864.0	1316.6	1982.6	4856.3		1454.3	960.2	984.5			4614.2	32591.0
Ag-flex	2016.3	2173.7				159.7	210.5	282.8	425.3	845.5		0.03	-528.1	313.2			2372.6	8271.5
Non-Ag-fix	1718.4	9024.1				466.1	653.6	1033.8	1557.3	4010.9		1454.3	1488.3	671.3			2241.6	24319.5
Factors of Production	3362.7	7858.9														74.2		11295.8
Skilled																		4024.9
Unskilled																		1174.5
Capital																	74.2	6096.4
			3743.6	1083.2							5409.8	1162.2					125.2	11524.2
First Quintile			88.0	109.1							140.3	372.8					12.6	722.9
Second Quintile			260.0	231.4							319.4	306.4					14.0	1131.4
Third Quintile			422.5	295.9							574.1	228.8					16.0	1537.2
Fourth Quintile			687.8	331.4							1078.9	157.8					25.8	2281.7
Fifth Quintile			2285.3	115.4							3297.1	96.4					56.7	5851.0
Firms																		6096.4
Government	611.7	1461.4				14.9	28.4	39.4	56.8	137.8	290.8	918.2					425.2	3984.4
Direct and Indirect Tax	534.1	1069.0				14.9	28.4	39.4	56.8	137.8	290.8	918.2					425.2	3514.5
Tariff	77.6	392.4																470.0
Savings						64.8	211.9	144.4	187.7	716.5		317.7						2748.3
Foreign	562.4	3801.4	281.3	91.2		17.4	27.1	36.8	54.7	140.4	395.8	132.0	2079.7	367.0				7987.1
Non-competitive Imports	562.4	3801.4				17.4	27.1	36.8	54.7	140.4		132.0	2079.7	367.0				7218.8
Foreign Factor Payments			281.3	91.2							395.8							768.3
Total	8271.5	24319.5	4024.9	1174.5	6096.4	722.9	1131.4	1537.2	2281.7	5851.0	6096.4	3984.4	3039.9	1351.5			7987.1	