The Role of Distribution of the Income Shares of Individuals in Tradables and Nontradables on Exchange Rate Fluctuations and Delay of Stabilizations

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Abstract

This paper shows that exchange rate alignments are also used for the redistribution of income among different groups. The heterogeneous impacts of stabilization policies lead to formation of various coalitions throughout the evolution of stabilization programs. These coalitions can produce unsustainable economic policies at the expense of other groups. The model categorizes these various groups with respect to their shares in total production of tradables and nontradables. An increase in the relative prices of nontradables benefits the poor more than the rich and middle classes. In addition to the poor, the rich benefit from unsustainable macroeconomic polices by lending to the government and eventually escaping the cost of stabilization in the long run.

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1. Introduction

In the last decades, many developing countries have experienced business cycles associated with stabilization programs. In the late 1970s and early 1980s, developing countries especially Southern Cone Latin America (Argentina, Chile and Uruguay) and later in 1990s, Mexican Peso crisis and recently Turkish crises and Argentine crisis have some common characteristics in spite of their unique features. In almost all these crisis episodes, we observe failure in stabilization policies adopted to bring macroeconomic stability and especially to reduce inflation. Even though countries adopt different programs for macroeconomic stability, broad examination of these episodes suggests a common pattern. In almost all countries, we observe a large real exchange rate appreciation, a rise in the real wage rate and deterioration of current account and external, in some cases, domestic debt accumulation. However, these effects have not been sustained too long and often reversed with sudden stop of the economy, real exchange rate depreciation, fiscal contraction and severe repayment of stock of debt.

This paper provides a political economy explanation for these empirical regularities. Individuals in the economy seem to be affected differently from any stabilization policy. The individuals are categorized with respect to their income as the poor, the rich and the middle class. Moreover, these three groups of individuals earn their income from tradables and nontradables. Since the stabilization policies alter the prices of tradables and nontradables, the stabilization policies affect the earnings of various groups asymmetrically. This paper shows that exchange rate alignments are used for the

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redistribution of income among different groups. Majority voting determines the choice of particular economic policies. However, maximization of self-interest for a particular type of individuals contradicts with the interest of other types of individuals. Certain types of agents form coalitions and maximize their utilities at the expense of others. This paper unravels that low and high income individuals benefit from the overvaluation of exchange rate and they form a coalition to increase the prices of nontradables and to delay the repayment of external debt with even further borrowing.

The model incorporates four key factors that give rise to populist stabilization cycles: (i) various coalitions are formed and later coalitions are shifted (ii) some of the factors are more mobile than others and can leave the country in the long run without incurring the cost economic policies (iii) the exchange rate policy is endogenous to distribution of tradables and nontradables in the economy (iv) the external debt repayment is delayed and even further borrowing occurs to raise the incomes of particular group of individuals at the expense of other groups. At the end, we also show that higher inequality generates higher probability of unsustainable economic programs especially in poor countries.

The outline of the paper is as follows. The next section gives a brief overview of the literature to explain the stabilization experiences of many developing countries in recent decades as an attempt to form a bridge among various approaches. Section III presents the model and in section IV, a benchmark case of homogeneous agents model is illustrated. In section V, heterogeneity in the income shares of tradables and nontradables is introduced without factor mobility. In section VI, the solutions to heterogeneous agents model in the presence of factor mobility is discussed. Section VII focuses on the role

inequality in the adoption of macroeconomic policies. Section VIII discusses a modified model with financial frictions to better account for the rich-poor coalition and last section concludes.

2. Motivation and the Literature Review

Above-mentioned boom-bust cycles have been a subject of an extensive research program. Dornbush (1982) and Rodriguez (1982) suggested that an initial fall in the real interest rate due to adaptive expectations generates an expansion in the economy. The fall in the rate of devaluation exceeds the fall in inflation and this in turn creates lower real interest rates. Later, temporariness hypothesis (Calvo (1986)) emphasizes the role of lack of credibility in the sense that the public expects the program to be discontinued in the future. Temporary reduction in nominal interest rate leads to intertemporal substitution of future consumption with today's consumption. Calvo and Vegh (1993) introduce the nontraded goods and sticky prices to show how noncredible stabilization policies bring a gradual appreciation of currency.

Helpman and Razin (1987) emphasize the role of fiscal policy and suggest that reduction in inflation generates a wealth effect and thus economic expansion in the absence of :Ricardian equivalence. Drazen and Helpman (1988) later attribute the wealth effect to the expectation of a future reduction in government spending.

Later attempts to explain the stylized facts of stabilization programs point out the supply side effects that may result from removing the inflationary distortion on labor supply or capital accumulation [Roldos (1995) and Uribe (1997)]. This supply-side approach claims that reduction in the rate of depreciation of currency can lead to real

appreciation, boom in economic activity and deterioration of current account due to reduction in inflation-induced distortions.

Rebelo and Vegh (1996) introduce a unified framework to test these alternative hypothesis and they show that at the qualitative level no single hypothesis is ample to account for all empirical regularities and at the quantitative level, they are unable to explain the magnitudes of observed real appreciations and consumption booms [see also Reinhart and Vegh (1995)].

In an attempt to account for disparities between theoretical models and empirical regularities, Calvo and Drazen (1998) focus on the role of uncertainty and incomplete contingent claim markets and illustrate gradual consumption boom.

More recently, Mendoza and Uribe (2000) use a general equilibrium model of a two-sector, small open economy in which agents expect a devaluation and a switch to a higher rate of depreciation of currency and they show that risk of devaluation induces large distortions on wealth and relative prices under incomplete insurance market settings. Their model generates macroeconomic dynamics that mimic some important features of stabilization programs implemented in many developing countries.

These recent attempts are quite important contributions to the literature because they not only better account for the quantitative regularities of data, but also draw attention to the imperfect credit markets like liquidity and collateral constraints [Mendoza (2000-a-b)], [Caballero and Krishnamurthy (1999)]. In spite of all the progress in explaining main characteristics of stabilization programs, our understanding of economic forces behind the business cycles associated with stabilization programs are still quite limited.

Overall, these macroeconomic approaches to uncover the dynamics of stabilization programs share a common feature of homogeneous agents in the economy. However, the homogeneous agent assumption ignores the political and institutional dimensions of actual experiences of countries concerned. Hence, the sole macroeconomic approaches are criticized by Acemoglu et al. (2002) by claiming that often blamed poor macroeconomic performances and distortionary macroeconomic policies are symptoms rather than main causes for the impacts of institutions on economic instability. They use settler mortality as an instrument for the institutional development and show that macroeconomic policies appear to have only minor impact on volatility and crises once institutional development is controlled. Hence, Acemoglu et al. suggest that adoption of certain macroeconomic policies is endogenous to the institutions prevailing in the society. This kind of endogenous macroeconomic policy approach has been also suggested by Rodrik in explaining the different reactions to global shocks in 1970s. Rodrik (1999) concludes that countries with weak institutions are unable to deal with major global shocks taking place during the 1970s and experience disappointing growth performance during 1980s and 1990s (see also Easterly 2001)]. Moreover, Rodrik (1999) attributes the success of adoption of macroeconomic adjustments to deeper social determinants and show how social conflicts and their management played a key role in transmitting the effects of external shocks onto economic performance.

This study draws attention on the importance of heterogeneity of agents in the economy and attempts to form a bridge between the political economy and open economy macroeconomics explanations of stabilization programs. The macroeconomic approaches with homogeneous agent assumption miss an important point. Inflation

reduction may be socially painless process under identical agents settings. However, in reality agents are heterogeneous in many respects and therefore it is hard to believe that all individuals in the society are affected equally from the stabilization policies. It is more likely that some groups of individuals depending on their different characteristics are hurt more than other sets of people in the economy. The simplest example is that fiscal adjustment required in almost all the stabilization programs are not easy to implement considering the asymmetric burden of fiscal contractions on various individuals in the society. Since different fiscal adjustments have different implications for various groups in the economy, it is hard to reach a wide consensus on any particular policy. This kind of conflict of interest further leads to delayed stabilization or adoption of incomplete stabilization programs which rationalize the inflation persistence and prevalence of short-lived stabilization programs experienced by many developing countries in recent decades.

This conflict of interest in heterogeneous agents economy is recognized by the political economy literature and generates numerous research on the delay of stabilization and adoption of incomplete stabilization policies. Interaction of two groups trying to minimize their own share in the cost of adjustment is formalized as a "war attrition" game by Alesina and Drazen (1991). Each group has incomplete information on the cost of adjustment of the other group. The group that concedes before the other group loses and bears the burden of stabilization more. Given the imperfect information, each group prefers to wait and learn the cost of their opponents. At the end, group suffering more from the existing distortions concedes and stabilization is realized with a delay and disproportionate burden of stabilization falls on the group that concedes first. The delay of the reform is also explained as a status quo bias in the existence uncertainty about the

winners and losers of the reform by Fernandez and Rodrik (1991). Later, Laban and Sturzenegger (1995) show that deteriorating conditions can generate a case that necessary reforms are first not adopted, but, as fundamental conditions get deteriorated further over time, necessary stabilization policies take place with delay. Velasco (1998) approaches the unsustainable policies and delay of necessary reforms to stabilize the economy as a "common pool" problem and considers two groups regarding fiscal resources as a common pool. These groups do not fully internalize the cost of financing government expenditure until debt accumulates and the cost of non-cooperative equilibrium reaches to critical level inducing both groups to act cooperatively and improve the fiscal stance.

Above-mentioned institutional and political economy approaches share a common feature that is absent in the macroeconomic explanations of stylized facts of stabilization programs in the developing countries. This feature is the heterogeneity of agents in the economy. Institutional and political economy approaches emphasize the role played by the distributional implications of stabilization policies on various social groups in the economy and take these factors into consideration to diagnose the reasons of often failed stabilization programs of less developed countries. Hence, the dynamics of societies and the distributional consequences of various policies on different groups need to be analyzed to have a better understanding of stylized facts of stabilization policies.

At the very basic level, a society is composed of people with varying levels of income. As it is documented by Baldacci et al (2002), the poor, rich and middle-income classes are not equally affected by stabilization policies. Therefore by recognizing the heterogeneity of agents, this paper suggests a political economy model to explain the stylized business cycles in developing countries.

2.1. How the poor are affected by the stabilization programs and the boom-bust cycles in developing countries

The boom-bust cycles of stabilization programs generate higher real wage and employment in the initial phases of stabilization programs. However, later in the program or after the program ends with a crisis, wages fall and unemployment rise. During the period 1997-98 real wages fell by 4.5 percent in Thailand and 10.6 percent in Korea and 44 percent in Indonesia [Agenor (2002)]. In 1998, unemployment rate rose to 5.3 percent from 2.2 percent in Thailand. In Korea, the urban unemployment rate rose to 8.4 percent in 1999 from 2.6 percent in 1997. In general, the poor are disproportionately affected by crises and poverty headcount index increased after the crises. Since the low-income groups and the poor generally involve in the production with their labor force, until stabilization programs are abandoned, low-income people enjoy higher real wage and employments. Hence, it seems to be the case that the low-income people benefit from existing conditions prior to major crises. Likewise we also observe that all the groups enjoy the benefits of existing circumstances before crises. However, some agents later pay the cost of stabilization programs more than the others.

Exchange rate realignment associated with abandonment of stabilization program results in relative price changes, likely to affect some social groups more adversely than others. Stabilization programs are largely characterized by the appreciation of currency before stabilization programs are abandoned. Stabilization programs therefore generally end with the discrete depreciation of currency. The appreciation of currency represents higher relative prices of nontradables in terms of tradables. This further implies that stabilization programs with overvalued currencies increases production of nontradables

relative to production of tradables. After the devaluation of currency however, the price and production of nontradables fall relative to the tradables. When the stabilization program is in effect with overvalued exchange rate, the low-income people tend to benefit from the higher real wages and employment if they have higher share in the nontradables as compared to tradables, which is shown by Uribe (1995). Uribe estimates that the labor share in the nontradable sector is more (0.63) than tradable sector (0.48), a feature consistent with our model.

Considering the fact that low-income people provide their labor services to the economy, it is more likely that low-income individuals are among the main beneficiaries of stabilization programs that bring higher wages and employment. Take for instance the temporariness hypothesis, the stabilization program is expected to be reversed in the future. Government starts with a hope to continue the stabilization policy for a long time, but later realizes that the economy needs realignment with the appreciated currency. Politicians may not be able to adjust the overheated economy due to the pressures from different groups in the society benefiting from existing circumstances. This pattern may induce the politicians to postpone the necessary adjustments. Eventually the economy ends up with high devaluations, unemployment and with a sudden stop of the economy [Calvo and Reinhart (2000)]. It is apparent that this process stems from the lack of incentives on the part of low and high-income people to bear the burden of economic adjustment.

The low income groups moreover object to certain reforms associated with realignments of the economy that requires them to move to different sectors. However given their lack of education and low skills, they are more likely to prefer to postpone the

reforms as long as possible due to status quo bias, high risk aversion or asymmetric information.

In addition to the higher shares of low income people in the nontradable production, overvalued currency allows the low income people to purchase tradable goods with relatively cheaper prices and this in turn increases their standards of living at least for a certain period of time. In spite of the eventual reality that the crisis is going to hit the low-income people, given the low intertemporal elasticity of substitution, this mechanism works for the low-income people more than it works for the other groups of people.

Recent literature on open economy macroeconomics draws attention to the credit market imperfections. This credit market imperfection is also not symmetric in the society. An increase in the prices of nontradable goods increases the collaterals used to insure lending. A fall in real interest rate also provides more credit opportunities for some of the previously credit constraint households. These sorts of credit imperfections are more prevalent for the low-income people. They are among the first to get rid of borrowing constraints like collateral constraints and to benefit from the net worth effects with the introduction of stabilization programs. Therefore, stabilization programs help the low-income people to avoid the financial frictions possibly more than any other groups.

Last, but not the least, even the direct benefits of avoiding the financial frictions are incurred by the firms, indirectly the low-income people enjoy the benefits in the form of higher wages and employment. For example, in many developing countries small and medium size firms benefit from the credit expansions and eliminations of financial frictions. Considering that small and medium size enterprises tend to use more labor-

intensive production technologies, an expansion in the output and employment induced by the increase in availability of credit indirectly helps the low-income groups by boosting the wages and employment [see Agenor (2002)].

3. The Model

The model is based on three different types of groups of agents in the economy. These different groups form various coalitions depending on the distributions of their income shares in tradables and nontradables. Exchange rate alignment is used as a mechanism for income redistribution. Since different groups are affected asymmetrically from exchange rate policies, coalitions representing the majority of the population decide on the tax rate, exchange rate and timing of debt repayment and moreover on the amount of additional debt.

A model with an idea of groups having conflicting interests has been introduced by Perotti (1996) to explain seemingly unsustainable fiscal policies arising from a coalition of the poor and rich when distribution of income is highly unequal. His model employs a fiscal policy that redistributes the income from the middle and high income classes to the poor. In relatively poor countries, the rich leave the country in the second period and this enables the poor to form a coalition with the rich and eventually to postpone all the payment of stock of debt to the second period in which only middle class pays all the tax and stock of debt. In this respect, our model carries the same idea of the poor and rich coalition to generate inconsistent macroeconomic policies. However, in our model the purpose is to explain appreciation of currency before stabilization along with further borrowing. Moreover, in practice, fiscal policy of transfer does not seem to be the main mechanism used for the redistribution of income. In our model, the redistribution of

income is achieved through increasing prices of goods produced by the targeted groups of redistribution. This price mechanism for the redistribution of income better mimics the stabilization experiences of many less developed countries. Unlike Perotti (1996), our model recognizes the significance of income shares of individuals in total tradables and nontradables and makes the income distribution as a function of tradable and nontradable income.

In addition to altering relative prices for redistribution, our model allows us to show why countries borrow more in spite of their existing stock of debt and high interest cost associated with extra borrowing. Without loss of generality, our model characterizes this pattern as domestic borrowing when country reaches its limit in external borrowing.

We also consider the mobility of some groups like Perotti (1996) and Alesina and Tabellini (1989) to capture capital flights associated with failure of stabilization programs and crises in general.

3.1. Technology and Preferences

The model incorporates two period economy. The first period can be regarded as initial stages of stabilization programs and the second period resembles the end of stabilization programs or period after crises that brings the end of existing stabilization program. The economy is endowed with two types of goods: tradables and nontradables. Agents take the utility from tradables and nontradables and all types of the agents have the same utility function and budget constraint is satisfied in each period.

$$(1) \qquad \sum_{t=1}^{2} U_t(C_N) + U_t(C_T)$$

$$(2) \qquad U(C_j) = \frac{C_j^{1-\gamma}}{1-\gamma} \qquad j{:}N{,}T$$

$$(3) \qquad P_N Y_N^i + Y_T^i = P_N C_N^i + C_T^i \qquad \text{i:P,M,R}$$

Where C_T and C_N represent the consumption of tradables and nontradables respectively. Y_N^i and Y_T^i denote the endowment of tradables and nontradables for agent i, respectively. P_N indicates the price of nontradables in terms of tradables and price of tradables is normalized to one. Lastly, in each period, consumption of nontradables is equal to the total endowment of nontradables in each period.

$$(4) \qquad \sum_{i=P,M,R} C_N^i = \sum_{i=P,M,R} Y_N^i$$

The function $U(C_j)$, j: T or N is bounded from below to have preference ordering over different consumption profiles. The inverse of elasticity of intertemporal substitution, γ, is less than 1. For simplicity, discount factor is taken to be equal to 1.

3.2. Income Distribution

The population is comprised of total mass 1 of different agents, divided into three groups: poor,P, middle,M, and rich,R. Any single group does not constitute majority. Hence, when all the population involves in the voting, single group does not have the majority of population. Without loss of generality, the model treats the different groups as if they have the same share, 1/3, of population. We also assume that when only the poor and middle class vote, the offer of middle class wins.

To capture the idea of redistribution, the model assumes that agents P do not have income from tradables. Therefore, the agents P attempt to raise the relative price of nontradables to maximize their income. To simplify the model, we assume that the income of tradables and nontradables is given as an endowment to isolate the shift of the labor force between tradables and nontradables as relative prices change.

3.3. Redistributive Policy

The exchange rate overvaluation combined with the fiscal policy is used as a redistributive mechanism. Redistribution of income among various groups is realized through increasing the relative price of nontradables. Since different groups have different shares in nontradables, exchange rate alignments have asymmetric impacts on various groups. The cost of increase in the price of nontradables is paid by taxing the tradable goods. For simplicity, the model assumes that only income from tradable goods is taxed. Given that middle and rich classes have income from tradable goods; the poor only benefit from higher taxation and increasing prices of nontradables good. In period j, income from tradable goods is taxed at a flat rate t_j, the revenue collected $[t_j*(Y_t^M + Y_t^R)]$ is then redistributed among people making their income from nontradable goods. Hence the rich pay $(t_j*Y_t^R)$ and receive their share times total tax collected.

$$[\frac{Y_N^R}{(Y_N^P + Y_N^M + Y_N^R)}]*[t_j*(Y_T^M + Y_T^R)]$$

Similarly, middle class pays $(t_j*Y_t^M)$ and receives their share in nontradables times total tax collected.

$$[\frac{Y_N^M}{(Y_N^P + Y_N^M + Y_N^R)}]*[t_j*(Y_T^M + Y_T^R)]$$

Finally, the poor are not exposed to any taxation and receive the following:

$$[\frac{Y_N^P}{(Y_N^P + Y_N^M + Y_N^R)}]*[t_j*(Y_T^M + Y_T^R)]$$

The tax revenue is used to finance the increase in exchange rate defined as prices of nontradables over price of tradables. Hence, individuals receive transfer proportional to their share of nontradables in total nontradables.

In practice, individuals generally receive their income either from tradable (T) or nontradable (NT) sectors. However this doesn't imply that income from T and NT sectors are uncorrelated. A shock in T (NT) sectors influences the NT (T) sectors and leads to changes in earnings of individuals in other sectors. Individuals in the economy mainly receive their income in the form of labor earnings, profit and/or rent. To illustrate how income in T and NT sectors are correlated, consider a negative shock in NT sectors, this shock reduces the labor income not only in NT sectors but in T sectors. Hence, when we assume that individuals receive their income from T and NT goods, this can be regarded as such that an individual's earning is correlated with the value of T and NT goods.

Since the poor earn their income mostly from their labor force, we expect that their share in nontradables is greater than the shares of other groups in nontradables. Income of the middle class comes both from tradables and nontradables. Middle class is more likely to have more human capital and to work in tradable sectors. Moreover, middle class is likely to have some capital (money) to invest. Therefore we expect that middle class receive income both from tradables and nontradables. The rich, on the other hand, are expected to have more capital and earn most of their income from renting or investing their capital instead of receiving most of their income through their labor force. Hence, the model assumes the following shares of tradables and nontradables for three groups.

$$\frac{P_N Y_N^P}{P_N Y_N^P} = 1 \geq \frac{P_N Y_N^M}{P_N Y_N^M + Y_T^M} \geq \frac{P_N Y_N^R}{P_N Y_N^R + Y_T^R}$$

$$\frac{Y_T^P}{P_N Y_N^P} = 0 \leq \frac{Y_T^M}{P_N Y_N^M + Y_T^M} \leq \frac{Y_T^R}{P_N Y_N^R + Y_T^R}$$

The results of the model do not rely on this assumption. What is crucial for the model is the different cost and benefit of taxation and redistribution for three types of agents. Moreover, this cost and benefit merely depend on their shares of nontradables and tradables in overall production. Individuals with higher share of income in nontradables relative to tradables prefer higher taxation and redistribution given that their benefit outweighs the cost of taxation. Hence, preferred tax rate of these individuals is the maximum possible tax rate,1 and corresponding exchange rate.

Due to lack of distortions from taxation, the optimal tax rate for any individual in this set up is either zero or one depending on their endowment of tradables and nontradables. In order to keep the model simple, we do not allow any distortion from taxation. If taxation leads to distortion then maximum tax rate, 1 can be eliminated.

3.4. Debt Payment and Further Borrowing

In this model, country may need two types of stabilizations as the devaluation of domestic currency and the debt repayment. Economy starts with an initial stock of debt; R and depending on the political decision given by majority, the government can appreciate the value of domestic currency in the first period. In the second period, exchange rate can be realigned to its real value and country must fulfill all the debt obligations by the end of second period. Thus the tax collected is allocated to either debt repayment or redistribution. R_j denotes the amount of repayment in period j and $t(R_j)$ indicates the tax rate that raises an amount of tax revenue just equal to R_j.

In order to capture the domestic debt phenomenon, it is assumed that country already reached the limit of external borrowing and additional borrowing can only be done in domestic markets with an extra interest cost of r. Hence, the interest rate for the

existing stock of debt is normalized to zero but one more unit of debt costs r units for the country. Moreover, we assume that only the rich have access to lend to the government. This assumption is made for the simplicity to reflect the idea that domestic borrowing can be beneficial for individuals with higher liquid assets.

If the private agents are allowed to lend and borrow in international markets to smooth their consumption, the model generates an interesting and realistic two way flow of resources with private flow going in opposite direction to official flows. However, in the model, private flows are restricted by introducing full capital control over private flows. This is not again crucial for the results of the model but allows us to focus on central issues.

Because of zero interest rate for stock of external debt, R and zero rate of time preference, representative agents would maximize their utilities by dividing debt repayment in two periods equally. Thus, in the model if less than half of the debt is repaid in the first period or even further borrowing occurs in the first period, then this is considered to be a delay of stabilization.

3.5. Political System

In the first period, agents decide on the tax rate t_1, and amount of debt repayment, R_1 and domestic debt, D. The redistributive transfer in the form of overvalued currency is endogenous to tax revenue, current debt repayment and domestic borrowing. In the second period economy pays all of its remaining debt, $R_2=(R-R_1)$ and domestic debt with the interest cost $D*(1+r)$. In the second period, therefore, only policy decided on the basis of majority voting is the tax rate, t_2.

In the model, the issues are not voted separately. Hence there can be a problem of stable-winner. However, the model incorporates three types of agents and this in turn ensures the finite number of proposals maximizing the utility of each type of agents. In other words, agents are assumed to give proposals that are best for them. Necessary and sufficient condition for a proposal to be stable winner is to defeat the other two in pair-wise comparison. The model assumes that each agent proposes the policy that maximizes his utility and votes sincerely. Strategic voting is not analyzed in this set up due to the complications associated with the definition of equilibrium and endogeneity of outcomes to allowable strategies. However, in this particular model, results are not expected to change drastically with the introduction of strategic voting. Since each proposal maximizes the utility of at least two types of agents, this eliminates the effects of strategic voting. Hence, each group of agents does not have any incentive to make a different proposal.

In each period, initial stock of debt can be repaid in full. Thus, if all the debt payment is postponed to the second period, there is a maximum domestic debt, D_{max} that can be incurred by the government in the first period.

3.6. Mobility and Capital Flight

The agents are allowed to move abroad in the long run. In the second period, nontradable endowment is not mobile, but agents can transfer their income from tradable goods to aboard. The level of development of the rest of the world relative to home country is represented by productivity variable, A. So, we simply assume the level of development is 1 in home country. If the rest of the world is more productive, A takes the value greater than 1 and if home country is more productive than the rest of the world

then A should be less than 1. This will enable us to distinguish the characteristics of the rich and poor countries. When agents move their tradable goods, they have to pay a fixed cost; f associated with the mobility of tradable goods. Hence, if an agent leaves the country in the second period income from his tradable goods becomes AY_T^i-f. Hence, mobility of tradables in the second period depends both on the relative productivity of home country and fixed cost, f. The individuals left the country in the second period are not kept responsible to pay the tax and they also do not involve in decision process in the second period. This assumption makes sense considering the political power exercised by each group at different times. It is more likely that the rich constitute a small fraction of total population. However, their political power comes not only from their number but also from other sources like campaign contributions etc. Hence, it is reasonable to think that the rich use their political power in the first period and remain indifferent in the second period as long as they are not affected.

Individuals compare the utility of leaving the country with staying in the country to maximize their pay offs. For example, the rich leave the country under the following condition:

$$Y_T^R[(1-t_2(R_2+D)] < AY_T^R-f$$

RHS represents the income from tradables abroad minus the cost of moving and LHS represents the income from tradables net of taxes at home country in the second period.

The tradable goods are generally more mobile and this mobility of more mobile factors generates a chance to avoid the cost of consolidation and to shift the burden of stabilization on the agents staying in the country.

The next section first introduces the benchmark case of homogeneous agent economy, and then focuses on the different dynamics of heterogeneous agents in rich countries and poor countries (more/less productive as compared to the rest of the world).

4. The Homogeneous Agent Economy

Agents in our model differ with respect to their endowment in tradables and in nontradables. Homogeneous economy, therefore, represents the case with no income dispersion in tradables and nontradables. Each individual in the economy has identical amount of tradables and nontradables. Homogeneous agents version of the model necessitates no fiscal and redistributive policy because any tax revenue from an agent is redistributed back without any net loss for the agents. Hence the proposition I follows:

Proposition I: *when all the agents own same amount of tradable and nontradable income, there is no incentive for the agents to appreciate the currency and to delay the debt repayment in order to redistribute the income. The external debt repayment is spread equally in two periods without further borrowing and thus consumption smoothing is achieved.*

Proof: since all the agents are identical, agents receive amount of transfer exactly equal to what they pay as taxes. Therefore, they are indifferent to any tax rate and any fiscal policy to raise the prices of nontradables. Other policy variables decided are the amount of debt repayment in each period and additional borrowing in the first period. Since agents are identical, all the agents leave or stay in the country in the second period. If agents leave, all the debt repayment must be done in the first period. If agents stay in the country, the strategy to pay half of the debt in each period dominates any other strategy because it provides consumption smoothing for identical agents.

In the presence of sufficiently high fixed cost of moving, nobody leaves the country in the second period and utility of agents are maximized when consumption is smoothed perfectly across two periods. Therefore, in the first period, appropriate tax rate is set just to pay half of the stock of debt and also no domestic borrowing is done to appreciate the domestic currency. Other half of the debt is paid in the second period. Since there is no effort to raise the price of nontradables for redistributive purposes, exchange rate remains stable over the periods. In the model, deviations from real exchange rate are not distortionary. Therefore changes in relative prices of nontradables do not bring any disutility to homogeneous agents. However, we assume that under these conditions agents prefer not to change the exchange rate due to potential distortions associated with volatility of exchange rate, which are not modeled in this set up.

When agents in the economy are treated as homogeneous, there is no business cycle: the cost of stabilization is spread over the two periods for rational, forward-looking individuals. However once we recognize the heterogeneity of agents in the economy with respect to their income, the model generates interesting pattern of overvalued exchange rate and delayed debt repayment with extra borrowing in the first period.

5. Heterogeneous Agent Economy

Since agents R have more endowment in tradables than agents M in the second period; when the agents M find it optimal to leave the country, agents R leave the country as well. But if both groups of agents M and R leave in the second period, all the debt should be repaid in the first period. However, this is not an interesting case to consider. Therefore we analyze two situations: one is nobody leaves the country in the second period and the other is only agents R leave the country in the long run. This part is

devoted to the first case: nobody leaves the country because of two possible reasons: either the cost of moving can be high enough to deter the agents to take their tradable goods outside the country or the rest of the world can be less productive than home country so that it becomes worthy to stay in more productive country in spite of taxation and debt obligations in the second period.

5.1. Heterogeneous Agent Economy When the Rich Do Not Leave the Country

Even economy is populated by heterogeneous agents with respect to their shares in total tradables and nontradables, when the rich don't leave the country we don't observe business cycles with devaluations and delay of debt repayments.

Proposition II: *When the rich don't leave the country, exchange rate is stable over time without devaluation in the second period. The external debt repayment is spread equally in two periods without much domestic borrowing.*

Proof: All the cases are considered below. Let's consider the income shares of each group in tradables and nontradables one by one:

Case I: $\dfrac{Y_N^M}{(Y_N^P + Y_N^M + Y_N^R)} < \dfrac{Y_T^M}{(Y_T^M + Y_T^R)}$

Case I considers the situation that share of nontradables of agents M is less than their share of tradables in overall tradable production. Whether agents R leave the country in the second period is common information to all the players. Therefore agents M propose zero tax rate in both periods because they pay more than they receive in the form of higher prices of nontradables. As a consequence of zero preferred taxation, the relative price of nontradables-exchange rate- is desired to be stable over time. Further borrowing is not desired because it only helps increase the price of nontradables at the

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expense of lower consumption in the second period. The repayment of external stock of debt is spread in two periods equally.

Case II: $\dfrac{Y_N^M}{(Y_N^P + Y_N^M + Y_N^R)} > \dfrac{Y_T^M}{(Y_T^M + Y_T^R)}$

This case is opposite of case I. Agents M have higher share in overall nontradable production as compared to their share in overall tradable production. Hence, agents M receive more from increasing price of nontradables than what they pay as a tax. Therefore the optimum tax rate happens to be maximum tax rate 1 for agents M.

Since nobody leaves in the second period, domestic borrowing with interest rate r only reduces the welfare. Thus, agents M propose zero domestic debt in the first period. They also want to spread the repayment of existing stock of debt in two periods equally, $R_1 = R_2 = R/2$.

The exchange rate as a function of fiscal policy appears to be stable over time and

equal to $P_N^O - P_N = \dfrac{a - R/2}{b}$ where a=Y_T^M+ Y_T^R and b= Y_N^P+ Y_N^M+ Y_N^R

P_N^O represents the overvalued prices of nontradables and P_N denotes the real value of nontradables. Hence, $[(P_N^O - P_N)/ P_N]$ is the rate of overvaluation of exchange rate. However, we do not observe any proposed devaluation in the second period. So exchange rate is stable over time.

Now let's consider the shares of tradables and nontradables of agents R. There can be again two possibilities.

Case III: $\dfrac{Y_N^R}{(Y_N^P + Y_N^M + Y_N^R)} < \dfrac{Y_T^R}{(Y_T^M + Y_T^R)}$

The share of tradables of agents R in overall tradables production exceeds their share of nontradables in overall nontradable production. This is more likely the case considering that the rich earn income more from their capital than from their labor force.

Since the cost of taxation exceeds the benefit of redistribution agents R prefer zero tax rate along with equal spread of debt repayment in two periods. If only agents R are allowed to lend in the first period, they lend up to D_{max}^{III} that should satisfy the following condition so that the rich find it beneficial to lend in the first period:

$$rD_{max}^{III} \geq (P_N^O - P_N) * (\frac{Y_N^P + Y_N^M}{b})$$

Case IV: $\dfrac{Y_N^R}{(Y_N^P + Y_N^M + Y_N^R)} > \dfrac{Y_T^R}{(Y_T^M + Y_T^R)}$

Case IV supposes that nontradables' share of agents R in overall nontradables exceeds their share of tradables. Under these conditions, the optimal proposal for the rich is the tax rate of 1 and R is again spread in two periods. Domestic lending by agents R is maximum debt that can be repaid in the second period because now agents R benefit from increase in prices of nontradables in addition to their benefit in the form of interest revenue in the second period. Moreover, no devaluation takes place in the second period.

The Poor

For agents P, the optimum choice is more limited. Since they receive their income only from nontradables without exposed to any taxation, they prefer to increase the prices of nontradables as much as possible. Therefore they offer tax rate 1 in each period and external debt is repaid in two periods equally. Domestic debt is preferred to be zero because nobody leaves in the second period and higher consumption with higher

domestic debt implies higher repayment with an interest cost and lower consumption in the second period.

Next, we consider possible combinations of all these cases.

Case I with Case III: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$

This is most likely combination of cases to encounter. The agents decides by pair-wise comparison, then the proposal of agents M is to be accepted because agents R prefer proposal of agents M over proposal agents P and agents P prefer proposal of agents M to the proposal agents R. The rich and middle class coalition wins with the following agenda:

$t_1([R+ D]/2)=t_2([R+ D]/2)$, $R_1=R_2=(R+D)/2$, $D=0$

$$P_N^O - P_N = \frac{a - (R+D)/2}{b}$$

where $t([R+ D]/2)$ denotes tax rate needed to raise tax revenue just equal to debt repayment of $[R+ D]/2$ in each period

Case I with Case IV: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} > \dfrac{Y_T^R}{a}$

Now proposal of agents P beats the proposals of agents M and R in pair-wise competition. Agents R prefer the proposal of agents P because it offers tax rate 1 and equal spread of external debt repayment. Only difference between proposals of agents P and R is that agents P offer zero domestic debt as opposed to D_{max}^{III} offered by agents R. Agents M prefer offer of agents P because at least it offers zero domestic debt as compared to the proposal of agents R with D_{max}^{III} . Exchange rate is again stable and equal to $P_N^O - P_N = (a-R/2)/b$, and the winning agenda is:

$t_1 = t_2 = 1$, $R_1 = R_2 = R/2$, $D = 0$

Case II with Case III: $\dfrac{Y_N^M}{b} > \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$

Agents P and M make the same offer therefore their offer is accepted with the following agenda:

$t_1 = t_2 = 1$, $R_1 = R_2 = R/2$, $D = 0$, $P_N^O - P_N = (a - R/2)/b$

We do not again observe exchange rate fluctuations over time.

Case II with Case IV: $\dfrac{Y_N^M}{b} > \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} > \dfrac{Y_T^R}{a}$

This combination of cases is impossible given that it leads to total shares of agents M and R in nontradables to be greater than 1.

TABLE: 1 *The rich don't leave in the second period*	Case III: $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$	Case IV: $\dfrac{Y_N^R}{b} > \dfrac{Y_T^R}{a}$
Case I: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$	**rich-middle coalition** **proposal of the middle class wins** **stable exchange rate** $t_1([R+D]/2)=t_2([R+D]/2)$, $R_1=R_2=(R+D)/2$, D= 0 $P_N^O - P_N = \dfrac{a-(R+D)/2}{b}$	**rich-poor coalition** **proposal of the poor wins** **stable exchange rate** $t_1=t_2=1$, $R_1=R_2=R/2$, D=0, $P_N^O - P_N = \dfrac{a-R/2}{b}$
Case II: $\dfrac{Y_N^M}{b} > \dfrac{Y_T^M}{a}$	**poor-middle coalition** **proposal of the poor and middle** **class is same and wins** **stable exchange rate** $t_1=t_2=1$, $R_1=R_2=R/2$, D=0, $P_N^O - P_N = \dfrac{a-R/2}{b}$	Impossible

6. Heterogeneous Agent Model When the Rich Leave the Country

Whenever fixed cost of moving abroad is small enough to make leaving more profitable strategy in the second period, the rich leave to benefit from higher productivity in the rest of the world and avoid taxation and debt repayment in the second period.

Hence the model predicts higher capital flight in poor countries and in countries with small cost associated with leaving the country like no capital control.

Proposition III: *when the rich leave the country in the second period, the poor and rich form a coalition in the first period. The currency is appreciated in the first period and all the debt repayment is delayed to the second period with additional domestic borrowing.*

Proof: all the possible cases and their implications are considered below.

Case I with Case III: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$

Since the rich leave in the second period and this is common information for all the agents in the economy. Agents M want all the external stock of debt to be repaid in the first period. Otherwise all the burden of the debt repayment falls on them in the second period. Agents M also lose more from taxation than what they receive as an increase in prices of nontradables. Therefore, they offer tax rate just enough to pay R, $t_1(R)$ in the first period and zero tax rate in the second period and full payment of debt with no further borrowing in the first period.

For agents R, net benefit of taxation and redistribution is negative. Hence, they propose zero tax rate. Moreover they want all the stock of external debt to be paid in the second period so that they do not need to pay any debt by fleeing the country in the second period. On the other hand, they are better off by lending to the government because they can earn interest revenue in addition to increased prices of nontradables in the first period.

Under these conditions agents P want to maximize prices of nontradables in two periods. However since the agents R leave the country in the second period, proposal of

agents M is accepted in the second period. Given that agents M offer zero tax rate in the second period, redistribution in the form of increase in the prices of nontradables takes place only in the first period. Therefore, agents P offer tax rate 1 in the first period and prefer to delay the repayment of external debt to the second period in order to increase the prices of nontradables as much as possible. Moreover, agents P propose the highest possible domestic debt that can be paid by the agents M in the second period.

$$D_{max} = \frac{Y_T^M - R}{(1+r)}$$

Given these proposals, in pair-wise competition, offer of the agents R beats other offers. Agents M prefer the proposal of agents R over the proposal of agents P because it offers zero tax rate instead of one. Agents P prefer the proposal of agents R even though it contains zero tax rate in the first period, it is better than the proposal of agents M at least it provides a rise in the prices of nontradables to the extent that can be repaid by agents M in the second period along with postponed external debt. At the end, agent R and agents P form a winning coalition and set the agenda as:

$t_1 = t_2 = 0$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$, $P_N^O - P_N = D_{max}/b$

Under these circumstances, we observe delay of stabilization. Exchange rate is devaluated in the second period and the external debt payment is postponed to the second period with an even costly borrowing in the first period.

Case II with Case III: $\dfrac{Y_N^M}{b} > \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$

Agents M benefit from redistribution more than the cost of taxation. Therefore agents M offer tax rate 1 in the first period. However agents M want the entire debt

obligation to be completed in the first period. Otherwise they bear all the burden of debt payment in the second period. Therefore they make the following proposal:

$t_1 = 1$, $t_2 = 0$, $R_1 = R$, $R_2 = 0$, $D = 0$

Agents R make the following offer discussed above:

$t_1 = 0$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$

Similarly, agents P have the same offer as before.

$t_1 = 1$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$

Agents P prefer the proposal of agents M if $P_N^O - P_N = \dfrac{a - R}{b} \geq \dfrac{D_{max}(1 + r)}{b} = \dfrac{Y_T^M}{b}$

LHS of inequality indicates the amount of appreciation due to accepting the offer of agents M. RHS of inequality denotes the appreciation due to accepting the offer of agents R.

Agents M prefer the proposal of agents P because at least agents P offer tax rate 1 instead of 0. Agents R prefer the proposal of agents P because set of offers on external debt and domestic debt are same as the offer of agents P, only difference is the tax rate and agents M also offer the same tax rate, therefore it is better for agents R to accept the proposal of agents P. Therefore proposal of agents P beats the other proposals with the following agenda.

$t_1 = 1$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$, $P_N^O - P_N = \dfrac{a + D_{max}}{b}$

In the second period, agents M constitute the majority and their offer of zero tax rate in the second period is in effect. We observe again delay of reforms in the sense of devaluation of currency and postponement of the debt obligations with increased borrowing in the first period.

Case I with Case IV: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$ **and** $\dfrac{Y_N^R}{b} > \dfrac{Y_T^R}{a}$

Agents M lose from redistribution, thus they want minimum redistribution possible. They also want all the tax to be paid in the first period to avoid debt burden later in the absence of agents R. Therefore agents M make the following offer:

$t_1 = t_1$ (R), $R_1 = R$, $R_2 = 0$, $D = 0$

t_1 (R) represents the tax rate just enough to pay external debt R.

Agents R want to pay tax because the net benefit of redistribution is positive for agents R. They want also to postpone the external debt repayment to the second period. However, they are willing to lend to the government with an interest rate r. Therefore they make the following offer:

$t_1 = 1$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$, $P_N^O - P_N = \dfrac{a + D_{max}}{b}$

Agents P again try to maximize the prices of nontradables in the first period and make the following offer:

$t_1 = 1$, $R_1 = 0$, $R_2 = R$, $D = D_{max}$, $P_N^O - P_N = \dfrac{a + D_{max}}{b}$

The proposal of agents R and P are same and therefore their offer is accepted by majority voting. In this case again, the debt repayment is postponed with an additional borrowing in the first period and exchange rate devaluation at the end.

TABLE: 2		
The rich leave in the second period **Delay of debt payment** **Domestic borrowing** **Exchange rate devaluation**	*Case III:* $\dfrac{Y_N^R}{b} < \dfrac{Y_T^R}{a}$	*Case IV:* $\dfrac{Y_N^R}{b} > \dfrac{Y_T^R}{a}$
Case I: $\dfrac{Y_N^M}{b} < \dfrac{Y_T^M}{a}$	**rich-poor coalition** **proposal of the rich wins** **devaluation in the second period** $t_1=0$, $R_1=0$, $R_2=R$, $D=D_{max}$, $P_N^O - P_N = \dfrac{D_{max}}{b}$	**rich-poor coalition** **proposal of the rich and poor** **wins** **devaluation in the second** **period** $t_1=1$, $R_1=0$, $R_2=R$, $D=D_{max}$, $P_N^O - P_N = \dfrac{a + D_{max}}{b}$
Case II: $\dfrac{Y_N^M}{b} > \dfrac{Y_T^M}{a}$	**rich-poor coalition** **proposal of the poor wins** **devaluation in the second period** $t_1=1$, $R_1=0$, $R_2=R$, $D=D_{max}$, $P_N^O - P_N = \dfrac{a + D_{max}}{b}$	Impossible

Proposition IV: *when the rich and middle class receive most of their income from tradables, there is less incentive for appreciation of currency in the first period and delay of debt repayment.*

Proof: Consider Case I and Case III, devaluation in the second period is less as compared to other cases when share of nontradables for agents M or R is greater than the share of tradables.

This proposition is extremely valid for countries receiving high income from tradable goods (high export). Those countries tend not to appreciate their currency for the fear of reduction in their income. This fact may stem from the structure of the economy in which the rich and middle class receive most of their income from tradable goods.

7. Income Inequality, Overvaluation of Currency and Delay of Stabilization

The economy experiences less exchange rate fluctuation and delay of debt obligations if all the individuals stay in the country in the second period. Hence, anything that increases the likelihood of leaving the country in the second period is welfare reducing for the economy in general. When nobody leaves the country, external stock of debt is repaid in two periods equally, which is closer to the optimal case. Moreover, if individuals do not leave the country, we observe less exchange rate fluctuations with no domestic borrowing and even there is some domestic debt it is less than the domestic debt when some agents leave the country. Given these observations, we can conclude that any progress that increases the individuals' probability of leaving generates unsustainable exchange rate arrangements and postponement of consolidation with further borrowing. Hence, financial liberalization may have negative long-term consequences for developing countries if it gives flexibility to the rich to move their productive resources abroad.

We will first approach the increasing income inequality from this perspective and analyze the effect of widening income inequality on individuals' decision to leave the country in the second period. Then we consider the effect of income inequality on

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different winning coalitions and show that increasing inequality can lead to shift of coalitions such that the economy ends up with highly volatile exchange rates and delay of necessary reforms to stabilize the economy. Before that however, following proposition points out the distinction between rich and poor countries. The delay of debt repayment and overvaluation of domestic currency is more likely to be seen in poor countries with less productivity as compared to the rest of the world.

Proposition V*: If a country is poor (less productive) as compared to the rest of the world, $A \geq 1$ then the rich in this country have more incentive to leave the country in the second period and subsequently, the country has less stable exchange rate with delay of debt repayment. Opposite holds for the rich (more productive) countries*.

Proof: The rich do not leave the country in the second period if the following inequality is satisfied:

$$Y_T^R[1 - t_2(R_2 + D)] \geq AY_T^R - f$$

LHS denotes the income received by the rich if they do not leave the country and RHS indicates the income net of fixed cost of leaving the country in the second period. Therefore probability of leaving the country is a function of following variables: $Y_T^R, t_2(R_2 + D)], A, f$. It is clear that probability of leaving the country increases as A

increases: $\dfrac{\partial P\{Y_T^R, t_2(R_2 + D)], A, f\}}{\partial A} \geq 0$

Hence as the rest of the world becomes more productive (richer) or equivalently the country becomes less productive (poorer), the rich are more likely to leave the country. Consequently, as the rich leave the country, the economy is characterized with devaluations and delay of debt repayment.

Since in the model there are two types of goods, change in income inequality is attributable to change in relative ownership of tradables and nontradables. To keep the matters simple, deterioration in income inequality is introduced as an increase in tradable endowment of the rich while keeping the total tradable endowment of the country fixed. Since we assume mean preserving spread in the tradables, increasing the endowments of tradables for agents R indicates lower share of tradables for agents M.

Proposition VI: *Higher income inequality in the form of higher endowment of tradables of the rich can induce the rich to leave the country in the second period and lead to overvaluation of currency and delay of debt repayment in the first period.*

Proof: Agents R do not leave the country if the following inequality is satisfied:

$$Y_T^R[1 - t_2(R_2 + D)] \geq AY_T^R - f$$

where $t_2(R_2 + D)$ is the tax rate needed in the second period to pay the external and domestic. Higher income inequality in the form of increasing Y_T^R can reverse this inequality depending on the fixed cost of moving and productivity factor A. An increase in Y_T^R effects both side of the equation, however if A is greater than $[1 - t_2(R_2 + D)]$ then RHS of inequality grows faster than LHS and this in turn leads to a reversal of above inequality in the existence of fixed cost of moving. Therefore, higher inequality in the form of increasing Y_T^R induces agents R to leave the country in the long run and eventually worse economic policies with delay of consolidation can be adopted in the first period.

For higher values of A, country is considered to be less productive and poorer as compared to the rest of the world. Hence, the model predicts more capital outflow for poor countries with high inequality, a feature consistent with actual experiences of many

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developing countries. Moreover, even though both countries are poor, we expect less capital flight in the country with better income distribution.

To illustrate the delayed stabilization and overvalued exchange rate with rise in inequality, consider that case I with III prevails and nobody leaves the country in the second period then higher share of tradable income for the rich and lower share for the middle class in mean preserving sense shifts the economy from case III with possible combinations of case I or case II and agents R leave the country in the second period. Eventually, all the external debt repayment is postponed to the second period, domestic borrowing increases in the first period with possibly more devaluation in the second period.

8. Impact of Financial Frictions on Coalition Formation of the Rich and the Poor

An interesting implication of the model is is that the rich and the poor form coalition to appreciate the currency and delay the debt repayment at the expense of the middle class. Hence, a country can adopt inefficient policies that benefit certain coalitions of agents and harm the rest of the population. In this model, the poor benefit from appreciation of currency and delay of debt repayment because these provide income redistribution in favor of the poor. The rich, on the other hand benefit from the delay of debt repayment because they leave the country and are not exposed to taxation in the second period.

This model seems to be realistic for types of developing countries where the rich own more mobile forms of production and income. For example, if the rich earn their income through lending their existing stock of capital, then it is quite reasonable to encounter that the rich leave the country and invest abroad avoiding the burden of

stabilization in the second period. This mechanism can be prevalent especially after the financial liberalizations that provide more flexibility to the owners of more mobile factors of production. That's why we confront with higher capital flight in financially liberalized economies as the citizens of those countries also shift their capital abroad after major crises.

It is hard, however, to imagine that the rich leave the country with their productive resources. In our model, the rich only shift their tradable income abroad and keep the nontradable income in home country. This is a realistic case given that governments do not want to impose taxes on nontradables after the crises to avoid too many job losses. Even in some cases, governments bailout the NT sectors like construction not to increase the unemployment.

A possible extension of the model is to consider the financial frictions. The rich now benefit from appreciation of currency and delay of debt repayment due to relaxation of financial constraints in the first period. It is widely accepted that financial frictions play an enormous role on the evolution of business cycles in developing countries [Aysan (2006)]. Financial frictions can be incorporated into the model such that it rationalizes the poor-rich coalition better. This modified model still assumes that the poor receive their income from nontradables and thus prefer to inflate the prices of nontradables. On the other hand, instead of assuming that the rich leave the country in the second period, the model with financial frictions allow the rich to borrow in international financial markets which is explicitly or implicitly guaranteed by the government. To this end, we assume that only the rich have access to the international financial markets and international investors employ collateral constraints to screen the borrowers. A rise in the prices of

nontradables increases the collateral value of the rich in the first period such that the rich can borrow the following additional amount of debt in the first period:

$$\theta(P_N^O Y_N^R - Y_N^R) = B^R$$

Where $P_N^O \geq 1$ denotes the overvalued prices of nontradables. The actual price of nontradables is normalized to 1. θ is parameter indicating that the rich can borrow additional amount in international markets.

Since the rich are assumed to give their T and NT income as collateral, only way to increase the borrowing from international markets is to raise the prices of nontradables so that their collateral value increases too. In the second period, all the private and public debt of the country is repaid and no further borrowing takes place. Hence, the domestic currency converges to its steady state with devaluation. The collateral value of the rich given in the first period to borrow additional debt is lost with devaluation in the second period. Then, government comes in and pays the additional borrowing, B^R to the international investors. Hence, the rich benefit from this process as much as B^R and like to form a coalition with the poor to inflate the prices of nontradables and delay the debt repayment in the first period as long as the following holds: $\theta(P_N^O Y_N^R - Y_N^R) = B^R \geq t_2 Y_T^R$. LHS denotes the amount of additional loan received by the rich in the first period, which is later paid by the government. RHS denotes the total tax paid by the rich in the second period. Therefore in the existence of financial frictions like collateral constraint and bailout guarantees, the rich have an incentive to appreciate the currency and delay the debt repayments.

This modified model is more relevant for the poor countries with weak financial institutions. It is apparent that collateral constraints with moral hazard associated with

bailout guarantees are more prevalent in the poor countries. On the contrary, the rich countries are immune to these cycles given their well-developed financial markets and strong institutions.

9. Conclusion

This paper provides a model to explain some of the regularities of stabilization programs experienced by many developing countries in recent decades. The model draws attention on the role of income shares of different groups in various types of goods. These different goods are categorized as tradables and nontradables. In practice, individuals earn their income from various types of goods. Hence, since stabilization programs generate changes in the relative prices of the goods traded in the country, individuals are not affected symmetrically by the introduction of new stabilization programs. Our model suggests that these heterogeneous impacts of stabilization policies lead to formation of various coalitions over the evolution of stabilization programs. These coalitions produce unsustainable economic policies at the expense of other groups in the economy. In our model, we categorize these various groups with respect to their shares in total production of tradables and nontradables. Moreover, in the model, an increase in the relative prices of nontradables benefits the poor more than the rich and middle classes. In addition to the poor, the rich benefit from unsustainable macroeconomic polices by lending to the government and eventually escaping the cost of stabilization in the long run, because they control more mobile factors of production like capital as opposed to labor. Under majority voting, the poor and rich form a coalition and pass decisions rendering the unsustainable economic policies that benefit them at the expense of the middle class. This interplay of different groups helps the model produce a pattern of devaluations, delay of

debt repayment and costly domestic borrowing which is absent under homogeneous agents settings. The overvaluation of exchange rate is used as a mechanism to redistribute the income among different types of agents. This aspect of the model explains the high exchange rate volatility in poor and highly unequal economies.

Later, the model focuses on the role of income inequality for unsustainable policies like overvalued currency, further borrowing in addition to existing stock of debt and show that delay of stabilizations occurs more likely in poor and unequal economies, a feature that seems to be consistent with a number of empirical studies.

The results of the model are supported by some empirical studies. First, the poor and unequal societies accumulated large external debt in the past [see Berg and Sachs (1988)], The main political support for the continuation of stabilization programs comes mainly from coalition of workers, low-income individuals and the association of industrialist. Berg and Sachs (1988) also point out the following observation consistent with our model "the maintenance of realistic exchange rates and balanced budgets is probably more difficult, the greater the income inequality"

The model also provides a link between income inequality and growth. The model predicts that higher income inequality along with unequal income shares of the individuals in tradables and nontradables induces a political mechanism that creates a delay in necessary stabilizations. Therefore, income inequality first effects the formation of new political coalitions among different types of individuals and these new coalitions later can hinder the adoption of needed policy changes on a timely basis.

This political economy model contributes the literature by showing the importance of distributional consequences of stabilization programs and suggests that

often failed stabilization programs can be improved by giving more attention to the distributional aspects of alternative policies and corresponding reactions of different groups to these policies.

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