Policy inertia, self-defeating expectations and structural reforms

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Abstract

This paper tackles the relationship between structural reforms, policy inertia and agents' expectations. By means of a stylized small-open economy encompassing barriers to entry in the non-tradable sector and political constraints' associated with the risk of political instability in a context of heterogeneous agents (rentiers and non-rentiers), we show that alternative situations may materialize. One can have rational expectations equilibria where structural reforms are undertaken when expected (or not implemented when not expected), but also situations where agents' expectations cannot be fulfilled. Thus, we maintain that economic models should take the possibility of self-defeating expectations into account for policymakers to exercise informed judgement, in particular about structural reforms. Some recent episodes in the euro area are discussed in the light of our model.

1. INTRODUCTION

The expectation impact on structural reforms (and generally the delicate balance between private and public decisions, filtered through mutual trust/mistrust) is crucial in determining the outcome of any policy aimed at creating a more favorable environment for economic growth. Optimism (pessimism) about reforms' effectiveness and authorities' determination in implementing them may dictate their success (failure). However, in certain cases, optimistic (or pessimistic) expectations about these reforms turn out to be self-defeating. This apparent paradox has been evoked with regard to the origin of the European debt crisis. Indeed, after the adoption of the single currency, optimism regarding the ability of the peripheral countries to adapt their economic structure to the new situation was widespread. Rosy beliefs helped attracting foreign capital and reducing interest

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rates in the periphery, thereby fostering economic growth and diminishing the incentives for the national authorities to implement the much needed reforms (Fernández-Villaverde et al. 2013). The outcome was one of limited reforms, at odds with the initial optimistic beliefs, which made the periphery vulnerable when it experienced a sudden stop of capital inflows. In a nutshell, these initial optimistic beliefs turned out to be self-defeating: by acting upon them, private agents created the conditions for their falsification.

The lack of structural reforms and convergence in the euro area represents only one example of the non-trivial relationship between expectations about reforms and the political economy of reforming the *status quo*. By developing a realistic model of structural reforms and showing analytically the relevance of the intuition about self-defeating expectations traps, our work contributes to the literature on the political economy of reforms.[1] Moreover, it informs the literature on policy modelling as it shows that, to exercise informed judgement, policymakers need be supported by models taking self-defeating expectations into account.

The issues outlined above are addressed by our model in that it investigates the relationship between i) private agents' expectations about reforms, ii) policy inertia by the authorities,[2] and iii) political economy concerns in a context with heterogeneous agents. The model shows that alternative situations may materialize according to the circumstances: one can have rational expectations equilibria where structural reforms are undertaken when expected (or not

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[1] Bonatti and Fracasso (2015) model such an interaction by postulating a single-representative agent and the authorities' policy inertia. In contrast, the model presented here incorporates heterogeneous agents with conflicting interests, so as to make the context more realistic. Section 3.5 moreover contains a numerical example showing the possible emergence of alternative scenarios at the varying of two political economy parameters.

[2] A rich literature on the political economy of reforms shows that policy-making is characterized by a *status quo* bias and inertia (Saint-Paul 2000, Hoj et al. 2006, OECD 2010 for developed countries; Roland 2002 and Fidrmuc 2000 for economic transition; Rodrik 1996, and Jain et al. 2014 for developing countries). Policy inertia may stem from several reasons: from pressure groups to multiple policy objectives, from divisions within coalitions (Alesina and Drazen 1991) to costs of reform reversals, from problems in compensating domestic losers to reform complementarities (Acemoglu et al. 2008, Bassanini and Duval 2009, Acemoglu et al. 2012), from uncertainty about distributional effects to uncertainty regarding public's perception (Fernandez and Rodrik 1991, Laban and Sturzenegger 1994, Drazen 1996, Cason and Mui 2005, Rubinchik and Wang 2008, Valderrama 2009, Bourguignon 2011).

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implemented when not expected), or alternatively a situation where agents' expectations cannot be fulfilled. These situations may arise for reasons that have to do neither with *ad hoc* agents' cognitive biases and meta-preferences (about which we remain agnostic)[3], nor with learning failures and irrationalities, nor with changes in ideologies and ideas (Rodrik 2014). The situations we refer to may occur because of the intertwined relationship between the authorities' objectives and inertia, agents' expectations, and the political constraints' associated with the risk of political instability in a context of heterogeneous agents.[4]

Realizing that such situations may occur is very important for modern policymaking: the euro area crisis provides an example of the costs of failing to do so. At the time of the construction of the monetary union, the scenarios envisaged by authorities and scholars shared a common feature, that is the validity of the "there-is-no-alternative" hypothesis, whereby a rational expectations equilibrium with expected and enacted reforms materializes. This only seemingly innocuous assumption rules out various political economy complications and is responsible for the neglect of the risks associated with the materialization of a self-defeating expectations situation.

Clearly, the case of self-defeating expectations neither regards one specific realm of policymaking, nor it affects exclusively the structural reforms ensuring convergence in the euro area. Accordingly, we elaborate a general and flexible model encompassing those elements necessary to create such non-trivial scenarios in policymaking. Although the model is kept as

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[3] On cognitive biases, expressive behaviours and policy, see Caplan (2002, 2007), Besley (2006) and Jennings (2011). We do not introduce concepts such as 'rational ignorance' (Downs 1957), preference falsification (which might lead to a *status quo* bias and collective conservatism, as in Kuran 1987), and individual misconceptions (Romer 2003).

[4] Our approach is only seemingly close to that in Chang (2001) who analyses the impact of expectations on investment when the government has a commitment problem in setting tax rates. The mechanism in Chang (2001) revolves around a government's time inconsistency problem and the model leads to two possible rational expectations equilibria: either delayed reforms or immediate reforms. In our model, agents choose investment levels before the government announces reforms (or not) and, under certain parameters, agents' expectations cannot be validated. Moreover, our model introduces heterogeneous agents whose relative well-being affects government's decisions, whereas Chang assumes homogenous agents. Finally, Chang introduces *de facto* two policy decisions, one about the timing of the reforms and one regarding the temporal profile of the tax rates to financing them. In our model, instead, the authorities decide only about the reform, so that agents do not implicitly trade-off the effects of the reform and of the tax rates. We also ignore strategic interactions between governments and private agents in Haaparanta and Pirttila (2007).

general as possible for this reason, we do follow two specific modelling strategies that deserve some discussion. The first choice regards the inefficiency that represents the object of the structural reforms. To create room for welfare-enhancing structural reforms, we assume the presence of entry barriers in the non-tradable sector, following the several studies providing evidence on their negative impact on the economy.[5] The presence of policy barriers granting monopoly power to firms is a well-established example to discuss structural reforms (Forni et al. 2010 and Eggertsson et al. 2014). Similar arguments and model extensions, however, could be developed to encompass other policy-related market imperfections that make the allocation of resources suboptimal.[6]

The second modelling choice we make has to do with the political economy of reforms and the *status quo* bias, as we need to keep the model tractable but suitable to capture societal cleavages and realistic policy trade-offs. We introduce a distributive conflict among heterogeneous agents: those earning rents because of the existence of entry barriers (the "rentiers") and those who do not earn rents (the "non-rentiers"). We then posit that the authorities consider the redistributive implications of a liberalization of the non-tradable sector and trade-off the adverse impact of reforms on the rentiers against the possibility that, without reforms, the well-being of the non-rentiers may fall below a threshold at which a policy response is inevitable to avoid social unrest and political turmoil. If it were not for the possibility that the non-rentiers' well-being falls below the critical value associated with unrest, the authorities would favor the maintenance of the regulatory regime (i.e., the *status quo*) in line with typical collective action problems affecting the non-rentiers and with possible rent-seeking pressures on the authorities by the rentiers (Olson 1971, Drazen 2000, Grossman and Helpman 2001). This representation is in line with the literature showing that policymakers do not maximize simplistic social welfare functions and that economic

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[5] See Djankov et al. (2002), Alesina et al. (2005), Klapper et al. (2006), Castanheira et al. (2006), Barseghyan (2008), Djankov (2009), Schivardi and Viviano (2011). Chari (2011), Corugedo and Perez Ruis (2014), Borchert et al. (2014)
[6] For instance, measures limiting the adoption of new technologies (Krueger 1974, Krusell and Rios-Rull 1996).

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reforms occur most likely under stressful circumstances (Drazen and Grilli 1993, Rodrik 1996, Lora and Olivera 2004, Alesina et al.2006, OECD 2010, Agnello et al. 2015) even when the society at large would benefit from their introduction. Often, policymakers are willing and able to implement reforms entailing a redistribution of resources that endangers certain interests only when failing to reform would affect the remaining population so negatively that social and political stability would be at stake. This is particularly the case for structural reforms that imply regime changes (e.g. a liberalization) rather than marginal adjustments to continuous policy variables.

The remainder of the paper proceeds as follows. The building blocks of the model are presented in section 2. The conditions under which one can have a rational expectations equilibrium and those under which one cannot are in section 3; a numerical example showing that alternative equilibria may emerge under different political economy parameters clarifies the importance that policymakers are informed by economic models encompassing possible self-defeating expectations traps. Section 4 discusses some recent episodes in the euro area in the light of our model. Section 5 concludes. All mathematical derivations and two extensions of the model are available online.

2. THE MODEL

We model a small-open economy with a nominal exchange rate irreversibly fixed, for simplicity, to one. Two market goods are produced in this economy: an internationally tradable good and an internationally non-tradable good. Firms are specialized in the production of either tradable or non-tradable goods. The tradable good is used as capital in the production of both goods and as consumption good, while the non-tradable good can only be consumed.[7] The international price of the tradable good is exogenously given and firms can freely enter this market, while firms' entry into the non-tradable sector is regulated: a license issued by the authorities is needed to operate.

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[7] The extreme assumption that investment consists only of tradables is adopted to simplify the set-up and to create a clear channel for tradable-induced learning, as suggested by Rodrik (2008).

Licenses are in possession of a portion of the population, who pays a fixed fee for each license and can cede its use at market price to firms willing to operate in the non-tradable sector. Since the number of licenses is lower than the number of firms willing to enter the non-tradable sector by paying a price equal to the fee, those holding a license can earn some rent (amounting to the difference between the price at which they cede the use of the license and the fee paid to the government). Accordingly, those holding a license for operating in the non-tradable sector are identified as "rentiers" in the model.

This regulatory regime is inherited from the past, and the government is willing to challenge the *status quo* by eliminating the rationing of licenses only under two extreme circumstances: either if all households get better off or if, without reform, the well-being of those without licenses would fall below the minimum level which is deemed acceptable in the society. This stylized representation of the government's incentives to reform the licensing system captures the main features of the *status quo* bias discussed in the Introduction and is in line with the widespread awareness that actual policy-making departs from the conventional assumption that the authorities maximize a social welfare function by means of marginal interventions on continuous policy variables (Drazen 2000, and Persson and Tabellini 2000).

The economy is populated by households that supply labor, buy consumer goods, accumulate productive assets (physical capital) to be rent to domestic firms, borrow or lend funds at the exogenously given world interest rate. A fraction of the households possess the licenses issued by the authorities for operating in the non-tradable sector. Wages are determined competitively but there is a reservation wage (given by the value of non-market activities) below which market wages cannot fall. Rental rates of capital are determined competitively. Also the prices at which households can cede the use of their licenses to firms that intend to operate in the non-tradable sector are determined competitively.

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Time is discrete and there are two periods: the present (time 0) and the future (time 1). In period 0, the government restricts the issuance of licenses to operate in the non-tradeable sector ("rationing"), while in period 1 the government chooses whether to maintain this regulatory regime or reform it by granting licenses to everyone willing to pay a fixed fee ("liberalization" of the non-tradable sector). Finally, there is no source of random disturbances. Hence, if expectations are rational, agents have perfect foresight.

2.1 Firms producing the (internationally) tradable good

In each period t (t=0,1), there is a continuum (whose measure is normalized to be one) of identical firms producing the tradable good Y_{Tt} according to the following technology:

$$Y_{Tt} = A_{Tt} K_{Tt}^{1-\alpha} L_{Tt}^{\alpha}, 0 < \alpha < 1, \tag{1}$$

where K_{Tt}, L_{Tt}, and A_{Tt} are, respectively, the capital stock, the labor input and the state of technology (total factor productivity) of the representative firm producing Y_{Tt} (the subscript "T" denotes a variable related to the tradable sector). Total factor productivity is a positive function of the capital installed in the tradable sector: $A_{Tt} = K_{Tt}^{\alpha}$. Consistently with this formal set-up, one can interpret technological progress as labor augmenting. This assumption combines the idea that learning-by-doing works in the tradable sector through each firm's capital investment and the idea that knowledge and productivity gains spill over instantly across all firms of this sector (see Barro and Sala-i-Martin, 1995). Therefore, in accordance with Frankel (1962), it is supposed that although A_{Tt} is endogenous to the economy, each firm takes it as given, since a single firm's decisions have only a negligible impact on the aggregate stock of capital of the tradable sector.

The profits of the representative firm producing tradables, π_{Tt}, are given by

$$\pi_{Tt} = Y_{Tt} - W_t L_{Tt} - R_t K_{Tt}, \quad t=0,1, \tag{2}$$

where W_t is the wage and R_t is the capital rental rate in period t. Notice that the price of the tradable good—the numéraire of the system—is exogenously given and normalized to one.

2.2 Firms producing the (internationally) non-tradable good

In each period t (t=0,1), there is a continuum of measure N_t of identical firms producing the non-tradable and non-storable good Y_{Nt} (where the subscript "N" denotes a variable related to the non-tradable sector). Each firm produces Y_{Nt} with the following technology:

$$Y_{Nt} = K_{Nt}^{\gamma} L_{Nt}^{\beta},\ 0 < \gamma < 1, 0 < \beta < 1, \gamma + \beta < 1, \tag{3}$$

where K_{Nt} and L_{Nt} are, respectively, the capital stock and the labor input employed to produce Y_{Nt}. We assume that the non-tradable sector roughly coincides with the technologically stagnant sector of the economy and thus rule out the possibility that also in this sector productivity improvements can take place as a result of the positive externalities generated by each single firm's activity.

The net profit (cash flow) π_{Nt} of the representative firm producing non-tradables is given by:

$$\pi_{Nt} = P_{Nt} Y_{Nt} - W_t L_{Nt} - R_t K_{Nt} - Q_t,\ t=0,1, \tag{4}$$

where P_{Nt} and Q_t are, respectively, the price of the non-tradable good and the price for the use of the license required to operate in the non-tradable sector at time t.

2.3 Households

There is a continuum (normalized to be one) of households who live for two periods. This population consists of two groups: a fraction λ ($0 < \lambda \leq 1$) of the households is endowed with the licenses for operating in the non-tradable sector (the "rentiers"), while the remaining fraction $1-\lambda$ is not (the "non-rentiers"). For simplicity and without loss of generality, it is assumed that the two groups of households differ solely with respect to the possession of these licenses.

In t (t=0,1), each household i produces the services C_t^i that it consumes by combining the tradable and the non-tradable goods according to

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$$C_t^i = \min(\eta C_{Nt}^i, C_{Tt}^i), \ \eta > 0, \ i = s, n, \tag{5}$$

where the superscripts "s" and "n" refer, respectively, to households endowed with a license and households without a license; C_{Nt}^i and C_{Tt}^i are, respectively, the amount of non-tradable good and the amount of tradable good used by a household i to produce consumer services in t.

In t (t=0,1), each household determines its labor supply L_t according to the rule:

$$L_t = \begin{cases} H \ \text{if} \ W_t \geq \underline{W} \\ 0 \ \text{otherwise,} \end{cases} \tag{6}$$

where H is a household's total time endowment in every period and $\underline{w}$ stays for the value of non-market activities (and acts as a reservation wage).

The lifetime utility of household i is given by

$$U^i = u_0^i + \theta u_1^i, \ 0 < \theta < 1, \ i=s,n, \tag{7}$$

where $u_t^i = \dfrac{(C_t^i)^{1-\xi}}{1-\xi}, 0 < \xi < 1$ (t=0,1), is the household's period utility function, θ is a time-preference parameter and ξ is the coefficient of relative risk aversion.

The individual period budget constraints of the two types of households are, respectively:

$$K_{t+1}^s + D_t^s(1+r) + P_{Nt}C_{Nt}^s + C_{Tt}^s \leq R_t K_t^s + D_{t+1}^s + N_t\pi_{Nt} + \pi_{Tt} + T_t + (N_t L_{Nt} + L_{Tt})W_t + N_t(Q_t\text{-}F),$$

$$K_0^s = \overline{K} \ \text{and} \ D_0^s = 0 \ \text{given}, D_2^s \leq 0, \ t=0,1, \tag{8a}$$

and

$$K_{t+1}^n + D_t^n(1+r) + P_{Nt}C_{Nt}^n + C_{Tt}^n \leq R_t K_t^n + D_{t+1}^n + N_t\pi_{Nt} + \pi_{Tt} + T_t + (N_t L_{Nt} + L_{Tt})W_t,$$

$$K_0^n = \overline{K} \ \text{and} \ D_0^n = 0 \ \text{given}, \ D_2^n \leq 0, \ t=0,1, \tag{8b}$$

where K_t^i are the productive assets held by household i in t, D_t^i are the net financial liabilities accumulated during period t-1 by the household i and carried over into period t with interest r (the exogenously given world interest rate), F is the fixed fee paid to the authorities by household s for

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each license it holds in t, and T_t are the net transfers that each household receives by the authorities in t. Notice that in each period household s can sell the right to use the licenses for operating in the non-tradable sector to the firms at a market price of Q_t per unit, while each household is entitled to receive the net profits earned by the firms as dividend payments (it is assumed that each household owns an equal share of all existing firms). Moreover, in (8a) and (8b) it is assumed for simplicity that capital fully depreciates every period, and that households enter period 0 with zero net financial liabilities (in that period they can become net creditors or net debtors).

2.4 Authorities

The authorities establish F, that is the fee that must be paid in each period for holding a license to operate in the non-tradable sector. Their period budget constraint is:

$$T_t = FN_t , \quad t=0,1. \tag{9}$$

In period 0, the licenses for operating in the non-tradable sector are restricted to $N_0 = \overline{N}$. In period 1, the authorities may either preserve the arrangement, so that the rentiers keep $N_1 = \overline{N}$ licenses paying a fixed fee F per unit, or lift the restriction and grant a license to anyone paying F.

After the lift of the restriction, the non-rentiers would be unambiguously better off. While the rentiers would lose the rent enjoyed as holders of the licenses, they would benefit from the elimination of the inefficiency created by the barrier to entry in the non-tradable sector. Two conditions may thus materialize. If the efficiency-related gains dominate over the license-related losses, so that the rentiers have a net gain from the removal of the restriction, the reform of the regulatory regime is Pareto improving and the authorities do implement it. Intuitively, this situation is likely to occur when the licenses are evenly distributed among a large fraction of households (i.e., λ close to 1), so that the rent lost by any license-holder because of the reform is very small. On the contrary, if lifting the restriction determines a net loss to the rentiers, the authorities have a

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preference to preserve the *status quo* and keep the regulatory regime favoring the rentiers. Although policy inertia is not explicitly modelled here (see the Introduction for a discussion), it can be explained with reference to collective action problems faced by the non-rentiers to exert pressure for the removal of the restriction and to rent-seeking activities undertaken by the rentiers.

As anticipated, however, structural reforms are not necessarily aborted whenever the rentiers face a net loss from the liberalization. The authorities would still implement a change of regime if and only if the well-being of the non-rentiers was to fall below the threshold at which a policy response is inevitable for avoiding social unrest and political turmoil.

To formally summarize the discussion above, at the beginning of period 1 the government decides to permit to any firm paying F the entry into the non-tradable sector either if

$$u_1^s\Big|_{N_1>\overline{N}} \geq u_1^s\Big|_{N_1=\overline{N}} \,, \tag{10a}$$

or if

$$u_1^s\Big|_{N_1>\overline{N}} < u_1^s\Big|_{N_1=\overline{N}} \text{ but } u_1^n\Big|_{N_1=\overline{N}} < \underline{u} \,, \tag{10b}$$

where $u_1^i\Big|_{N_1=\overline{N}}$ and $u_1^i\Big|_{N_1>\overline{N}}$ are, respectively, the utility level that household i (i=s,n) can get in period 1 if only $\overline{N}$ firms are permitted to operate in the non-tradable sector and the utility level that it can get in period 1 if this restriction is lifted, and $\underline{u}$ is the minimum utility level below which a policy change is inevitable. Thus, in period 0 it is rational for a household to believe that that in period 1 the authorities will implement a reform of the regulatory regime if either (10a) or (10b) holds, while it is rational to believe that they will not if neither of them holds.

3. RATIONAL EXPECTATIONS EQUILIBRIUM AND LACK THEREOF

The interaction between the two types of households and the government can be depicted as a simple game whose tree is represented in Figure 1. At time 0, the households may or may not expect that at time 1 the authorities reform the regulatory regime restricting firms' entry and they

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invest more when the reform is expected. Once expectations and investment choices are made, the authorities choose what to do with the license system, subject to the constraints illustrated above. We consider the various possibilities in the following sub-sections.

FIGURE 1 <u>Tree of the game between households and government</u>
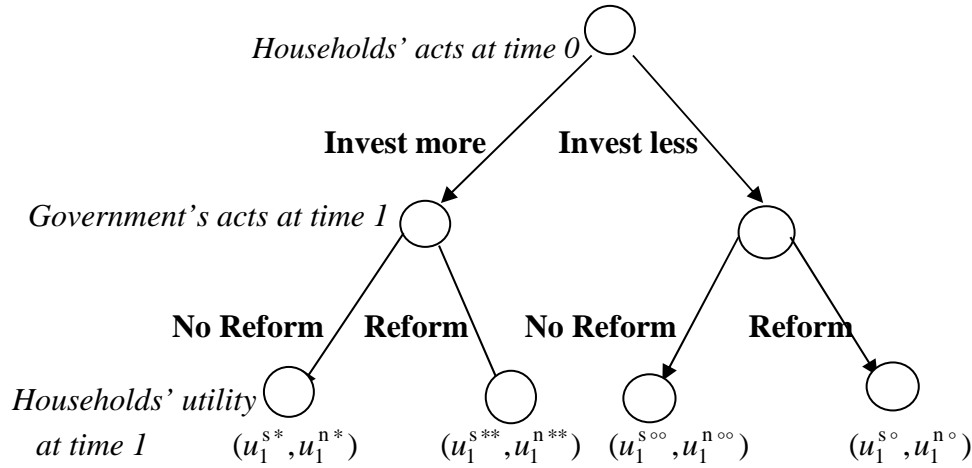
3.1 No reform is expected at time 0.

If at time 0 the households expect that the government will restrict the issuance of licenses required to operate in the non-tradable sector also in period 1 (so that $N_1^* = N_0^* = \overline{N}$, where "*" denotes the value of a variable when the households act on the belief that no reform will be implemented), one can use (A1)-(A15) and (A16a)-(A17a) (see Appendix online) to solve for what the households consume, work, invest and borrow in the present (i.e., for C_{T0}^{i*}, C_{N0}^{i*}, L_0^*, K_1^{i*}, D_1^{i*}) and for what they plan to consume and to work in the future (i.e., for C_{T1}^{i*}, C_{N1}^{i*}, L_1^*), i=s,n.. Together, one can solve for the associated Q_0^*, W_0^*, R_0^*, P_{N0}^*, K_{T0}^*, K_{N0}^*, L_{T0}^*, L_{N0}^* Y_{T0}^*, Y_{N0}^*, Q_1^*, W_1^*, R_1^*, P_{N1}^*, K_{T1}^*, K_{N1}^*, L_{T1}^*, L_{N1}^* Y_{T1}^*, Y_{N1}^*.

Households' expectations may be validated (the authorities keep the regulatory regime unchanged) or may not be validated (the authorities reform the regulatory regime). Suppose that when the future arrives the authorities keep the regulatory regime unchanged. In this case,

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households' expectations are fulfilled and the agents actualize at time 1 the optimal plan made at time 0, thus consuming C_{T1}^{i*} and C_{N1}^{i*} units of tradable and non-tradable goods, and supplying L_1^* units of labor. Their associated utility is then u_1^{i*}. All the other variables take at time 1 the values predicted at time 0 (Q_1^*, W_1^*, R_1^*, P_{N1}^*, K_{T1}^*, K_{N1}^*, L_{T1}^*, L_{N1}^* Y_{T1}^*, Y_{N1}^*).

In contrast, suppose that the authorities liberalize firms' entry into the non-tradables sector in time 1. In this case, households' expectations are not fulfilled and the agents at time 1 revise the optimal plan made at time 0 on the basis of their (wrong) expectations. One can obtain the values C_{T1}^{i**}, C_{N1}^{i**}, L_1^{**}, u_1^{i**}, Q_1^{**}, N_1^{**}, W_1^{**}, R_1^{**}, P_{N1}^{**}, K_{T1}^{**}, K_{N1}^{**}, L_{T1}^{**}, L_{N1}^{**} Y_{T1}^{**}, Y_{N1}^{**} which the endogenous variables take in t=1 when the households' expectations of no reform are not validated and agents revise their plans, by using (A1)-(A11), (A16b)-(A17b) (see online Appendix) and the budget constraints (8a)-(8b). In particular, since any firm willing to pay F can enter the non-tradable sector in period 1, the budget constraint satisfied by the rentiers' population and by the non-rentiers' population in that period are given, respectively, by

$$\lambda(R_1 K_1^s + K_{T1} L_{T1}^\alpha + P_{N1} N_1 K_{N1}^\gamma L_{N1}^\beta - R_1 K_{T1} - N_1 R_1 K_{N1}) =$$
$$= \lambda[C_{T1}^s + P_{N1} C_{N1}^s + (1+r)D_1^s], \quad K_1^s = K_1^{s*} \text{ and } D_1^s = D_1^{s*} \text{ given} \quad (11a)$$

and by

$$(1-\lambda)(R_1 K_1^n + K_{T1} L_{T1}^\alpha + P_{N1} N_1 K_{N1}^\gamma L_{N1}^\beta - R_1 K_{T1} - N_1 R_1 K_{N1}) =$$
$$= (1-\lambda)[C_{T1}^n + P_{N1} C_{N1}^n + (1+r)D_1^n], \quad K_1^n = K_1^{n*} \text{ and } D_1^n = D_1^{n*} \text{ given.} \quad (11b)$$

By aggregating (11a) and (11b), one obtains the resource constraint satisfied in period 1:

$$K_{T1} L_{T1}^\alpha = \lambda[C_{T1}^s + (1+r)D_1^{s*}] + (1-\lambda)[C_{T1}^n + (1+r)D_1^{n*}]. \quad (12)$$

Typically, i) no matter what policy the authorities implement in period 1, the rentiers' well-being is higher than that of the non-rentiers ($u_t^{s*} > u_t^{n*}$, $u_1^{s**} > u_1^{n**}$, t=0,1), and ii) the non-rentiers' well-being in period 1 is unambiguously higher if the authorities liberalize firms' entry ($u_1^{n**} > u_1^{n*}$).

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3.2 Reform is expected

If at time 0 the households expect that in period 1 the government will stop restricting the issuance of licenses (thus believing that $N_1^\circ > N_0^\circ = \overline{N}$, where "$\circ$" denotes the value of a variable when the households act on the belief that the reform will be implemented) one can use (A1)-(A15) and (A16b)-(A17b) (see online) to solve for what the households consume, work, invest and borrow at 0 (i.e., for $C_{T0}^{i\circ}$, $C_{N0}^{i\circ}$, L_0°, $K_1^{i\circ}$, $D_1^{i\circ}$) and for what they plan to consume and to work in the future (i.e., for $C_{T1}^{i\circ}$, $C_{N1}^{i\circ}$, L_1°), i=s,n. Together, one can solve for the associated Q_0°, W_0°, R_0°, P_{N0}°, $K_{T0}^\circ, K_{N0}^\circ$, $L_{T0}^\circ, L_{N0}^\circ$ Y_{T0}°, Y_{N0}°, N_1°, Q_1°, W_1°, R_1°, P_{N1}°, $K_{T1}^\circ, K_{N1}^\circ$, $L_{T1}^\circ, L_{N1}^\circ$ Y_{T1}°, Y_{N1}°.

Households' expectations may be validated (the regulatory regime is reformed) or not (the regulatory regime is kept unchanged). Suppose that when the future arrives the government removes the restriction to entry the non-tradable sector. In this case, households' expectations are fulfilled and the agents actualize at time 1 the optimal plan made in the previous period, thus consuming $C_{T1}^{i\circ}$ and $C_{N1}^{i\circ}$ units of the tradable and non-tradable goods, and supplying L_1° units of labor. Their associated utility is thus $u_1^{i\circ}$. All the other variables take at time 1 the values predicted at time 0 (N_1°, Q_1°, W_1°, R_1°, P_{N1}°, $K_{T1}^\circ, K_{N1}^\circ$, $L_{T1}^\circ, L_{N1}^\circ, Y_{T1}^\circ$, Y_{N1}°). In contrast, suppose that when the future arrives the authorities do not liberalize the entry into the non-tradable sector and the number of licenses remains restricted ($N_1^{\circ\circ} = \overline{N}$). In this case, households' expectations are not fulfilled and the agents revise in period 1 the optimal plan made at time 0 on the basis of their (wrong) expectations. One can obtain the values $C_{T1}^{i\circ\circ}$, $C_{N1}^{i\circ\circ}$, $L_1^{\circ\circ}$, $u_1^{i\circ\circ}$, $Q_1^{\circ\circ}$, $N_1^{\circ\circ}$, $W_1^{\circ\circ}$, $R_1^{\circ\circ}$, $P_{N1}^{\circ\circ}$, $K_{T1}^{\circ\circ}, K_{N1}^{\circ\circ}$, $L_{T1}^{\circ\circ}, L_{N1}^{\circ\circ}$ $Y_{T1}^{\circ\circ}$, $Y_{N1}^{\circ\circ}$ which the endogenous variables take in t=1 when the households' expectations of reform are not validated and agents revise their plans, by using (A1)-(A11) (where $K_1 = K_1^\circ$ is given), (A16a)-(A17a) (see online Appendix) and the budget constraints (8a)-(8b). In

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particular, since only $\overline{N}$ firms are allowed to operate in the non-tradable sector, the budget

constraints satisfied by the rentiers and by the non-rentiers in period 1 are given, respectively, by

$$\lambda[R_1 K_1^s + K_{T1} L_{T1}^\alpha + P_{N1} \overline{N} K_{N1}^\gamma L_{N1}^\beta - R_1 K_{T1} - \overline{N} R_1 K_{N1} - \overline{N}(Q_1 - F)] +$$
$$+ \overline{N}(Q_1 - F) = \lambda[C_{T1}^s + P_{N1} C_{N1}^s + (1+r)D_1^n], \quad K_1^s = K_1^{s\circ} \text{ and } D_1^s = D_1^{s\circ} \text{ given } (13a)$$

and by

$$(1-\lambda)[R_1 K_1^n + K_{T1} L_{T1}^\alpha + P_{N1} \overline{N} K_{N1}^\gamma L_{N1}^\beta - R_1 K_{T1} - \overline{N} R_1 K_{N1} - \overline{N}(Q_1 - F)] =$$
$$= (1-\lambda)[C_{T1}^n + P_{N1} C_{N1}^n + (1+r)D_1^n], \quad K_1^n = K_1^{n\circ} \text{ and } D_1^n = D_1^{n\circ} \text{ given. } (13b)$$

By aggregating (13a) and (13b), one obtains the resource constraint satisfied in period 1:

$$K_{T1} L_{T1}^\alpha = \lambda[C_{T1}^s + (1+r)D_1^{s\circ}] + (1-\lambda)[C_{T1}^n + (1+r)D_1^{n\circ}]. \tag{14}$$

Again, i) no matter which policy the authorities implement in period 1, the rentiers' well-being is

higher than that of the non-rentiers ($u_t^{s\circ} > u_t^{n\circ}$, $u_1^{s\circ\circ} > u_1^{n\circ\circ}$, t=0,1), and ii) the non-rentiers' well-

being in period 1 is unambiguously higher if the authorities liberalize firms' entry ($u_1^{n\circ} > u_1^{n\circ\circ}$).

3.3 Rational expectations equilibria

The subgame-perfect equilibria of the game outlined above corresponds to the rational

expectations equilibria of the economy modeled. Indeed, depending on the parameter values, one

may have i) a rational expectations equilibrium in which the households act in period 0 upon the

belief that the authorities will not reform the regulatory regime, and the authorities actually do not

reform it, thus determining utility levels (u_1^{s*}, u_1^{n*}) for the two types of households; or ii) a rational

expectations equilibrium in which the households act in period 0 upon the belief that the authorities

will reform the regulatory regime, and the authorities actually do it because it benefits all

households; or iii) a rational expectations equilibrium in which the households act in period 0 upon

the belief that the authorities will reform the regulatory regime, and the authorities actually do it

because failing to do so would make the utility of the non-rentiers fall below the threshold. In cases

ii) and iii), the utility levels for the two types of households are thus $(u_1^{s\,\circ}, u_1^{n\,\circ})$. We examine these

three possible cases of rational expectations equilibria in the following sub-sections.

3.3.1 "Reform, reform!!": $u_1^{s\,**} \geq u_1^{s\,*}$ *and* $u_1^{s\,\circ} \geq u_1^{s\,\circ\circ}$

In this case, even the rentiers are better off in period 1 if the authorities liberalize firms' entry

into the non-tradable sector. Hence, liberalizing the regulatory regime of the non-tradable sector is

a Pareto-superior policy and the authorities implement it in period 1: at time 0 private agents

anticipate this change of regime, thus materializing the rational expectations equilibrium entailing

$(u_1^{s\,\circ}, u_1^{n\,\circ})$. This outcome is very likely when the share of rentiers (λ) is close to 1, so that the rent

lost by any single license-holder because of the reform is very small, while s/he can benefit – as

any other household – from the elimination of the inefficiency caused by the restriction on the

possibility to enter the non-tradable sector (see the numerical example in section 3.5).

3.3.2 "Enact the expected reforms, but under stress": $u_1^{s\,**} < u_1^{s\,*}$ *and* $u_1^{s\,\circ} < u_1^{s\,\circ\circ}$ *, but* $u_1^{n\,\circ\circ} < \underline{u}$

The combination of agents' actions entailing $(u_1^{s\,\circ}, u_1^{n\,\circ})$ is the unique subgame perfect

equilibrium of the game (see the numerical example in in section 3.5): although reforming the

regulatory regime of the non-tradable sector is not a Pareto-superior policy as in the previous case,

it is rational to expect such a reform since the *status quo* would imply that the utility of the non-

rentiers falls below the threshold $\underline{u}$. Intuitively, this outcome is likely to occur when λ is relatively

low (each rentier has much to lose from the reform) but the threshold $\underline{u}$ is relatively high. With

regard to this, notice that $u_1^{n\,\circ\circ} < \underline{u}$ entails $u_1^{n\,*} < \underline{u}$. Indeed, economic agents tend to invest more in

productive assets at time 0 when they believe that reforms augmenting the efficiency of the

economy will be implemented in the subsequent period ($K_1^{i\circ} > K_1^{i*}, i = s, n$). And – other things

being equal – households' well-being in period 1 is higher the larger the investment in productive

assets undertaken in the past ($u_1^{i\circ} > u_1^{i**}$ and $u_1^{i\circ\circ} > u_1^{i*}$, $i = s, n$). The latter inequality, in particular, implies that – even if the regulatory reform is never implemented – households' well-being is higher if economic agents believed (erroneously) that the authorities would have implemented it.

3.3.3 "No room for reform" : $u_1^{s**} < u_1^{s*}$, $u_1^{s\circ} < u_1^{s\circ\circ}$ and $u_1^{n*} \geq \underline{u}$

In this case, in period 1, the rentiers are better off when the *status quo* is preserved, and the well-being of the non-rentiers is not low enough when the *status quo* is preserved to force the authorities to reform the regulatory regime of the non-tradable sector (notice again that $u_1^{n*} \geq \underline{u}$ entails $u_1^{n\circ\circ} > \underline{u}$). Hence, the combination of agents' actions entailing (u_1^{s*}, u_1^{n*}) is the unique subgame perfect equilibrium of the game (see the numerical example in section 3.5).

3.4 No rational expectations equilibria: $u_1^{s**} < u_1^{s*}$, $u_1^{s\circ} < u_1^{s\circ\circ}$ and $u_1^{n\circ\circ} \geq \underline{u} > u_1^{n*}$

In this case, there exists no rational expectations equilibrium. Indeed, acting on the basis of pessimistic (optimistic) expectations about a future regulatory reform, economic agents invest less (more) than otherwise, thereby reducing (increasing) the non-rentiers' future well-being below (above) that threshold which is critical for inducing the authorities to change their regulatory policy. In other words, pessimistic (optimistic) expectations about the possibility of a future reform motivate agents to act in a way that generates more (less) pressure on the authorities to implement the reform (see the numerical example in section 3.5).

In our model the condition $u_1^{n\circ\circ} > u_1^{n*}$ is necessary for the existence of a situation in which expectations create the conditions for their falsification. In real world situations, conditions of this kind are likely to occur: economic agents tend to invest more in productive assets when they expect that reforms augmenting the efficiency of the economy will be implemented, and households' well-being tend to be higher the larger the investment in productive assets made in the past. Hence,

optimism (pessimism) about future reforms may reduce (increase) the urgency for the government to implement them: in this case, expectations tend to be self-defeating.

3.5 Political economy parameters and alternative equilibria: a simple numerical exercise

A simple numerical exercise is developed in this section to show that, by varying the structural parameters of the model, one can obtain each of the four cases discussed before.[8] By showing that different circumstances (proxied by different values of the parameters) can be associated, *ceteris paribus*, with alternative equilibria, we provide support to our claim that adopting policy models that revolve around rational expectations equilibria (with or without reforms) is not an innocuous decision because the situations where self-defeating expectations are at work are implicitly, but erroneously, ruled out by construction. Policymakers need instead to be informed by economic models potentially incorporating all the equilibria discussed above.

As we are not matching any particular real-life situation in this exercise, we set and keep constant most parameters, whereas we let vary the two key parameters related to the political economy elements: the share of rentiers in the population (λ) and the threshold for the minimum non-rentiers' future well-being ($\underline{u}$). Notwithstanding the limited degrees of freedom available by varying only two parameters, different reasonable combinations turn out to be conducive, *ceteris paribus*, to any of the four cases mentioned above. Importantly, in accordance with our focus on the political economy of reforms, what equilibrium arises is due, *ceteris paribus*, to changes in the authorities' sensitivity with respect to the utility level of the non-rentiers and in their number, and not to peculiar specifications of the structure of the economy. We assume standard values for the parameters of the Cobb-Douglas production functions: $\alpha=0.7$; $\beta=0.6$; and $\gamma=0.2$. These values

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ensure a share of income accruing to labour around the realistic value of 65%. As discussed, the nontradable sector exhibits decreasing returns $\beta+\gamma<1$. The ratio between tradable and nontradable consumption (η) is set to 0.3, a value ensuring that nontradables realistically account for about three-quarters of total consumption. The time-preference parameter (θ) is set to 0.8 and, in line with the literature, the intertemporal elasticity of substitution assumes a value close but lower than 1 (i.e, $\xi=0.86$). The (pre-tax) real return on capital (i.e., r) is set equal to 8% in line with average historical values and with the literature. Finally, we set the values of F and $\overline{\text{N}}$, H, $\overline{\text{K}}$ and $\underline{\text{W}}$ (respectively, 4, 42, 45, 3.1) to ensure that the results are economically meaningful in each of the four scenarios.[9]

We start by assuming that the society is mainly composed by rentiers and set their share in the population (λ) equal to 90% (first line of Table 1, scenario 1). The rentiers derive positive net benefits from the liberalization as the rent lost by any license-holder after the regime switch is very small and the rentiers– as well as the non-rentiers – benefit from the elimination of the inefficiency associated with the entry restriction. Accordingly, $u_1^{s**} \geq u_1^{s*}$ and $u_1^{s\circ} \geq u_1^{s\circ\circ}$. The reform is thus a Pareto-superior policy and there exists a rational expectations equilibrium (REE, hereafter) associated with $(u_1^{s\circ}, u_1^{n\circ})$. This policy scenario is consistent with the "there-is-no-alternative" argument, whereby failing to implement expected reforms is not an option.

If the society is more evenly composed and the rentiers account for half of the population ($\lambda=0.5$), three alternative scenarios (2,3,4 in Table 1) may occur depending on the critical value of the utility function, i.e. $\underline{u}$. In all cases, the rentiers are better off with no regulatory change and this is reflected in the twofold inequalities $u_1^{s**} < u_1^{s*}$ and $u_1^{s\circ} < u_1^{s\circ\circ}$. When the reforms are expected, the non-rentiers' utility would fall below the critical value if the authorities did not implement them

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[9] The capital/labour and capital/output/ratio are lower than the usual values. These values, however, are compatible with a model in which the rate of depreciation of capital is, for simplicity, 100%.

(i.e., if $u_1^{n\,\circ\circ} < \underline{u}$). The combination of agents' actions entail that $(u_1^{s\,\circ}, u_1^{n\,\circ})$ is the subgame perfect equilibrium: reforming the regulatory regime is not a Pareto-superior policy but it is rational to expect the reform because the *status quo* would be associated with an utility of the non-rentiers below the critical threshold. On the contrary, if $u_1^{n\,\circ\circ} \geq \underline{u}$ and $u_1^{n\,*} \geq \underline{u}$ there is a REE associated with $(u_1^{s\,*}, u_1^{n\,*})$, whereby no reform is expected and none is enacted.

TABLE 1 Simulation for different values of λ. (REE: rational expectations equilibrium)

Λ	$\underline{u}$	$u_1^{s\,*}$	$u_1^{s\,**}$	$u_1^{s\,\circ}$	$u_1^{s\,\circ\circ}$	$u_1^{n\,*}$	$u_1^{n\,\circ\circ}$	Equilibrium	Scenario	
0.9	-	9.386	9.403	9.428	9.407	9.301	9.316	REE $(u_1^{s\,\circ}, u_1^{n\,\circ})$	1	Only solution
0.5	$\underline{u} > 9.358$	9.393	9.367	9.481	9.515	9.302	9.358	REE $(u_1^{s\,\circ}, u_1^{n\,\circ})$	2	Unlikely
0.5	$\underline{u} < 9.302$	9.393	9.367	9.481	9.515	9.302	9.358	REE $(u_1^{s\,*}, u_1^{n\,*})$	3	Most likely
0.5	$9.302 < \underline{u} < 9.358$	9.393	9.367	9.481	9.515	9.302	9.358	No REE	4	Unlikely
0.1	$\underline{u} > 9.394$	9.590	9.010	9.601	9.744	9.273	9.394	REE $(u_1^{s\,\circ}, u_1^{n\,\circ})$	2	Possible
0.1	$\underline{u} < 9.273$	9.590	9.010	9.601	9.744	9.273	9.394	REE $(u_1^{s\,*}, u_1^{n\,*})$	3	Possible
0.1	$9.273 < \underline{u} < 9.394$	9.590	9.010	9.601	9.744	9.273	9.394	No REE	4	Possible

The last possible scenario is associated with the condition $u_1^{n\,\circ\circ} \geq \underline{u} > u_1^{n\,*}$. *Ceteris paribus*, the value of $\underline{u}$ is key: when $u_1^{n\,*} < \underline{u}$ and $u_1^{n\,\circ\circ} < \underline{u}$, one can rationally expect a reform $(u_1^{s\,\circ}, u_1^{n\,\circ})$; when $\underline{u} < u_1^{n\,*}$ and, hence, $\underline{u} < u_1^{n\,\circ\circ}$, the REE is $(u_1^{s\,*}, u_1^{n\,*})$ and reforms should not be expected as they will not be implemented; when $u_1^{n\,\circ\circ} \geq \underline{u} > u_1^{n\,*}$, no REE emerges. When the rentiers account for half of the population (λ=0.5), the REE $(u_1^{s\,*}, u_1^{n\,*})$ occurs for any value of $\underline{u}$ smaller than 9.302, that

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implies any situations in which the level of consumption of the non-rentiers (with no reform) is more than 7% lower than the consumption of the rentiers (with no reform). The REE $(u_1^{s\circ}, u_1^{n\circ})$ occurs instead when $\underline{u}$ is larger than 9.358, that is when the authorities are concerned with minor consumption differences between the two groups. It follows that, even though the "no REE" scenario can in principle materialize, the values of $\underline{u}$ that would support it are highly unlikely (as they would require a very high sensitivity of the authorities to consumption inequality). Hence, when rentiers and non-rentiers are equally represented in the society (λ=0.5), the most reasonable scenario of the three is the REE with no reform (u_1^{s*}, u_1^{n*}).

Things are more complex when the non-rentiers represent the bulk of the population and the rentiers a minority (λ=10%). In this case, it is more likely that no REE exists for the reasons that follow. The conditions $u_1^{s**} < u_1^{s*}$ and $u_1^{s\circ} < u_1^{s\circ\circ}$ surely hold while the inequality $u_1^{n\circ\circ} \geq \underline{u} > u_1^{n*}$ depends on the value of $\underline{u}$. By referring to Table 1, one can conclude that the situation where "no REE" scenario emerges whenever the politically tolerable ratio between the consumption of the non-rentiers and that of the rentiers is between 0.78 and 0.86.[10] In these circumstances neglecting the possible existence of a self-defeating expectations trap is risky and policymakers should be informed through policy models that take all cases into account.

These simple examples show that minor differences in the values of two political economy parameters may entail, *ceteris paribus*, several alternative situations. From this it follows that developing economic models that allow for all possible situations is important for the authorities deciding upon structural reforms. It should be stressed that allowing for self-defeating expectations traps does not make that these latter necessarily relevant under all circumstances. The first exercise

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[10] When the politically tolerable difference in consumption across the two groups is below 13%, there is a REE with reform, whereas when the politically tolerable difference is larger 23% there is a REE with no reform.

suggests that, under certain conditions, even a simpler model encompassing only the "there-is-no-alternative" setting (i.e., REE with reform) would suffice because reforms are Pareto-superior. On the contrary, the second exercise (when rentiers and non-rentiers are equally) suggests that a REE with no reform is the most reasonable scenario, around which a simpler model could be built. In the final exercise, instead, all scenarios turn out to be possible and therefore need be considered jointly. In sum, to exercise professional judgment, the authorities need be supported by economic models that incorporate also situations with self-defeating expectations; simpler models could be considered only when the actual circumstances make their realizations highly unlikely.

4. SELF-DEFEATING EXPECTATIONS IN THE EURO AREA

The relationship between the authorities' policy inertia, heterogeneous agents' expectations, and structural reforms modeled in this work sheds light on those extreme situations in which, by acting on the basis of certain expectations regarding reforms, agents create the conditions for their falsification and no rational expectations equilibrium exists. This kind of indeterminacy is different from that emerging in the presence of multiple rational expectations equilibria and cannot be resolved by singling out some device whereby expectations are coordinated, thereby selecting a unique equilibrium. In contrast, this kind of indeterminacy has a more fundamental character. One may state that in these extreme situations a self-defeating expectations trap is at work. This has implications on policymaking both in terms of *ex ante* decisions and of *ex post* evaluations.

As argued in the Introduction, our set up is inspired by and may help to account for the events that led to the European debt crisis. Notably, we focus on agents' expectations about reforms, whose role has not received much attention in the literature on the costs and benefits of a monetary union among highly heterogeneous countries. Indeed, only the early debate on the EMU addressed the effects of the Union on the national incentives to implement reforms (Bean 1998a, 1998b, Bentolila and Saint-Paul 2000), and most commentators maintained that the recognition that

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participating in a monetary union requires real convergence would have led the authorities to undertake the necessary reforms.[11] This situation, corresponding to the "there-is-no-alternative" argument, refers to a rational expectations equilibrium with reform where all alternative equilibria are ruled out. With the benefit of hindsight, it can be maintained that this equilibrium did not occur and this strengthens the case for developing policy models (as ours) explaining the lack of real convergence and reforms as a case of self-defeating (optimistic) expectations about reforms.

Along this line, one may claim that at the origin of the crisis there was the widespread belief that—thanks to the euro and the impossibility for the countries to recover competitiveness by depreciating their currencies—the periphery would have implemented structural reforms for boosting productivity and displayed German-like wage and price moderation. This optimistic belief made the nominal interest rates in the periphery converge rapidly to core's levels, facilitating access to external borrowing and bloating domestic demand in the non-tradable sectors. Periphery's GDP and employment performance appeared satisfactory, thus removing the incentives to reform and defeating the initial optimistic expectations of a regime switch. As a result, aggregate productivity growth slowed down, competitiveness of the tradable sector worsened, and the prospects of real convergence in the longer term were undermined. Although large current account imbalances emerged in the euro area and debt continued to pile up in the periphery, for some years financial markets ignored these problems. Only the change in market sentiment worldwide after the US sub-prime crisis and the revelation of the true figures of the Greek public deficit put an end to the "benign neglect" with which financial markets had looked at the periphery's weaknesses. While some scholars attributed to these movements in financial market sentiment the responsibility for

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[11] Agents' expectations played a role in the Walters' critique to the establishment of fixed exchange rates in the European Community. According to Sir Alan Walters, financial market expectations about the fate of the exchange rate regime could have been inconsistent with the expectations in the labor markets. Miller and Sutherland (1991) envisaged and modeled the case of a gradual convergence of initially inconsistent expectations.

multiple equilibria in the euro area, our interpretation stresses the role played by the political economy of economic reforms in determining the lack of real convergence. On the basis of our model one could argue that, had the determination of the periphery's governments to pursue structural adjustment not been trusted, no credit bubbles and macroeconomic imbalances would have emerged, reforms would have been implemented and no crisis would have occurred.

Interestingly, although the case of self-defeating optimistic expectations is consistent with this narrative about the European crisis, a careful interpretation of our model suggests that the situation may in fact have been more complicated. One may claim (in the awareness that counterfactual scenarios are highly speculative!) that pessimistic expectations about reforms could have also been self-defeating: pessimism about the peripheral countries' capacity to adapt to the euro could have prevented the boom in the non-tradable sectors that drove the apparently satisfactory—although unsustainable—performance of these countries in the years preceding the crisis, thus forcing their governments to implement structural reforms. [12] If also this alternative scenario is deemed as realistic, then it follows that the euro area was in a self-defeating expectations trap, that is an extreme situation where no rational expectations equilibrium could in fact occur.

Along the lines outlined above, one may think of the situation that has been created by the victory of populist parties in the Italian general elections of March 2018 as a sort of natural experiment. The new ruling coalition promised to undertake costly counter-reforms that are perceived by many experts as risky for the sustainability of the public debt and negative for long-term growth. [13] The new coalition made clear that the structural reforms enacted by previous

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[12] The acceleration of structural reforms in the periphery that followed the outbreak of the European debt crisis is consistent with the idea that market pressure is essential to overcome the resistance. See Anderson et al. (2014) for the estimation of the benefits of wide-ranging structural reforms in product and labor market regulations for the euro area's peripheral countries that had to undertake painful fiscal consolidation as a consequence of the European debt crisis.

[13] Most commentators emphasized the risks for the Italian public debt. Less attention was devoted to the implications on long-term growth of the electoral promises to undertake measures amounting to the dismantling of structural

governments are not compatible with the political economy constraints they face: this clarity regarding the authorities' preferences seems compatible with a rational expectations equilibrium where counter-reforms are expected and enacted. Our model suggests that the situation may in fact be more complex, although the latter remains a very plausible scenario.

Indeed, one could argue that the belief that counter-reforms will be implemented in Italy may set the conditions for its falsification. This would be the case if it will cause a rapid decrease in investment (due also to the increase in the risk premia on the Italian debt brought about by the financial markets' reaction to the announced counter-reforms) that will deter the Italian government from pursuing its agenda. Alternatively, expectations may turn out to be self-defeating if agents will not trust the resolve of the ruling coalition and will not expect the implementation of the promised counter-reforms, thus keeping on investing in the real economy: this might create enough fiscal space and confidence to conduce the authorities to enact the counter-reforms.

What situation shall prevail, as our model suggests, will depend on features that are closely associated with the political economy of reforms, in particular the distributional impact of the counter-reforms: the parameter space compatible with different outcomes depends on distributional effects and preferences, as well as on the general level of well-being. An additional element to consider is the speed and the intensity with which agents will respond to the Italian government's announcements of counter-reforms, related to the trustworthiness of these announcements. Short of divining future scenarios, this discussion shows that self-defeating expectations are potentially recurrent, thus relevant, in modern economic policy and policy modelling.

5. CLOSING REMARKS

To account for policy inertia and self-defeating expectations, we develop a realistic representation of policymaking that differs from traditionally simple economic modelling, whereby

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reforms in matter of pensions, welfare, labor and product markets. See Annicchiarico et al. (2013) and Gerali et al. (2018) for estimates of the effects of these structural reforms on the Italian economy.

the authorities maximize standard social loss functions by maneuvering continuous policy variables. Only when certain aspects of policymaking are taken into account a model can deliver predictions consistent with what observed in the literature and contribute to the understanding of structural reforms (and lack thereof). First, threshold effects are important, as the authorities undertake major policy changes only if failing to do so jeopardizes their position. Second, structural reforms imply full-fledge regime changes rather than marginal interventions. Finally, differentiated effects across heterogeneous agents and redistributive conflicts influence the likelihood that reforms are enacted even when the society as a whole would benefit from efficiency-enhancing reforms; hence, the authorities' objectives and constraints cannot necessarily be represented as a weighted average of groups' welfare gains and losses. Our model, despite simplistic and general, does take these considerations into account and therefore contributes to the literature on policy modelling.

When deciding upon whether to implement a policy change, the authorities assess the benefits and costs associated with maintaining the *status quo*, as well as the gains from the shift. As we show in this work, governments' decisions are not independent from people's expectations. Once optimistic expectations are held across agents, for instance, the authorities have incentives not to proceed with the reform unless failing to do so can trigger the reactions of those who are worse off without change. Taking this into account is a further contribution of this work to the literature.

Finally, this model address the relationship between agents' expectations and authorities' incentives to reform. In particular, it shows that, under certain circumstances, the beliefs upon which the agents base their actions can turn out to be *ex post* wrong, even though no unpredictable event has occurred. This is not due to their falling prey to some irrationality, cognitive bias or information problem. Rather, it might be the consequence of the impossibility to reach a rational expectations equilibrium with (or without) reforms. By illustrating analytically the importance of

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such self-defeating expectations traps, this work suggests that policymakers should be supported by economic models taking the possibility of self-defeating expectations into account, and use simpler models ruling them out only with the due care.

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ONLINE APPENDIX TO:

Policy inertia, self-defeating expectations and structural

reforms

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A1. Equilibrium conditions

Markets for labor and for the non-tradable good are purely domestic. Equilibrium in the labor market implies

$$W_t > \underline{W} \text{ , t=0,1} \tag{A1a}$$

and

$$N_t L_{Nt} + L_{Tt} = H, \text{ t=0,1,} \tag{A2a}$$

or, alternatively,[14]

$$W_t = \underline{W} \text{ , t=0,1} \tag{A1b}$$

and

$$N_t L_{Nt} + L_{Tt} < H, \text{ t=0,1.} \tag{A2b}$$

Equilibrium in the market for the non-tradable good requires:

$$\lambda C_{Nt}^s + (1 - \lambda) C_{Nt}^n = N_t Y_{Nt} = N_t K_{Nt}^\gamma L_{Nt}^\beta, \text{ t=0,1.} \tag{A3}$$

The market for the tradable good is internationally integrated. Equilibrium in this market requires:

$$Y_{Tt} = K_{Tt} L_{Tt}^\alpha = \lambda (C_{Tt}^s + K_{t+1}^s) + (1 - \lambda)(C_{Tt}^n + K_{t+1}^n) + TA_t, \text{ t=0,1,} \tag{A4}$$

where TA_t is the trade account (net exports) in period t.

Equilibrium in the market for productive assets entails

$$\lambda K_t^s + (1 - \lambda) K_t^n = N_t K_{Nt} + K_{Tt}, \text{ t=0,1.} \tag{A5}$$

---

[14] The corner solution entails $W_t = \underline{W}$ and $N_t L_{Nt} + L_{Tt} = H$, t=0,1.

The representative firms equalize the value of the marginal productivity of capital to the rental rate of capital and the value of the marginal productivity of labor to the wage:

$$(1-\alpha)L_{Tt}^{\alpha} = R_t = \gamma P_{Nt}K_{Nt}^{\gamma-1}L_{Nt}^{\beta}, \ t=0,1, \tag{A6}$$

$$\alpha K_{Tt}L_{Tt}^{\alpha-1} = W_t = \beta P_{Nt}K_{Nt}^{\gamma}L_{Nt}^{\beta-1}, \ t=0,1. \tag{A7}$$

By solving for the output that the representative firm operating in the non-tradable sector produces in equilibrium (see the Online Appendix A2), one can obtain from the market-clearing condition (A3) that

$$\lambda C_{Nt}^{s} + (1-\lambda)C_{Nt}^{n} = N_t Y_{Nt} = \frac{N_t}{W_t^{\beta}R_t^{\gamma}}\left[\frac{(\beta+\gamma)Q_t}{(1-\beta-\gamma)\Psi}\right]^{\beta+\gamma}, \ t=0,1, \tag{A8}$$

where $\Psi \equiv \left(\dfrac{\beta}{\gamma}\right)^{\frac{\gamma}{\beta+\gamma}} + \left(\dfrac{\gamma}{\beta}\right)^{\frac{\beta}{\beta+\gamma}}$.

The equilibrium price of the non-tradable good is given by (see the Online Appendix A2):

$$P_{Nt} = \frac{W_t^{\beta}R_t^{\gamma}Q_t^{1-\beta-\gamma}}{(1-\beta-\gamma)}\left[\frac{(1-\beta-\gamma)\Psi}{(\beta+\gamma)}\right]^{\beta+\gamma}, \ t=0,1. \tag{A9}$$

Solving the optimization problem of household i, one obtains that in equilibrium:

$$K_2^{i} = D_2^{i} = 0, \quad i=s,n, \tag{A10}$$

$$C_{Tt}^{i} = \eta C_{Nt}^{i}, \ i=s,n, \ t=0,1, \tag{A11}$$

$$\frac{(C_{T0}^{i})^{-\xi}}{(\eta+P_{N0})} = \frac{\theta R_1(C_{T1}^{i})^{-\xi}}{(\eta+P_{N1})}, \ i=s,n, \tag{A12}$$

$$\frac{(C_{T0}^{i})^{-\xi}}{(\eta+P_{N0})} = \frac{\theta(1+r)(C_{T1}^{i})^{-\xi}}{(\eta+P_{N1})}, \ i=s,n. \tag{A13}$$

Notice that (A12)-(A13) entails $R_1 = 1+r$ (this is a non-arbitrage condition that must be always satisfied since households can invest in productive assets or lend their savings at rate r in the world

market for loanable funds). Moreover, one can use (1), (2), (3), (4) and (A10) to write (8a) and (8b), respectively, as the intertemporal budget constraint satisfied by the rentiers:

$$\lambda\left(R_0\overline{K} + K_{T0}L_{T0}^{\alpha} + P_{N0}N_0K_{N0}^{\gamma}L_{N0}^{\beta} - R_0K_{T0} - R_0N_0K_{N0} - Q_0N_0 + T_0\right) +$$

$$+ \lambda\left(\frac{R_1K_1^s + K_{T1}L_{T1}^{\alpha} + P_{N1}N_1K_{N1}^{\gamma}L_{N1}^{\beta} - R_1K_{T1} - R_1N_1K_{N1} - Q_1N_1 + T_1}{1+r}\right) + \qquad\text{(A14a)}$$

$$+ N_0(Q_0 - F) + \frac{N_1(Q_1 - F)}{1+r} = \lambda\left(C_{T0}^s + P_{N0}C_{N0}^s + K_1^s + \frac{C_{T1}^s + P_{N1}C_{N1}^s}{1+r}\right)$$

and as the intertemporal budget constraint satisfied by the non-rentiers:

$$(1-\lambda)\left(R_0\overline{K} + K_{T0}L_{T0}^{\alpha} + P_{N0}N_0K_{N0}^{\gamma}L_{N0}^{\beta} - R_0K_{T0} - R_0N_0K_{N0} - Q_0N_0 + T_0\right) +$$

$$+ (1-\lambda)\left(\frac{R_1K_1^n + K_{T1}L_{T1}^{\alpha} + P_{N1}N_1K_{N1}^{\gamma}L_{N1}^{\beta} - R_1K_{T1} - R_1N_1K_{N1} - Q_1N_1 + T_1}{1+r}\right) = \qquad\text{(A14b)}$$

$$= (1-\lambda)\left(C_{T0}^n + P_{N0}C_{N0}^n + K_1^n + \frac{C_{T1}^n + P_{N1}C_{N1}^n}{1+r}\right).$$

By aggregating (A14a) and (A14b) – and by using (9), (A3) and (A5) – one can obtain the intertemporal resource constraint satisfied by the economy:

$$K_{T0}L_{T0}^{\alpha} + \frac{K_{T1}L_{T1}^{\alpha}}{1+r} = \lambda(C_{T0}^s + K_1^s) + (1-\lambda)(C_{T0}^n + K_1^n) + \frac{\lambda C_{T1}^s + (1-\lambda)C_{T1}^n}{1+r}. \qquad\text{(A15)}$$

If in period t the government restricts the issuance of licenses required to operate in the non-tradable sector, the price that firms are willing to pay for using a license increases up to the point where their profits go to zero. Hence, one has:

$$N_t = \overline{N}, \quad t=0,1, \qquad\text{(A16a)}$$

thus obtaining from (A8)

$$Q_t = \frac{(1-\beta-\gamma)\Psi}{(\beta+\gamma)}\left\{\frac{W_t^{\beta}R_t^{\gamma}[\lambda C_{Nt}^s + (1-\lambda)C_{Nt}^n]}{\overline{N}}\right\}^{\frac{1}{\beta+\gamma}} > F, \quad t=0,1. \qquad\text{(A17a)}$$

In contrast, if in period 1 the government grants licenses to everyone willing to pay a unit price F, the number of firms that intend to operate in the non-tradable sector increases up to the point where their profits go to zero. Hence, one has

$$Q_1 = F, \qquad\qquad (A16b)$$

thus obtaining from (A8)

$$N_1 = W_1^{\beta} R_1^{\gamma} [\lambda C_{N1}^s + (1-\lambda) C_{N1}^n] \left[\frac{(1-\beta-\gamma)\Psi}{(\beta+\gamma)F} \right]^{\beta+\gamma} > \overline{N}. \qquad (A17b)$$

Appendix A2. Derivation of the equilibrium output of the representative firm operating in the non-tradable sector and of the equilibrium price of its output

We find the cost-minimizing demand functions for L_{Nt} and K_{Nt} by solving

$$\min_{L_{Nt}, K_{Nt}} W_t L_{Nt} + R_t K_{Nt} + Q_t \text{ subject to } L_{Nt}^{\beta} K_{Nt}^{\gamma} \geq Y_{Nt}. \qquad (A18)$$

From the solution to (A18), one can derive the cost function of the representative firm producing the non-tradable good:

$$C(W_t, R_t, Q_t, Y_{Nt}) = \begin{cases} \Psi(Y_{Nt} W_t^{\beta} R_t^{\gamma})^{\frac{1}{\beta+\gamma}} + Q_t & \text{if } Y_{Nt} > 0 \\ 0 \text{ otherwise, } \Psi \equiv \left(\frac{\beta}{\gamma}\right)^{\frac{\gamma}{\beta+\gamma}} + \left(\frac{\gamma}{\beta}\right)^{\frac{\beta}{\beta+\gamma}}. \end{cases} \qquad (A19)$$

By solving

$$\max_{Y_{Nt}} P_{Nt} Y_{Nt} - C(W_t, R_t, Q_t, Y_{Nt}), \qquad (A20)$$

one can find the supply function of the representative firm producing the non-tradable good:

$$Y_{Nt} = \begin{cases} \left\{ \frac{P_{Nt}(\beta+\gamma)(W_t^{\beta} R_t^{\gamma})^{\frac{-1}{\beta+\gamma}}}{\Psi} \right\}^{\frac{\beta+\gamma}{1-\beta-\gamma}} & \text{if } P_{Nt} \geq \text{Min } AC(W_t, R_t, Q_t, Y_{Nt}) \\ 0 \text{ otherwise.} \end{cases} \qquad (A21)$$

Notice that $AC(W_t, R_t, Q_t, Y_{Nt})$ is the average cost function of the representative firm operating in the non-tradable sector:

$$AC(W_t, R_t, Q_t, Y_{Nt}) = \begin{cases} \Psi(Y_{Nt}^{1-\beta-\gamma} W_t^{\beta} R_t^{\gamma})^{\frac{1}{\beta+\gamma}} + \dfrac{Q_t}{Y_{Nt}} & \text{if } Y_{Nt} > 0 \\ 0 & \text{otherwise.} \end{cases} \tag{A22}$$

Knowing that in equilibrium the representative firm produces the quantity which minimizes its average cost, one can solve

$$\min_{Y_{Nt}} AC(W_t, R_t, Q_t, Y_{Nt}), \tag{A23}$$

thus obtaining the equilibrium output of the representative firm producing the non-tradable good:

$$Y_{Nt} = W_t^{-\beta} R_t^{-\gamma} \left[\frac{(\beta+\gamma)Q_t}{(1-\beta-\gamma)\Psi} \right]^{\beta+\gamma}. \tag{A24}$$

Moreover, knowing that in equilibrium the price of the non-tradable good equalizes the minimum of the average cost function, one can use (A24) to substitute for Y_{Nt} in (A22), thus obtaining (A9).

A3. Extensions

A3.1 Probability of a regulatory reform

One could argue that the basic model applies to the special case in which the households attach probability one, or alternatively probability zero, to the possibility that the *status quo* will prevail and a regulatory reform will not be implemented in the future. We can generalize our results considering the case in which the households attach probability q, with $0 \leq q \leq 1$, to the possibility that the restriction limiting firms' entry into the non-tradable sector will remain in period 1. In this case, at time 0 household i maximizes its expected lifetime utility $(U^i)^e = u_0^i + \theta \left[q u_1^i \big|_{N_1 = \overline{N}} + (1-q) u_1^i \big|_{N_1 > \overline{N}} \right]$, i=s,n, and the economy is still governed by (A1)-(A11) and (A14)-(A17), while (A12)-(A13) must be rewritten as

$$\frac{(C_{T0}^i)^{-\xi}}{(\eta + P_{N0})} = \theta \left[q \frac{R_1(C_{T1}^i)^{-\xi}}{(\eta + P_{N1})} \Big|_{N_1=\overline{N}} + (1-q) \frac{R_1(C_{T1}^i)^{-\xi}}{(\eta + P_{N1})} \Big|_{N_1>\overline{N}} \right], \quad i=s,n, \qquad (A25)$$

$$\frac{(C_{T0}^i)^{-\xi}}{(\eta + P_{N0})} = \theta(1+r) \left[q \frac{(C_{T1}^i)^{-\xi}}{(\eta + P_{N1})} \Big|_{N_1=\overline{N}} + (1-q) \frac{(C_{T1}^i)^{-\xi}}{(\eta + P_{N1})} \Big|_{N_1>\overline{N}} \right] \quad i=s,n. \qquad (A26)$$

By solving the model, one can check that the agents tend to invest more in productive assets if they attach a higher probability to the possibility that reforms augmenting the efficiency of the economy will be implemented: $\frac{\partial K_1^{i\#}}{\partial q} < 0$ and $K_1^{i\circ} \geq K_1^{i\#} \geq K_1^{i*}$, i=s,n, where "#" denotes the value of a variable when the households assign probability q to the absence of any liberalization in the non-tradable sector. Hence, one has $\frac{\partial u_1^{i\#}\big|_{N_1=\overline{N}}}{\partial q} < 0$ and $u_1^{i\circ\circ} \geq u_1^{i\#}\big|_{N_1=\overline{N}} \geq u_1^{i*}$, i=s,n: even if the liberalization will never be implemented, households' future well-being is higher if economic agents did attach a higher probability to the implementation of the reform.

If $u_1^{s**} < u_1^{s*}$, $u_1^{s\circ} < u_1^{s\circ\circ}$ and $u_1^{n\circ\circ} \geq \underline{u} > u_1^{n*}$ hold, $\frac{\partial u_1^{n\#}\big|_{N_1=\overline{N}}}{\partial q} < 0$ entails the existence of an unique value of q<1, say $\overline{q}$, such that $u_1^{n\#}\big|_{N_1=\overline{N}} = \underline{u}$ whenever the agents attach probability $\overline{q}$ to the absence of any liberalization. In this case, one has that for $q > \overline{q}$ (i.e., if the households are relatively pessimistic about the possibility that the authorities will liberalize firms' entry into the non-tradable sector), the authorities will implement the liberalization (since $u_1^{n\#}\big|_{N_1=\overline{N}} < \underline{u}$). On the contrary, if the households are relatively optimistic (i.e., if $q \leq \overline{q}$), the authorities will not undertake the reform. In other words, if $u_1^{s**} < u_1^{s*}$, $u_1^{s\circ} < u_1^{s\circ\circ}$ and $u_1^{n\circ\circ} \geq \underline{u} > u_1^{n*}$ hold, a self-defeating expectations trap emerges even if the households attach probability q to the possibility that in period 1 only $\overline{N}$ firms will be permitted to operate in the non-tradable sector.

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A3.2 Possibility of default

In the basic model, we implicitly ruled out the possibility that the households can default on their debt. Here, we relax this assumption by admitting that the households will honor their entire debt service if and only if this will not prevent them from reaching in period 1 the minimum acceptable level of consumption $\underline{C}$, where $\underline{C}$ is such that $\underline{u} = \dfrac{\underline{C}^{1-\xi}}{1-\xi}$.

By assuming for simplicity that this possibility of partial or total repudiation of the debt can make a difference only for the non-rentiers, we reformulate the latter's utility function in period 1 as

$$u_1^n = \begin{cases} \dfrac{(C_1^n)^{1-\xi}}{1-\xi} - \zeta Z_1^n & \text{if } C_1^n \geq \underline{C} \\[2mm] -\zeta Z_1^n & \text{otherwise, } \zeta \geq \underline{C}^{-\xi}, \end{cases} \tag{A27}$$

where $Z_1^n, 0 \leq Z_1^n \leq D_1^n(1+\hat{r})$, is the amount of the outstanding debt service repudiated by a non rentier, ζ is a parameter measuring the households' sensitivity to the reputational loss due to the repudiation of Z_1^n, and $\hat{r}$ (with $\hat{r} \geq r$) is the interest rate at which a non rentier can go into debt (it is assumed that lenders can perfectly discriminate between rentiers and non-rentiers). It derives from (A27) that in period 1 a non rentier sets

$$Z_1^n = \begin{cases} 0 \ \ \text{if } D_1^n(1+\hat{r}) \leq R_1 K_1^n + K_{T1} L_{T1}^{\alpha} + P_{N1} N_1 K_{N1}^{\gamma} L_{N1}^{\beta} - R_1 K_{T1} - N_1 R_1 K_{N1} - \\[2mm] \qquad - N_1(Q_1 - F) - \dfrac{P_{N1}\underline{C}}{\eta} - \underline{C} \\[3mm] \dfrac{P_{N1}\underline{C}}{\eta} + \underline{C} + D_1^n(1+\hat{r}) - R_1 K_1^n - K_{T1} L_{T1}^{\alpha} - P_{N1} N_1 K_{N1}^{\gamma} L_{N1}^{\beta} + R_1 K_{T1} + \\[2mm] \qquad + N_1 R_1 K_{N1} + N_1(Q_1 - F) \ \text{otherwise}, \end{cases} \tag{A28}$$

where it is assumed that

$R_1 K_1^n + K_{T1} L_{T1}^{\alpha} + P_{N1} N_1 K_{N1}^{\gamma} L_{N1}^{\beta} - R_1 K_{T1} - N_1 R_1 K_{N1} - N_1(Q_1 - F) - \dfrac{P_{N1}\underline{C}}{\eta} - \underline{C} \geq 0$ (the rentiers, by

repudiating entirely their outstanding debt service, can <u>at least</u> reach the minimum acceptable level

of consumption) and $\dfrac{\underline{C}^{1-\xi}}{1-\xi} - \zeta\left[\dfrac{P_{N1}\underline{C}}{\eta} + \underline{C} + D_1^n(1+\hat{r}) - R_1 K_1^n -\right.$

$- K_{T1}L_{T1}^{\alpha} - P_{N1}N_1 K_{N1}^{\gamma}L_{N1}^{\beta} + R_1 K_{T1} + N_1 R_1 K_{N1} + N_1(Q_1 - F)] > 0$ (if the non-rentiers cannot

reach $\underline{C}$ by honoring entirely their debt service, they are strictly better off by repudiating that

amount of debt service which is necessary to reach $\underline{C}$ than by paying off entirely $D_1^n(1+\hat{r})$).

Together with $\zeta \geq \underline{C}^{-\xi}$, this implies that whenever their debt service is excessive (i.e., whenever

$D_1^n(1+\hat{r}) > R_1 K_1^n + K_{T1}L_{T1}^{\alpha} + \quad + P_{N1}N_1 K_{N1}^{\gamma}L_{N1}^{\beta} - R_1 K_{T1} - N_1 R_1 K_{N1} - N_1(Q_1 - F) - \dfrac{P_{N1}\underline{C}}{\eta} - \underline{C}$), it is

optimal for the non-rentiers to repudiate <u>exactly</u> that amount of debt service which is necessary to

reach $\underline{C}$.

Creditors are aware of the possibility that their credits will not be entirely repaid. Hence, the

interest rate at which they are willing to lend to the non-rentiers ($\hat{r}$) may be higher than the world

(risk-free) interest rate:

$$\hat{r} = r + \dfrac{Z_1^n}{D_1^n} \quad . \tag{A29}$$

Consider the self-defeating expectations trap studied in the previous section, namely a situation

where $u_1^{s**} < u_1^{s*}$, $u_1^{s\circ} < u_1^{s\circ\circ}$ and $u_1^{n\circ\circ} \geq \underline{u} > u_1^{n*}$. In the absence of the possibility of default, we

know that if the households did not expect a regulatory reform and their expectations were

validated, the non-rentiers would have got $C_1^{n*} < \underline{C}$, thus inducing the authorities to implement the

reform. Instead, in the presence of the possibility to repudiate (partially or entirely) their debt, in

such a situation the non-rentiers would choose to default in order to consume $\underline{C}$ anyway. Thus, the

question is whether they prefer at time 0 to consume more by going excessively into debt in the

anticipation that in period 1 they will not repay (partially or entirely) it, or they prefer at time 0 to

consume and borrow less in order to be able in period 1 to consume $\underline{C}$ without repudiating (partially or entirely) their debt.

More formally, the question raised above can be formulated in the following way: the non-rentiers will honor entirely their debt service if, in the situation in which at time 1 no debt repudiation will occur and they will consume exactly $\underline{C}$, the marginal increase in utility brought about by the increment in consumption at time 0 obtainable by one additional unit of debt is lower than the future discounted disutility of repudiating that unit of debt (and the interest payment on it), i.e., if and only if

$$(C_0^{n*})^{-\xi}\Big|_{\substack{Z_1^n=0 \\ C_1^n=\underline{C}}} \le \theta(1+r)\zeta \text{ .}^{[15]} \tag{A30}$$

Condition (A30) is necessary for avoiding a default on the non-rentiers' debt when the households do not expect a regulatory reform and the authorities do not liberalize the firms' entry into the non-tradable sector. It is straightforward that (A30) holds when the cost of default is relatively large and the households do not discount the future too heavily: under these circumstances, if the households' expectations are validated by the government, the non-rentiers do not default in t=1 and their utility is $u_1^{n*} = \underline{u}$. Hence, the condition $u_1^{n*} < \underline{u}$ does not hold and there is no self-defeating expectations trap: recalling (10), the belief that no reform will be implemented is going to be validated.

In contrast, if (A30) does not hold, the belief that no reform will be implemented is going to be falsified, since – in the absence of the liberalization of the non-tradable sector – the non-rentiers would default on their debt and their utility in period 1 would be $u_1^{n*} = \dfrac{\underline{C}^{1-\xi}}{1-\xi} - \zeta Z_1^{n*} < \underline{u}$, where

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[15] Notice that C_0^{n*} can be obtained by solving (A1)-(A11), (A13-(A15), (A16a)-(A17a) and $C_1^n = \underline{C}$.

$Z_1^{n*} > 0$. Being aware that – without the removal of the barriers limiting firms' entry into the non-tradable sector – the non-rentiers' utility in period 1 would fall below $\underline{u}$, the government is induced in this period to liberalize the non-tradable sector. In other words, if the cost of default is relatively small and the non-rentiers discount the future heavily, they tend to augment their consumption in period 0 by increasing excessively their debt, thus going into default and reducing their well-being below $\underline{u}$ in period 1, in the absence of a regulatory reform on the part of the government. This will lead the government to implement this reform, thus falsifying the households' expectations: again, a self-defeating expectations trap is at work.