Three essays on regime change[*]

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Abstract

This dissertation consists of three chapters from different economic fields that have a regime change in common. While the first chapter deals with anticipated monetary regime change, the other two chapters address political regime change. The impact of the particular regime change on equilibrium outcomes, based on microfoundations, is part of the result common to all chapters. In addition, each chapter provides additional results and insights into the corresponding topic.

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Introduction

In the first chapter, we investigate the effects of an anticipated future change in monetary policy regime in small open economies targeting either inflation or the exchange rate. The announcement of a future change in the monetary policy regime triggers an immediate change in the behavior of households and firms. As a result the economy starts to behave differently even though the current monetary policy rule remains the same for the whole period before the monetary policy regime change. Thus, the behavior of economic agents over the transitory period to the new monetary policy rule depends not only on the current monetary policy rule in this transitory period, but also on the anticipated future monetary policy regime. Given a common future monetary policy regime, the behavior of inflation and exchange rate targeting economies converges after the announcement.

In the second chapter I analyze the strategic behavior of political parties after the fall of communist regimes by means of a post-election political model. In particular I focus on the incentives of communist parties to reform themselves, transform to social democrats and on the incentives of governing democratic parties to implement a particular privatization method. I document that incumbent democrats tended to implement the privatization method of direct sales in countries where communist parties transformed into social democrats. On the other hand, incumbent democrats tended to implement mass privatization (privatization by vouchers) in countries where communist parties did not transform into social democrats and rather preferred to stay orthodox. Based on this evidence I study the incentives of both communists and democrats by using strategic games.

In the third chapter I model post-election politics along the lines of the second chapter. Here I assume asymmetric information where the media transfers the missing information to voters. I analyze how the incentives of media owners affect political corruption. Media owners have preferences for profits and public good

provision, they thus differ in their profit orientation. I show that the media profits are in trade-off with public good provision and corruption. I conclude that the more profit oriented are media owners, the higher the political corruption and the lower the public good provision. Moreover the media differs in the number of owners (the ownership concentration). The central prediction is that the higher the number of owners in media firms (the lower the media ownership concentration), the lower the political corruption and the higher the public good provision. I argue that the way transformation in regime change from autocracy with state monopoly over media to democracy is implemented might affect political corruption in a transition economy. If the public media keeps on dominating the media market, corruption may be lower. However, this is not because public media is necessarily more accepting of corruption or more public good or anti-corruption oriented, but because the ownership of public media is not concentrated. On the other hand, if transformation leads to dispersed ownership of media, it may contribute to higher corruption.

1 First chapter – The effects of anticipated future change in monetary policy

In this chapter, we analyze the impact of an announced future change in monetary policy regime on small open economies. We focus on inflation targeting and exchange rate targeting economies in order to compare this effect on different monetary policy regimes. The economies studied are considering joining a monetary union in the future. Therefore, we assume that these economies will imitate the monetary union regime by operating strict exchange rate targeting. Two alternative versions of exchange rate targeting, differing in the weight put on nominal exchange rate stabilization, are investigated.

As long as the domestic and monetary union business cycles and inflation developments are not perfectly synchronized, the nominal interest rates of the independent inflation targeting economy will be different from those in the monetary union. Since the nominal interest rate differential is required to be close to zero in both alternative future regimes, the determination of domestic nominal interest rates will change after either regime change. Under both alternative future regimes, the nominal interest rate trajectory of the economy will be driven exogenously by the foreign (monetary union) interest rate.

The future adoption of the regime can be viewed as a test of the economy's readiness to maintain a fixed exchange rate against the union's currency. The fact that the domestic economy may even be required to undergo this test before joining the union (e.g. ERM2) motivates our analysis of the future adoption of exchange rate targeting.

Before the announcement of the future regime change, we refer to the economies as independent. After the regime change announcement but before the regime change itself, we refer to the economies as transitory. In the transitory economy,

the model thus allows for the regime change. After the regime change, we refer to the economy as a unilateral peg. In the unilateral peg economy, agents do not foresee a future change in the monetary policy rule (the rule in the monetary union). Thus, we model not the entry into the monetary union but the change in the monetary policy rule. However, the change in the monetary policy rule is triggered by prospective future entry into the monetary union.

As soon as the independent economy becomes transitory, expectations change due to the change in the future monetary policy rule. Changes in the responses of the economy to shocks and changes in macroeconomic volatility are induced.

We aim to analyze the changes in an inflation targeting economy (transitory relative to independent) and an exchange rate targeting economy (transitory relative to independent) due to the anticipated future change in monetary policy in two alternative versions. A comparison of macroeconomic stability and welfare between the independent and transitory economies is provided.

A New Keynesian framework attributing the short-run real effects of monetary policy to the presence of nominal rigidities and monopolistic competition is implemented. We use a simple small open economy DSGE model along the lines of Justiniano and Preston (2004). A simple model that is able to describe the effect of the announced monetary regime change is suitable. We deliberately ignore other potential effects that might be triggered by the transition to a monetary union (productivity gains, foreign investment flows, etc.). Likewise, we avoid building a model structure that would go beyond our needs. Therefore, we abstract from the use of capital, the productivity growth trend, the real exchange rate appreciation trend, risk premia, etc. Similarly, perfect sustainability of exchange rate targeting is assumed and thus no speculation on exchange rate crises is allowed. We also do not analyze the benefits of joining the monetary union, including trade, reduction of transaction costs, more efficient labour markets, etc.

The announcement effect of the future monetary regime change on the inflation targeting and exchange rate targeting small open economy and on macroeconomic stabilization within these economies constitutes the main contribution of this chapter.

The chapter proceeds as follows. Section 2 reviews the literature. Section 3 introduces the model and derives the small open economy dynamics. Section 4 provides and discusses the results of the simulations. Section 5 concludes.

2 Literature Review

The dynamic stochastic general equilibrium (DSGE) model structure of the New Keynesian models is consistent with the underlying behavior of optimizing economic agents. Clarida, Gali, and Gertler (1999), Svensson and Woodford (2004), Woodford (2001), and Clarida, Gali, and Gertler (2002), among others, popularized the closed economy New Keynesian models.

Most central banks today use a short-term nominal interest rate as their instrument for implementing monetary policy. The nominal quantity of money is then endogenously determined to achieve the desired nominal interest rate. The predictability of money demand becomes less relevant. Instead, the link between short-term and long-term interest rates as well as the link between interest rates and exchange rates become of crucial importance. Cashless economy models approximate the interest rate operating procedure type of monetary policy in the economy, where monetary aggregates have negligible effects on equilibrium outcomes. Woodford (2003) illustrates the major conceptual ideas in modern monetary economics with well-specified forward-looking elements in a cashless general equilibrium closed economy framework.

The literature on optimal monetary policy in closed economies has focused mainly on whether inflation stabilization should be the only objective. The pres-

ence of staggered prices brings in gains from minimizing relative price fluctuations, justifying the inflation stabilization objective. Goodfriend and King (1998) in a survey paper point out the trade-off between CPI inflation and output stabilization in the presence of cost-push shocks. The central bank should then aim to stabilize an index of sticky prices alone, a core price index, eliminating the trade-off between inflation and output variability

A number of papers for example Aoki (2001) and Clarida, Gali, and Gertler (2001) and (2002) extended the basic framework to the open economy context. Gali and Monacelli (2005) adopt the cashless framework for an open economy. In their model, money does not appear in either the utility function of consumers or the budget constraint. Since they specify monetary policy in terms of an interest rate rule, they do not need to introduce money explicitly into the model. Money plays the role of a unit of account only. Moreover, labor is the only technological input, as capital is left out of the model. These open economy contributions to the literature suggest that a welfare maximizing monetary policy should focus on stabilizing internal relative prices.

However, further analyses of open economy models, such as Devereux and Engel (2003), Sutherland (2005a), Sutherland (2005b), and Benigno and Benigno (2003), show that optimal monetary policy should involve some consideration of exchange rate volatility. Devereux and Engel (2003) and Sutherland (2005a) argue that incomplete pass-through from the exchange rate to local currency prices implies that exchange rate volatility can directly affect welfare. Thus, they conclude that when there is incomplete pass-through, optimal monetary policy should take the exchange rate volatility into account. Sutherland (2005b) shows that exchange rate volatility can become an important factor in welfare evaluation in the presence of full pass-through. Benigno and Benigno (2003) illustrate the potential welfare gains from monetary policy cooperation between economies in exchange rate adjustment.

Paoli (2006) generalizes the optimal loss function for a small open economy from the utility of a representative household. The small open economy prevents domestic policy from affecting the rest of the world and thus allows one to abstract from strategic interactions between economies. It is shown that the loss function is a quadratic expression in domestic producer inflation, the output gap, and the real exchange rate. The weights given to these variables depend on the structural parameters of the model. Movements in international relative prices can create a wedge between the marginal utility of consumption and the marginal disutility of production, which directly affect welfare. Hence, there are incentives to manage fluctuations in the exchange rate in order to affect this wedge. Allowing some additional volatility of inflation in order to reduce the volatility in the other variables in the loss function may turn out to be welfare improving. Paoli (2006) shows that pegging of the exchange rate outperforms inflation targeting when the economy is relatively open, demand is sensitive to exchange rate movements (the intratemporal elasticity of substitution between domestic and foreign goods is high), and the intertemporal elasticity of substitution is small.

Recent literature on monetary policy shows that the optimal monetary policy rule can be implemented by minimizing the optimal loss function. However, practical implementation of such an optimal rule may be difficult. As Sutherland (2005a) shows, even in a relatively simple model the coefficients in the optimal loss function are quite complicated combinations of the model parameters. The structure of the optimal loss function is sensitive to uncertainty about the structure of the model and to uncertainty about the true values of the model parameters. It is therefore useful and typical to analyze the welfare performance of non-optimal but simple monetary policy rules.

Our paper adopts a simple inflation targeting and exchange rate targeting rule, and a future change in the rules. We study the impulse responses generated after

the future change in this rule is announced, as well as the resulting conditional variances and welfare based on an ad hoc loss function. We are not aware of any previous papers analyzing the effect of an anticipated future change in monetary policy regime.

3 Model

We consider a small open economy model that is characterized by the presence of habit formation and indexation of prices. The following section sketches the derivation of the structural equations in line with the model presented by Justiniano and Preston (2004). The presented model is based on the studies of Gali and Monacelli (2002) and Monacelli (2003), where the microfoundations for a small open economy model and incomplete pass-through are summarized. We aim to implement a simple model that allows us to distill the pure effect of the declaration of the future regime shift.

3.1 Households

The small open economy considered is populated by a representative household that maximizes its lifetime utility function

$$E_t \sum_{t=0}^{\infty} \beta^t \varepsilon_t^g \left[\frac{C_t - H_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi} \right], \tag{1}$$

where β, $0 < \beta < 1$ is the discount factor; σ and η are the inverses of the elasticities of intertemporal substitution and the labor supply, respectively; ε_t^g is the preference shock; and $H_t = hC_t$ is the external habit taken as exogenous by households. The parameter h indexes the importance of habit formation. Households consume a

Dixit-Stiglitz composite of home and foreign goods

$$C_t \;=\; [(1-\alpha)^{\frac{1}{\eta}}(C_t^H)^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}}(C_t^F)^{\frac{\eta-1}{\theta}}]^{\frac{\theta}{\theta-1}}, \tag{2}$$

where α is the share of imported goods in domestic consumption and $\eta > 0$ is the intratemporal elasticity of substitution between domestic and foreign goods.

Given the specification for preferences, the minimization of expenditures for a given level of C_t implies as in Walsh (2003) the following aggregate domestic consumer price index (CPI):

$$P_t \;=\; [(1-\alpha)(P_t^H)^{1-\eta} + \alpha(P_t^F)^{1-\eta}]^{\frac{1}{1-\eta}}, \tag{3}$$

where P_t^H and P_t^F are prices of the domestic and foreign Dixit-Stiglitz composite goods used to produce the final composite good.

In aggregate, the household maximizes lifetime utility according to the following budget constraint:

$$C_t \;=\; P_t C_t + E_t[Q_{t,t+1}D_{t+1}] \le D_t + W_t N_t + T_t, \tag{4}$$

where W_t is the nominal wage; $Q_{t,t+1}$ is the stochastic discount factor; D_{t+1} are payments originating from the portfolio held at the end of period t; W_t is the nominal wage and T_t are transfers.

Households optimally (cost minimization) allocate their aggregate expenditures according to the following demand functions:

$$
\begin{aligned}
C_t^H &= (1-\alpha)\left(\frac{P_t^H}{P_t}\right)^{-\eta} C_t \\
C_t^F &= \alpha\left(\frac{P_t^F}{P_t}\right)^{-\eta} C_t.
\end{aligned}
\tag{5}
$$

The intratemporal optimality condition for the labor-leisure choice and the intertemporal condition that follow from the first order conditions of the household's optimization problem are given by

$$C_t \quad : \quad \lambda_t = \varepsilon_t^g (C_t - hC_{t-1})^{-\sigma} \tag{6}$$

$$N_t \quad : \quad \lambda_t \frac{W_t}{P_t} = \varepsilon_t^g N_t^\varphi \tag{7}$$

$$D_t \quad : \quad \lambda_t Q_{t,t+1} = \beta E_t[\lambda_{t+1} P_t / P_{t+1}], \tag{8}$$

where in asset pricing equation $E_t[Q_{t,t+1}] = (1 + i_t)^{-1} = R_t$, where $E_t[Q_{t,t+1}]$ is the stochastic discount factor for the one-period ahead nominal pay-off of the household's portfolio. R_t is then the gross interest rate on that bond. We assume that households have access to a complete set of internationally traded contingent claims. The households' optimality conditions imply the Euler equation given by

$$1 \quad = \quad (1 + i_t)\beta E_t\left[\frac{\lambda_{t+1}}{\lambda_t} \frac{P_t}{P_{t+1}}\right]. \tag{9}$$

3.2   International Arrangements

Let us define the real exchange rate as the ratio of foreign prices in the domestic currency to domestic prices as $\hat{q}_t \equiv \hat{e}_t \frac{P_t^*}{P_t}$, where $\hat{e}_t$ is the nominal exchange rate and P_t^* the foreign consumer price index. Since, we assume that $P_t^* = P_t^{F*}$, the law of one price (LOP) gap is given by $\Psi_t^F \equiv \hat{e}_t \frac{P_t^*}{P_t^F}$, as in Monacelli (2003). When the law of one price fails to hold, $\Psi_t^F \neq 1$.

The foreign economy is identical in preferences; therefore, conditions similar to the optimality conditions (6) and (7) also apply.[1] The foreign economy is considered large enough; therefore, the composite consumption bundle can be simplified and only foreign produced goods $C_t^{F*}(i)$, $i \in < 0, 1 >$ are considered.

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[1]The superscript * denotes "foreign" throughout the paper.

Furthermore, under the assumption of complete international financial markets, arbitrage implies that the marginal utility of consumption in the foreign economy is proportional to that in the domestic economy. Therefore, the following condition must be satisfied

$$\beta \frac{\lambda_{t+1}}{\lambda_t} \frac{P_t}{P_{t+1}} = Q_{t,t+1} = \beta \frac{\lambda_{t+1}^*}{\lambda_t^*} \frac{P_t^*}{P_{t+1}^*} \frac{\hat{e}_t}{\hat{e}_{t+1}}. \tag{10}$$

The asset pricing equation, which determines the price of bonds in the domestic and foreign economy, together with the risk sharing condition (10), implies the uncovered interest rate parity condition (UIP):

$$E_t[Q_{t,t+1}(R_t - R_t^*(\frac{\hat{e}_{t+1}}{\hat{e}_t}))] = 0. \tag{11}$$

The uncovered interest rate parity places a restriction on the relative movements of the domestic and foreign interest rate and the nominal exchange rate.

We define the effective terms of trade as the relative price of imports in terms of exports,

$$S_t = \frac{P_t^F}{P_t^H}. \tag{12}$$

Note that changes in the terms of trade reflect changes in the competitiveness of the economy.

3.3 Firms

Suppose that there is a continuum of firms indexed by i, $0 \leq i \leq 1$. A typical firm in the home country produces a differentiated good with constant returns to scale

according to the following function:

$$Y_t(i) = \varepsilon_t^a N_t(i),$$

where ε_t^a is an exogenous technology shock. According to this production function firms face real marginal costs $MC_t = \frac{W_t}{P_t \varepsilon_t^a}$.

Firms producing the domestic good are monopolistically competitive in a Calvo style price setting with indexation to the past value of the inflation rate, where the inflation rate is defined as $\pi_t^H = log(P_t^H/P_{t-1}^H)$. A fraction $(1 - \theta^H)$ of firms are allowed to sets their price optimally. The fraction θ^H set its price according to the following indexation rule:

$$log(P_t^H(i)) = log(P_{t-1}^H(i)) + \delta \pi_{t-1}^H,$$

where $0 \leq \delta < 1$ is the degree of indexation. The price index evolves according to

$$P_t^H = \left[(1 - \theta^H)(P_t^{H,new})^{(}1 - \varepsilon) + \theta^H \left(P_{t-1}^H \left(\frac{P_{t-1}^H}{P_{t-2}^H} \right)^\delta \right)^{(1-\varepsilon)} \right]^{1/(1-\varepsilon)}. \quad (13)$$

A firm i setting its price in period t and following the indexation rule faces in period T, $T \geq t$ the demand curve:

$$y_t^H(i) = \left(\frac{P_t^H(i)}{P_T^H} \left(\frac{P_{T-1}^H}{P_{t-1}^H} \right)^\delta \right)^{-\varepsilon} (C_t^H + C_t^{H*}),$$

where C_t^{H*} is foreign demand for the domestic good. Therefore, the firm's price-setting problem in period t can be stated as

$$E_t \sum_{T=t}^\infty (\theta^H)^{T-t} Q_{t,T} y_t^H(i) \left[P_t^H(i) \left(\frac{P_{T-1}^H}{P_{t-1}^H} \right)^\delta - P_t^H MC_T \right].$$

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This implies the following first order condition.

$$E_t \sum_{T=t}^{\infty} (\theta^H)^{T-t} Q_{t,T} y_t^H(i) \left[P_t^H(i) \left(\frac{P_{T-1}^H}{P_{t-1}^H} \right)^{\delta} - \frac{\theta^H}{1-\theta^H} P_t^H MC_T \right].$$

The distortion occurs due to the monopolistic competition in the goods market.

Foreign retailers import the foreign good so that the law of one price holds "at the docks" and resell it in a monopolistically competitive market. They use Calvo pricing with indexation to past inflation defined as $\pi_t^F = log(P_t^F/P_{t-1}^F)$.

A fraction $(1 - \theta^H)$ of importers are allowed to set their price optimally in each period. The fraction θ^H set their price according to the indexation rule

$$log(P_t^F(i)) = log(P_{t-1}^F(i)) + \delta\pi_{t-1}^F,$$

where we assume the same degree of indexation as for domestic producers. The foreign good price index evolves according the following relation:

$$P_t^F = \left[(1-\theta^F)(P_t^{F,new})(1-\varepsilon) + \theta^F \left(P_{t-1}^F \left(\frac{P_{t-1}^F}{P_{t-2}^F} \right)^{\delta} \right)^{(1-\varepsilon)} \right]^{1/(1-\varepsilon)}.$$

Firm i setting its price in period t faces in period T, $T \geq t$ the following demand curve:

$$y_t^F(i) = \left(\frac{P_t^F(i)}{P_T^F} \left(\frac{P_{T-1}^F}{P_{t-1}^F} \right)^{\delta} \right)^{-\varepsilon} C_t^F.$$

Therefore, the firm's price-setting problem in period t can be stated as

$$E_t \sum_{T=t}^{\infty} (\theta^F)^{T-t} Q_{t,T} y_t^F(i) \left[P_t^F(i) \left(\frac{P_{T-1}^F}{P_{t-1}^F} \right)^{\delta} - \hat{e}_T P_t^F MC_T \right].$$

This implies the following first order condition

$$E_t \sum_{T=t}^{\infty} (\theta^F)^{T-t} Q_{t,T} y_t^F(i) \left[P_t^F(i) \left(\frac{P_{T-1}^F}{P_{t-1}^F} \right)^{\delta} - \frac{\theta^F}{1-\theta^F} \hat{e}_T P_t^F MC_T \right],$$

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which is the solution to this equation. This generates deviations from the law of one price in the short run, while complete pass-through is reached in the long-run as presented in Monacelli (2003).

3.4 Equilibrium

The market clearing condition in the domestic economy is given by the following equation

$$Y_t^H \quad = \quad C_t^H + C_t^{H*}. \tag{14}$$

Under the maintained assumption of a large foreign economy, market clearing in the foreign economy gives $Y_t^* = C_t^*$. Households are assumed to have identical initial wealth so they make identical consumption and portfolio decisions. The following analysis considers a symmetric equilibrium in which domestic producers, importers, and foreign firms set common prices P_T^H, P_t^F and P_t^*, respectively.

The distortion that occurs due to the monopolistic competition in the goods market introduces a wedge between the marginal rate of substitution in the labor consumption choice and the marginal rate of transformation. Under flexible prices, equilibrium implies a constant markup that is equivalent to the markup implied by a zero-inflation steady state with rigidities. As in (Gali and Monacelli 2002) we assume that the government fully offsets the distortion by a subsidy that is financed through a lump-sum tax/transfer T_t to households.

3.5 Linearized Model

To analyze the behavior of the model, an approximation around the non-stochastic steady state of the presented model is obtained as in Justiniano and Preston (2004). For any variable, we denote by lowercase letters the log-deviation from the steady

state of their uppercase counterparts. The deterministic steady state is character-ized by $\varepsilon_t^a = \varepsilon_t^g = \varepsilon_t^m = 0$ in the domestic economy and $\varepsilon_t^\pi = \varepsilon_t^y = \varepsilon_t^i = 0$ in the foreign block.

As in Justiniano and Preston (2004), we assume a non-inflationary steady state $\pi_t = \frac{P_t}{P_{t-1}} = \frac{P_t^H}{P_{t-1}^H} = \frac{P_t^F}{P_{t-1}^F} = 1$ and a steady state interest rate $1 + i_t = \frac{1}{\beta}$.

Linearizing the domestic goods market clearing condition (14) together with the linearized version of demand functions (5) implies

$$(1 - \alpha)c_t = y_t - \alpha\eta(2 - \alpha)s_t - \alpha\eta\psi_t^F - \alpha y_t^*, \tag{15}$$

where $\psi_t^F = (e_t + p_t^*) - p_t^F$ is the log linear approximation of the law of one price gap, and $s_t = p_t^F - p_t^H$ approximates the terms of trade given by equation (12). Time differencing of the terms of trade definition implies

$$\Delta s_t = \pi_t^F - \pi_t^H. \tag{16}$$

Using the approximations of the law of one price gap and the terms of trade, the following link between the terms of trade and the real exchange rate is defined:

$$q_t = \psi_t^F + (1 - \alpha)s_t. \tag{17}$$

The log-linear approximations to the optimality conditions of domestic firms for price setting, the law of motion for domestic producer prices and the domestic price index (13) imply the following hybrid Philips curve:

$$\pi_t^H - \delta\pi_{t-1}^H = \frac{1 - \theta^H}{\theta^H}(1 - \theta^H\beta)mc_t + \beta E_t[(\pi_{t+1}^H - \delta\pi_t^H)], \tag{18}$$

where

$$mc_t \;=\; \varphi y_t - (1+\varphi)\varepsilon_{a,t} + \alpha s_t + \sigma(1-h)^{-1}(c_t - hc_{t-1}) \tag{19}$$

denotes the real marginal cost function of each firm, which originates from approximation of the aggregate production function and the household's optimality condition for labor choice.

Similarly, the optimality condition for the pricing problem of retailers results in the following Philips curve:

$$\pi_t^F - \delta\pi_{t-1}^F \;=\; \frac{1-\theta^F}{\theta^F}(1-\theta^F\beta)\psi_t^F + \beta E_t[(\pi_{t+1}^F - \delta\pi_t^F)]. \tag{20}$$

Following the arguments of Justiniano and Preston (2004) and the derivation presented by Gali and Monacelli (2002), the complete markets assumption together with the condition (10) imply the following approximate relation for the log-linear approximation of the Euler equation: (9)

$$c_t - hc_{t-1} \;=\; y_t^* - hy_{t-1}^* + \sigma^{-1}(1-h)[\psi_t^F + (1-\alpha)s_t] + \sigma^{-1}(1-h)\varepsilon_t^g. \tag{21}$$

The log-linear approximation of the uncovered interest rate parity equation (11) gives $i_t - i_t^* = E_t \Delta e_{t+1}$ and using the definition of the real exchange rate we get

$$(i_t - E_t\pi_{t+1}) - (i_t^* - E_t\pi_{t+1}^*) = E_t\Delta q_{t+1}. \tag{22}$$

Note that from the definition of the real exchange rate we have

$$\Delta e_t \;=\; \Delta q_t + \pi_t - \pi_t^*. \tag{23}$$

Finally, the approximation of the CPI equation (3) and the change in the terms

of trade (16) gives the following relation:

$$\pi_t = \pi_t^H + \alpha \Delta s_t. \tag{24}$$

Because the foreign economy (monetary union) is considered large enough, it is exogenous to the domestic economy. This gives us some flexibility in specifying the behavior of foreign variables. We assume that the paths of foreign variables π_t^*, y_t^*, and i_t^* are determined by the following VAR process:

$$\pi_t^* = \omega_\pi^\pi \pi_{t-1}^* + \omega_y^\pi y_{t-1}^* + \omega_i^\pi i_{t-1}^* + \varepsilon_t^\pi, \tag{25}$$

$$y_t^* = \omega_\pi^y \pi_{t-1}^* + \omega_y^y y_{t-1}^* + \omega_i^y i_{t-1}^* + \varepsilon_t^y, \tag{26}$$

$$i_t^* = \omega_\pi^i \pi_{t-1}^* + \omega_y^i y_{t-1}^* + \omega_i^i i_{t-1}^* + \varepsilon_t^i, \tag{27}$$

where ε_t^π, ε_t^y, and ε_t^i are the structural shock vectors that drive the foreign economy.

3.6 Monetary Policy

The model is closed by the description of the monetary policy conducted by the domestic monetary policy authority.

We assume that the independent monetary policy authority conducts inflation targeting or exchange rate targeting according to the following inflation forecast based Taylor rule:

$$i_t = \rho i_{t-1} + \rho_\pi \pi_{t+1} + \rho_y y_t + \rho_e \Delta e_t + \varepsilon_t^m, \tag{28}$$

where ρs stand for weights describing the objectives of the domestic monetary authority and ε_t^m is the monetary policy shock. By the choice of weights, the rule given by equation (28) is used to model the behavior of the monetary authority, which conducts an independent inflation targeting or exchange rate targeting mon-

etary policy. We find stabilization of the change in the nominal exchange rate preferable to stabilization of the level of the nominal exchange rate. This approach allows the nominal exchange rate to enter the new regime at any level and not at a particular level.

We assume that the monetary authority is free to set the weights of the rule. In our experiment, the independent inflation targeting economy sets the weight on inflation to 2, the weight on interest rate smoothing to 0.7, and the other weights to zero. Thus we call this economy $IT2$. The independent exchange rate targeting economy sets the weight on nominal exchange rate stabilization to 1, the weight on the interest rate smoothing parameter to 0.7, and the remaining weights to zero, and the economy is called $ET1$.

As soon as the economy enters the future regime, the monetary policy rule in the following form is used

$$i_t = \widehat{\rho}_e \Delta e_t. \tag{29}$$

where $\widehat{\rho}_e > 1$ is the measure for offsetting the change in the nominal exchange rate. This is the rule of the unilateral peg economy. We consider two alternatives of the rule. In the first the weight on nominal exchange rate stabilization is 3, and in the second it is 10.

The transitory economy is characterized by the announcement of a future change in the monetary policy rule. It arises as soon as the monetary authority announces the future shift from rule (28) to rule (29). Thus, the monetary policy rule of the transitory economy is given by

$$i_t = regime_t(\rho i_{t-1} + \rho_\pi \pi_{t+1} + \rho_y y_t + \rho_e \Delta e_t + \varepsilon_t^m) + (1 - regime_t)\widehat{\rho^e} \Delta e_t, \tag{30}$$

where

$$
regime_t = \begin{cases} 1, & \text{if } t < T; \\ 0, & \text{if } t \geq T, \end{cases}
$$

and T is the time of the regime change.

The transitory inflation targeting economy moving to exchange rate targeting with weight 3, we denote as $IT2 \rightarrow ET3$. Analogously, we denote $IT2 \rightarrow ET10$, $ET1 \rightarrow ET3$ and $ET1 \rightarrow ET10$.

Our approach to modeling the transitory economies is based on creating an information buffer by extending the state space of the underlying model. The information buffer of length N takes the following form:

$$
\begin{aligned}
regime_t &= inf_{t,1} \\
inf_{t,1} &= \rho_{inf} inf_{t,2} + \nu_{t,1} \\
inf_{t,2} &= \rho_{inf} inf_{t,3} + \nu_{t,2} \\
&\vdots \\
inf_{t,N-1} &= \rho_{inf} inf_{t,N} + \nu_{t,N-1} \\
inf_{t,N} &= \nu_{t,N},
\end{aligned}
$$

(31)

where $inf_{t,i}$, $i \in 1, \ldots, N$ are new endogenous variables, $\nu_{t,i}$, $i \in 1, \ldots, N-1$ are information shocks and $0 < \rho_{inf} < 1$. We assume that $\nu_{t,i} \sim N(0, \gamma^2), \forall i$ and $\gamma^2 \in \Re^+$ is a small number or zero. For computational purposes, the steady state of this system coincides with the model that uses rule (29).

The announcement in period t of the regime change that happens in period T

means that $\nu_t,$'s are realized with the following values:

$$
\nu_{t,i} = \begin{cases} \rho^{1-i}, & i < T; \\ 0, & i \geq T, \end{cases}
$$

in the initial period and $\nu_{t,i} = 0$, $\forall i$ in all subsequent periods.

The construction of the regime indicator implies non-linearities in the monetary policy rule. Therefore, to solve and simulate the transition regime we use Dynare++. Dynare++ is a standalone C++ version of Dynare developed by Kameník (2007). Employing Dynare++, we are able to use the second order approximations in our experiments. The second order approximations are essential because of the quadratic nature of the monetary policy rule in the model of the transition regime.

To sum up, three types of economies are modeled: first, the independent economy with an inflation targeting or exchange rate targeting Taylor rule; second, the transitory economy, where the model allows for future regime change; and third, the unilateral peg economy having a monetary policy rule with weights of 3 or 10 on nominal exchange rate stabilization.

3.7 Calibration

We analyze the behavior of a generic economy rather than a particular one. However, we attempt to select parameter values that are consistent with recent empirical studies and that are used in theoretical studies such as Svensson (2003), Justiniano and Preston (2004), Natalucci and Ravenna (2002) and Lubik and Schorfheide (2005).

A summary of the parameter settings is presented in Table 2 in the Appendix. We assume $\beta = 0.99$, which implies a riskless annual return of about 4% in the steady state. We choose Φ so that the elasticity of labor is $\frac{1}{2}$ according to Natalucci

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and Ravenna (2002). The calibration for the price stickiness parameters θ's is based on Lubik and Schorfheide (2005) and should reflect the evidence in US prices. The price indexation value is set to 0.5, although there do exist studies where the indexation value is set to unity. However, Smets and Wouters (2003) find this value to be significantly smaller.

We set the persistence of foreign shocks to 0.7, as is typically used in the literature (e.g. Natalucci and Ravenna (2002)). We find the values of Justiniano and Preston (2004) to be quite low. The rest of the parameters are derived from previous studies or are the same as those used by Justiniano and Preston (2004).

In calibrating the variances of the shocks, we reflect the evidence that monetary policy shocks and risk premium shocks exhibit lower variance than inflation shocks and output shocks.

The evidence suggests that small open economies differ in the extent of synchronization with the large neighboring foreign economies. If foreign and domestic business cycles are sufficiently synchronized (foreign and domestic shocks are correlated), the macroeconomic stabilities in independent inflation targeting and independent exchange rate targeting economies are expected to be close together. As a result, we would be limited in distinguishing between independent inflation and exchange rate targeting economies as far as macroeconomic stability and welfare are concerned, and also between the effect of the announcement of the future regime change on the transitory inflation targeting economy and that on the transitory exchange rate targeting economy. Therefore, we assume that the shocks in the foreign economy are independent of domestic shocks, and that allows for different macroeconomic stability and welfare in the independent inflation targeting economy compared to the independent exchange rate targeting economy.[2]

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[2]Business cycle synchronization mitigates nominal exchange adjustment and the volatility of other variables. As a result, exchange rate targeting might provide better welfare if business cycles are synchronized.

We performed a sensitivity analysis by changing the calibrated parameters to various plausible levels. For example, interest rate smoothing was chosen between 0.5 and 0.9 or the degree of openness between 0.2 and 0.6. Since the main results of the study remain unchanged, we do not report the results based on the alternative calibrations.

4 Results

The goal of this section is to investigate the independent economies ($IT2$ and $ET1$) and the transitory economies ($IT2 \rightarrow ET3$, $IT2 \rightarrow ET10$, $ET1 \rightarrow ET3$ and $ET1 \rightarrow ET10$) by means of impulse responses, macroeconomic stability (conditional variances) and welfare (given a particular loss function). All figures are in the Appendix.

4.1 Impulse Responses

4.1.1 No Regime Change

In figures B.1–B.7, we compare the impulse responses of the independent inflation targeting economy ($IT2$) with the independent exchange rate targeting economy ($ET1$) to a particular shock.

The technology shock (Figure B.1) can be viewed as a supply shock. In economy $IT2$, it leads to a fall in inflation, inducing a very moderate interest rate drop. This triggers an initial depreciation of the nominal exchange rate, $\Delta e > 0$, and an expected appreciation. The real exchange rate depreciation induces an output and consumption expansion. As a result, inflation increases and returns to the steady state. Imported inflation follows the nominal exchange rate fluctuation. Since domestic inflation decreases and foreign inflation is unaffected (there is no transmission from the small open economy to the large foreign economy), the terms of

trade worsen (increase). Since the LOP gap increases, the rise in the real exchange rate is larger than the rise in the terms of trade. Importers make profits at the beginning, but then their pricing behavior makes them increase import prices and a new equilibrium is established.

In $ET1$, the technology shock, also accompanied by an inflation drop, does not lead to even a moderate interest rate reduction because that would induce a nominal exchange rate adjustment. Since the monetary policy rule is designed to keep the nominal exchange rate stable, the interest rate and the nominal exchange rate, which are linked together by UIP, remain stable.[3] The response of inflation is slightly more volatile than in $IT2$, as expected. The initial response of the real exchange rate and the terms of trade corresponds to the responses of inflation and the nominal exchange rate. Over time, the decreasing inflation leads to an improvement in the terms of trade, as the appreciation fades. It turns out that the differences between $IT2$ and $ET1$ come from the differences in the nominal interest rate, the nominal exchange rate, and the law of one price gap. Since the differences are small relative to the size of the responses, the other variables in $IT2$ and $ET1$ respond in the same way.

The preference shock (Figure B.2) can be viewed as a demand shock, that is, a shock to consumption. In $IT2$, it induces a rise in inflation and consequently in the nominal interest rate. Nominal exchange rate appreciation and higher inflation result in a real exchange rate appreciation that accounts for the fall in output and subsequent return of consumption to the steady state. The initial fall in real interest rates (nominal interest rates minus inflation) is followed by their subsequent increase. Real interest rates return to zero with the other variables. The rise in inflation results in an improvement in the terms of trade, but as importers catch up, they increase the price of imports and a new equilibrium is established.

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[3]There might be some non-zero interest rate differential and some nominal exchange rate fluctuation, but its size is negligible.

The preference shock to $ET1$ leads to similar responses, except that the nominal exchange rate is held even more stable than in the independent $ET1$. As a result, nominal interest rates and the nominal exchange rate are stable, resulting in slightly different responses of the other variables in terms of magnitude, but the direction of the responses remains the same.

The response to the risk premium shock is depicted in Figure B.3. The real exchange rate and nominal exchange rate both depreciate and create appreciation expectations. Also, the real interest rate increases to compensate for the increased risk premium. The weak real exchange rate leads to output, consumption, and inflation increases. The terms of trade improve with the fall in inflation, and the different direction of the terms of trade response compared to the real exchange rate response is a result of a relatively large LOP gap. Since the risk premium shock leads to a real exchange rate depreciation and at the same time leads to an inflation increase, the nominal exchange rate is required to depreciate by more than the real exchange rate.

It turns out that the $ET1$ monetary regime results in a larger nominal exchange rate adjustment than the $IT2$ regime. In fact, if the risk premium shock is accompanied by such a shock, the nominal exchange should adjust in order to make the real exchange rate compensate for the higher risk premium. If the other shock does not induce a nominal exchange rate adjustment, the risk premium shock calls for a higher nominal exchange rate adjustment than if the other shock induces some nominal exchange rate adjustment in the same direction. The higher nominal exchange rate depreciation leads to higher inflation, so that the real exchange rate depreciates in response to the risk premium shock.

The responses to the monetary policy shocks are depicted in Figure B.4. The deviation dies out fast, since there is no persistence involved. The monetary policy shock leads to an exchange rate appreciation and a consequent drop in inflation

and the real economy (consumption and output). The terms of trade worsen as a result of the inflation drop and, given the real exchange rate appreciation, we observe a large LOP gap deviation. The behavior in $IT2$ and $ET1$ is the same.

The foreign inflation shock (Figure B.5) directly affects the nominal exchange rate in $IT2$, which appreciates at once. Due to the persistence in the foreign inflation shock, the nominal exchange rate is expected to keep on appreciating at a decreasing rate. Hence, the nominal interest rate decreases to satisfy UIP and returns to the steady state later. The tight real exchange rate causes a fall in output, consumption, and inflation.

The real exchange rate in $ET1$ depreciates due to a negative inflation differential between domestic and foreign inflation. This contributes to easy monetary conditions along with an easy real interest rate. As a result, output, consumption, and inflation increase in $ET1$. In $IT2$, a nominal exchange rate appreciation directs inflation down. In $ET1$, the nominal exchange rate and interest rates remain stable and inflation thus increases. This translates to a terms of trade improvement in $ET1$ as opposed to $IT2$.

The foreign output shock (Figure B.6) translates to roughly the same responses in both $IT2$ and $ET1$. The nominal exchange rate depreciates, output, consumption, and inflation increase, calling for a monetary tightening, and so nominal interest rates increase. The rise in inflation and output soon inverts to negative values. The higher initial domestic inflation results in a terms of trade improvement, and since the LOP gap remains close to zero, the real exchange rate appreciates.

The impulse responses of the variables to the foreign interest rate shock (Figure B.7) are very close to the responses to the foreign output shock, except for the responses of the nominal interest and exchange rates in $ET1$. The foreign nominal interest rate shock leads to a nominal depreciation, calling for nominal interest rate increases. The nominal exchange rate and inflation are stabilized after a commen-

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surate interest rate response. The rise in inflation improves the terms of trade and the increase in the LOP gap makes the real exchange rate depreciate. This depreciation is smaller in magnitude than the nominal exchange rate depreciation because of a positive inflation differential between the domestic and foreign economy.

The real exchange rate depreciation resulting from the foreign interest rate shock is required to be the same in both $IT2$ and $ET1$ in order to satisfy UIP. Because $IT2$ leads to lower inflation than $ET1$, and thus to a higher real depreciation than $ET1$, the nominal exchange rate is allowed to depreciate less in $IT2$ than in $ET1$.

4.1.2 Regime Change

In figures C.1–D.7, we compare the impulse responses of the transitory inflation targeting economies $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET10$ to a particular shock. In figures C.1–C.7, we study the responses after the announcement that the monetary policy rule will change in 20 periods, while in figures D.1–D.7 we study the announcement that the change will occur in 8 periods.

In figures E.1–F.7, we compare the impulse responses of the transitory exchange rate targeting economies $ET1 \rightarrow ET3$ and $ET1 \rightarrow ET10$, also for a 20 period ahead change (figures E.1–E.7) and an 8 period ahead change in monetary policy.

Right after the announcement of the future change in the monetary policy rule, the transitory economy arises and expectations adjust accordingly.

The impulse responses in $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET3$ match those in IT2 in terms of direction, apart from the foreign inflation shock, which causes a nominal appreciation that now leads to an inflation increase. The real exchange rate depreciates in these transitory economies, since the inflation differential between domestic and foreign inflation more than compensates for the nominal exchange rate appreciation.

However, the volatilities in the transitory economies differ from those in $IT2$.

The nominal exchange rate and the variables linked to it (interest rates and import prices) are much less volatile than in $IT2$. On the other hand, the volatilities of inflation and other variables increase. Since the monetary policy rule after 20 periods (8 periods) stabilizes the nominal exchange rate, the impulse responses of the nominal exchange rate and interest rate return to the steady state within 20 periods (8 periods). Import prices follow the nominal exchange rate.

The impulse responses in $ET1 \rightarrow ET3$ and $ET1 \rightarrow ET10$ are the same, except for the responses to the risk premium shock, monetary policy shock, and foreign interest rate shock, which lead to higher macroeconomic stabilization in $ET1 \rightarrow ET10$ than in $ET1 \rightarrow ET3$.

The impulse responses in both $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET3$ approach the impulse responses of $ET1$. They are placed between the impulse responses in $IT2$ and $ET1$. Hence, the nominal exchange rate, nominal interest rates and import prices are stabilized more in transitory $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET10$ than in independent $IT2$ and less than in independent $ET1$. On the other hand, the other variables are stabilized less in transitory $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET3$ than in $IT2$ and more than in $ET1$.

The comparison of $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET10$ reveals that $IT2 \rightarrow ET10$ is closer to $ET1$ than to $IT2$ relative to $IT2 \rightarrow ET3$. The reason for the stabilization of the nominal exchange rate in the transitory economies even before the regime change is the penalization of the monetary policy ($ET3$ or $ET10$) adopted after the regime change in case of exchange rate movements. Economic agents do not like potential abrupt changes in nominal interest rates causing jumps and distortions to the real economy (and to utility and profits), and prefer a smooth transition. If the economy is hit by a shock and the nominal interest rate is free to adjust, economic agents find it optimal to behave such that the resulting contemporaneous nominal exchange rate adjustment is considerable, followed by further adjustments in the

nominal exchange rate. However, if they are informed by the monetary authority that the monetary policy rule the next period offsets the nominal exchange rate adjustments, they re-optimize their behavior and find the new nominal exchange rate trajectory that is optimal for utility and profit maximizing. The trajectory of the nominal exchange rate is consistent with the trajectories of the other variables. Thus, if further adjustments of the nominal exchange rate are not allowed, a strong contemporaneous adjustment of the nominal exchange rate would be followed by a jump in nominal exchange rate stability. This would be accompanied by jumps in the nominal interest rate, real interest rate, and real economy which agents do not find optimal. Therefore, agents smooth the trajectories and allow for lower nominal exchange rate adjustment and higher adjustment of the other variables.

It turns out that even though the monetary policy rule is the same for 20 periods (8 periods), the announcement of the future change in monetary policy makes economic agents behave differently, which results in different impulse responses. Thus, the current behavior of economic agents depends not only on the current monetary policy rule, but also on the future monetary policy rule.

4.2 Macroeconomic Stability

In this section, we compare the variances in the independent economies $IT2$ and $ET1$ and the conditional (on time) variances (or standard errors) in the transitory economies $IT2 \rightarrow ET3$, $IT2 \rightarrow ET10$, $ET1 \rightarrow ET3$, and $ET1 \rightarrow ET10$.

Table 1 shows the standard errors in the independent economies. As expected, inflation is stabilized better in $IT2$ than $ET1$, while the nominal exchange rate, Δe, is stabilized better in $ET1$ than $IT2$.

The conditional variances (and standard errors) depend on the number of periods after the announcement of the regime change. Therefore, we compute the conditional variance of the considered variables using the second order approximation.

Table 1: Comparison of std. errors – in percentage points

Variable	IT2	ET1
CPI inflation	0.9	1.6
Δe	2.1	0.6
Imported inflation	0.6	1.2
Real Exchange rate	2.2	2.1
Output	2.6	2.6
Consumption	1.6	1.5
Domestic inflation	1.1	1.8
Terms of Trade	2.8	2.8
Nominal int. rate	1.0	1.0
Marginal costs	2.6	3.0
LOP gap	0.8	0.6

To do this, we evaluate the information shocks and we compute the conditional variances for the announced regime change with transition period lengths of 20 and 8 periods, respectively.

Figures G.1 and G.2 display the conditional standard errors for transitory economies that change their monetary policy rule to $ET3$ after 20 and 8 periods, respectively, and figures G.3 and G.4 display the conditional standard errors for transitory economies that change their rule to ET10 after 20 and 8 periods, respectively. As described in the previous section, the standard error of the change in the nominal exchange rate in transitory inflation targeting economies $IT2 \rightarrow ET3$ and $IT2 \rightarrow ET10$ decreases (and decreases more in $IT2 \rightarrow ET10$ than in $IT2 \rightarrow ET3$). The standard error of the other variables (except for the LOP gap) increases. The volatility of inflation increases from 0.9 p.p (see Table 1) in the independent IT economy to 1.5 p.p in the transitory IT economy (see Figures G.3 and G.4).

Regarding transitory exchange rate targeting, it turns out that the standard errors do not change that much between the independent and transitory exchange rate targeting economies for inflation, the exchange rate, marginal costs, and the LOP gap, while for the rest of the variables, transitory exchange rate targeting exhibits higher volatility than independent exchange rate targeting.

4.3   Welfare

In this section we compare the independent and transitory economies based on welfare. As in Santacreu (2005), for the purpose of monetary policy comparison we define the loss function of the monetary authority in the following form:

$$L_t = \lambda Var(\pi_t) + (1-\lambda)Var(y_t) + \frac{\lambda}{4}(i_t),$$

where $\lambda \in\, <0, 1>$ is the weight on inflation stabilization. The results of the loss function computation are plotted in tables H.1–K.1.

Further, following Gali and Monacelli (2005) we define an alternative loss function in the following form:

$$L_t = \frac{1}{\tau}Var(\pi_t) + (1+\phi)Var(y_t),$$

where $\tau = (1-\theta)(1-\beta\theta)/\theta$ and ϕ are parameters of the underlying model. The result of the calculation is shown in figures H.1–K.1 for various transitory regimes and times of monetary policy rule change.

Finally, as the last criterion we use terms of trade variance comparison. In this case, we compare the $ET1$ regime to the $IT2$ regime. The use of this criterion is based on the arguments of Gali and Monacelli (2005). Figures H.2–K.2 show the result of this comparison for various transitory regimes and times of monetary policy rule change. It can be seen that the $IT2$ regime is preferable to the $ET1$ regime with respect to the terms of trade, given our particular calibration.

We can observe that the loss in the transitory economies is higher than that in the independent economies, and that the loss increases with the approaching change in the monetary policy rule. If monetary policy targets the exchange rate in the unilateral peg economy with a weight of 10 on nominal exchange rate stabilization, the loss in the transitory inflation targeting economy is closer to the loss in the

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exchange rate targeting economy than if the weight is 3. This result is consistent across the alternative measures.

5   Conclusions

In this chapter, we analyze the effect of the announcement of future change in a monetary policy regime. We investigate the behavior of small open inflation targeting and exchange rate targeting economies after the announcement of the future monetary policy rule change. The economies are considering entering a monetary union in the future. Thus, the monetary policy rule after the regime change targets the change in the exchange rate (to imitate monetary union entry). We study two alternatives, differing in the extent of nominal exchange rate stabilization. As soon as the monetary authority announces the future regime change, the independent economy becomes transitory. After the regime change, the economy is referred to as a unilateral peg.

The goal of this chapter is to investigate the changes between the independent and transitory economies (inflation and exchange rate targeting economies) due to future alternative changes in the monetary policy rule. Impulse responses are provided. We also compare macroeconomic stability and welfare between the independent and transitory economies. Thus, we study macroeconomic stability and welfare within the economy (either independent and transitory inflation targeting, or independent and transitory exchange rate targeting) rather than across economies (inflation targeting and exchange rate targeting).

We show that the announcement of the future regime change affects the impulse responses and variances of the variables before the regime change. It turns out that even though the monetary policy rule is the same until the future regime change occurs, the announcement of the future change in the monetary policy regime makes economic agents behave differently, which results in different impulse responses.

The variance of the nominal exchange rate in the transitory inflation targeting economy decreases, while the variance of the other variables (except for the LOP gap) increases. Regarding transitory exchange rate targeting, it turns out that the variances do not change that much between the independent and transitory exchange rate targeting economies for inflation, the exchange rate, marginal costs, and the LOP gap, while for the rest of the variables, transitory exchange rate targeting exhibits higher volatility than independent exchange rate targeting. Thus, the transitory economies exhibit higher volatility of variables, except for the nominal exchange rate.

As long as the domestic and foreign business cycles are not synchronized, as assumed, the welfare in the unilateral peg economy is lower than in the independent economies (the loss is higher). However, if the economies are on the transition to a new regime with a fixed exchange rate, welfare starts to deteriorate right after the announcement of the future regime change even though current monetary policy is unchanged until the regime change. Thus, the loss in the transitory economies is higher than that in the independent economies, and the loss increases with the approaching change in the monetary policy rule. This effect is larger for the transitory inflation targeting economy than for the transitory exchange rate targeting economy. A transitory inflation targeting economy with stricter exchange rate targeting after the regime change exhibits a loss that is closer to the loss under exchange rate targeting than a transitory inflation targeting economy with a less strict alternative of future anticipated exchange rate targeting.

The announcement of the future regime change triggers an immediate change in the behavior of households and firms, which translates to different responses of the variables before and after the announcement. As a result, the variances and welfare change. The behavior of economic agents over the transitory period depends not only on the current monetary policy rule in the transitory period, but also on the

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future anticipated monetary policy rule. As soon as future exchange rate targeting is announced, the difference in macroeconomic volatility and impulse responses between the inflation and exchange rate targeting economies is lower, due to the common future monetary policy regime.

The model predicts that the more aggressive the future anticipated exchange rate targeting, the closer the behavior of agents in the transitory inflation and exchange rate targeting economies. The resulting inflation path induces nominal interest rate behavior that leads to a more stable nominal exchange rate. In the exchange rate targeting economy, policy interest rates – stabilizing the nominal exchange rate – determine inflation. In the transitory inflation targeting economy, economic agents make inflation behave such that the resulting policy interest rates stabilize the nominal exchange rate. This is why the inflation targeting economy after the regime change announcement (the transitory inflation targeting economy) starts to exhibit behavior that is closer to the exchange rate targeting economy. The nominal exchange rate is in the transitory inflation targeting economy stabilized at the cost of higher inflation volatility. Thus, the behavior of the inflation and exchange rate targeting economies converges after the announcement of the future regime change.

A   Calibration summary

Table 2: Model parameters

Coefficient	Description	Value
β	Discount factor	0.99
σ	Inverse elasticity of substitution	1.20
φ	Inverse elasticity of labor supply	1.50
θ_H	Calvo pricing - domestic	0.50
θ_F	Calvo pricing - foreign	0.50
α	Degree of openness	0.30
η	Elasticity of F-H substitution	1.50
h	Degree of habit formation	0.50
δ	Degree of price indexation	0.50
ρ_i	Interest rate smoothing	0.70
ρ_π	Response to inflation	2.00 or 0
ρ_y	Response to output gap	0.00
ρ_e	Response to ex. rate change	0.00 or 1
ω_{11}	Foreign VAR	0.70
ω_{12}	Foreign VAR	0.00
ω_{13}	Foreign VAR	0.00
ω_{21}	Foreign VAR	0.00
ω_{22}	Foreign VAR	0.70
ω_{23}	Foreign VAR	0.00
ω_{31}	Foreign VAR	0.00
ω_{32}	Foreign VAR	0.00
ω_{33}	Foreign VAR	0.70
ρ_a	Technology - VAR(1)	0.70
ρ_s	Ex. rate risk - VAR(1)	0.70
ρ_g	Taste shock - VAR(1)	0.70
stderr ε^π	Foreign shock variance	1.00
stderr ε^y	Foreign shock variance	1.00
stderr ε^i	Foreign shock variance	0.10
stderr ε^a	Domestic shock variance	2.00
stderr ε^m	Domestic shock variance	0.10
stderr ε^g	Domestic shock variance	1.00
stderr ε^s	Domestic shock variance	0.10

B   IRF: No regime change − $IT2$ vs $ET1$

Figure 1: No change - $IT2$ (solid), $ET1$ (dashed) - response to technology shock ε^a
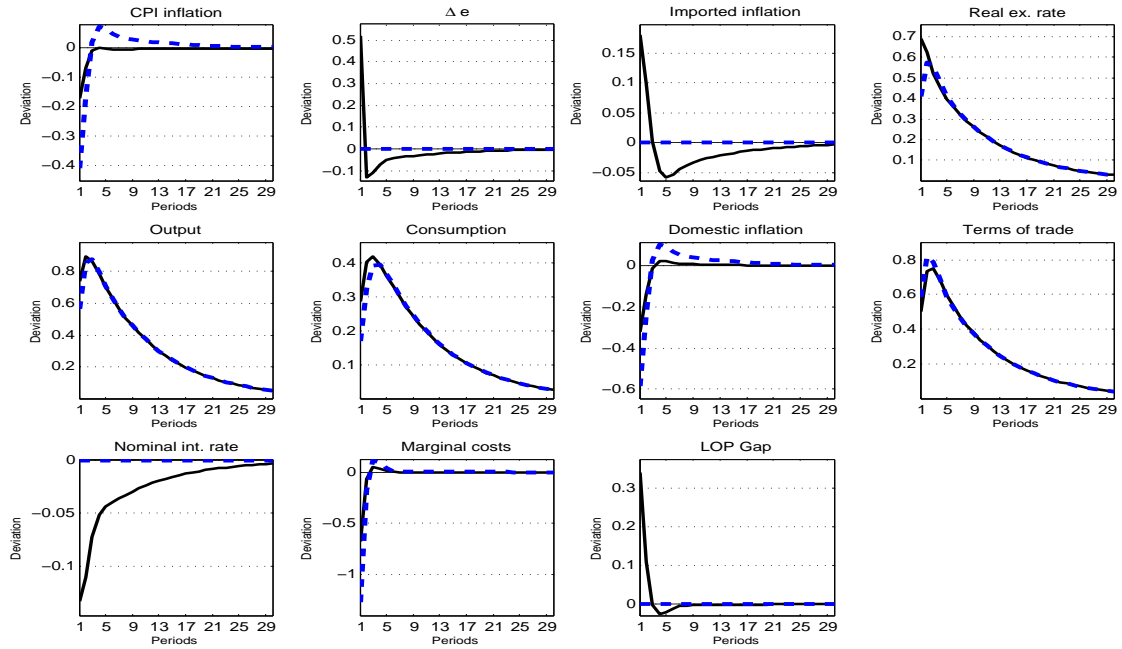
Figure 2: No change - $IT2$ (solid), $ET1$ (dashed) - response to preference shock ε^g
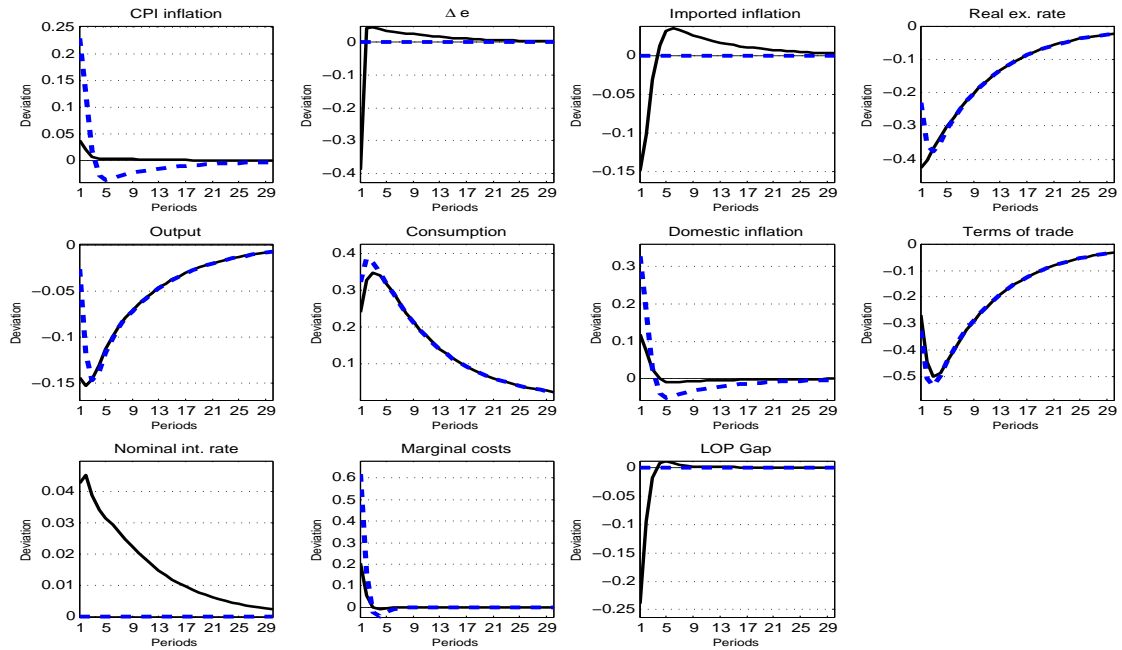
Figure 3: No change - $IT2$ (solid), $ET1$ (dashed) - response to risk prem. shock ε^s
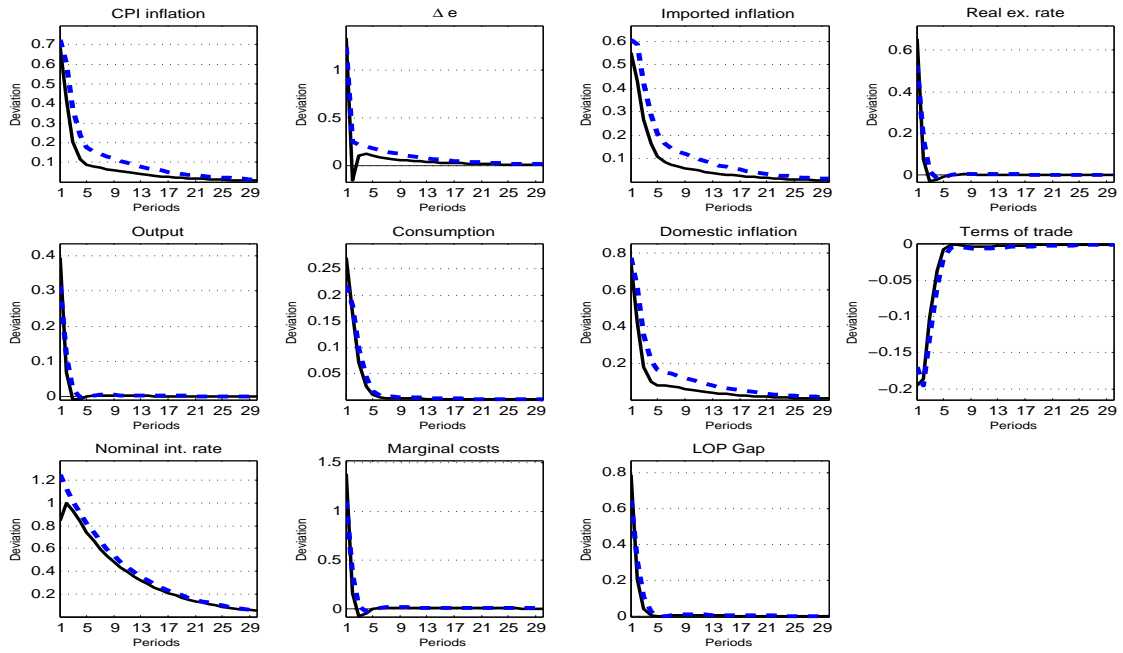
Figure 4: No change - $IT2$ (solid), $ET1$ (dashed) - response to policy shock ε^m
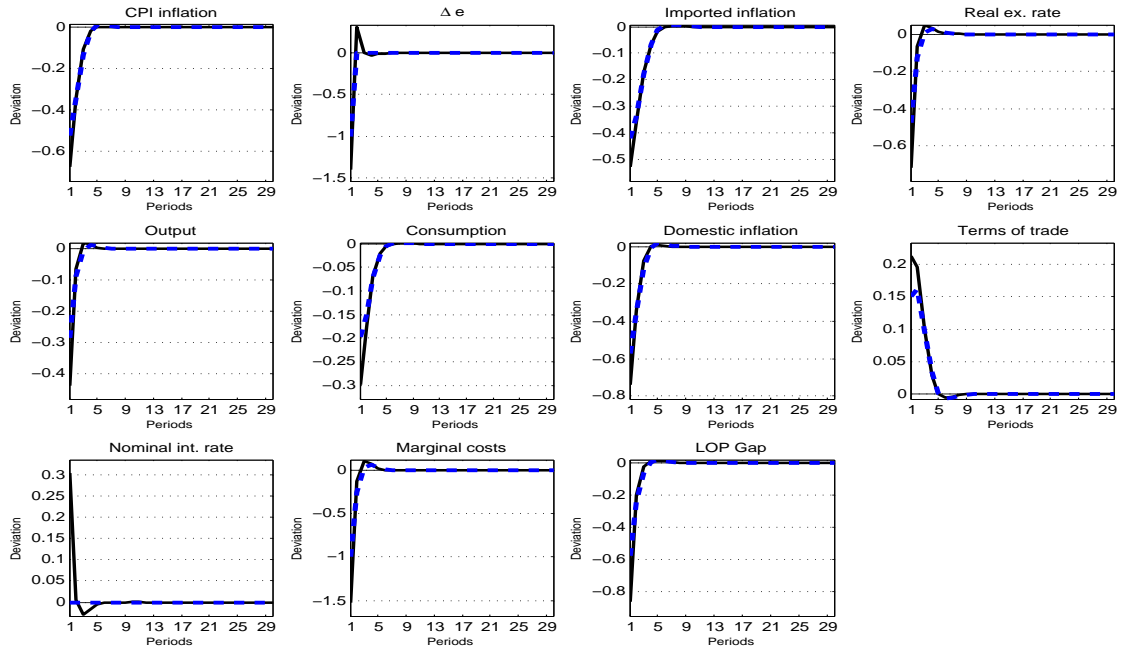
Figure 5: No change - *IT*2 (solid), *ET*1 (dashed) - response to foreign inflation ε^{π}
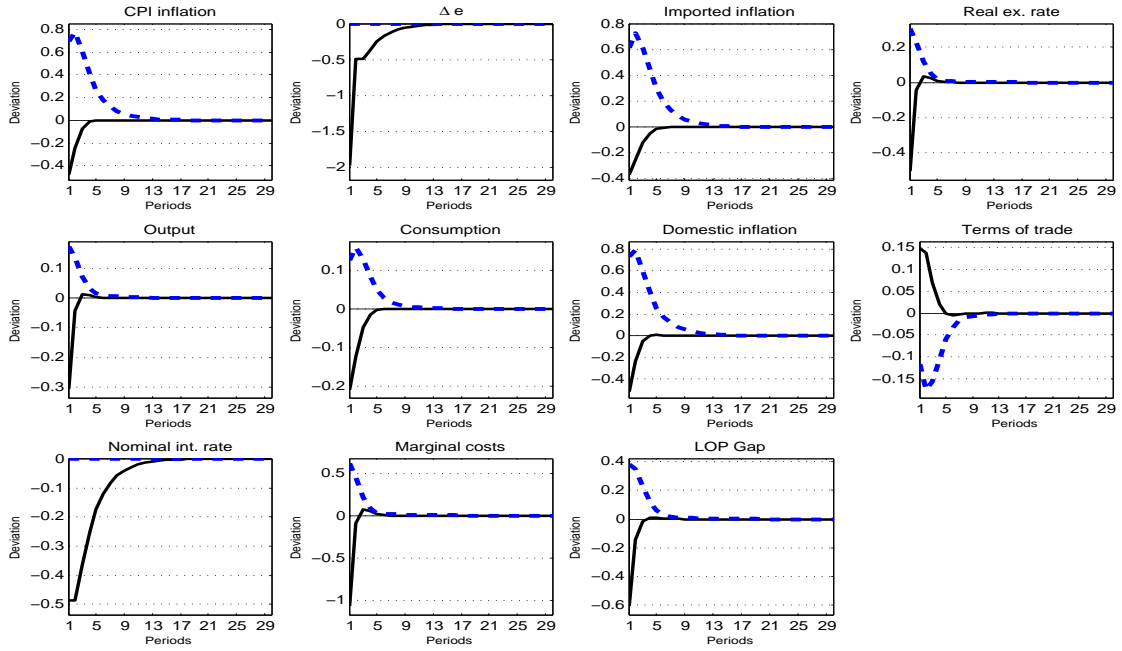
Figure 6: No change - *IT*2 (solid), *ET*1 (dashed) - response to foreign output ε^{y}
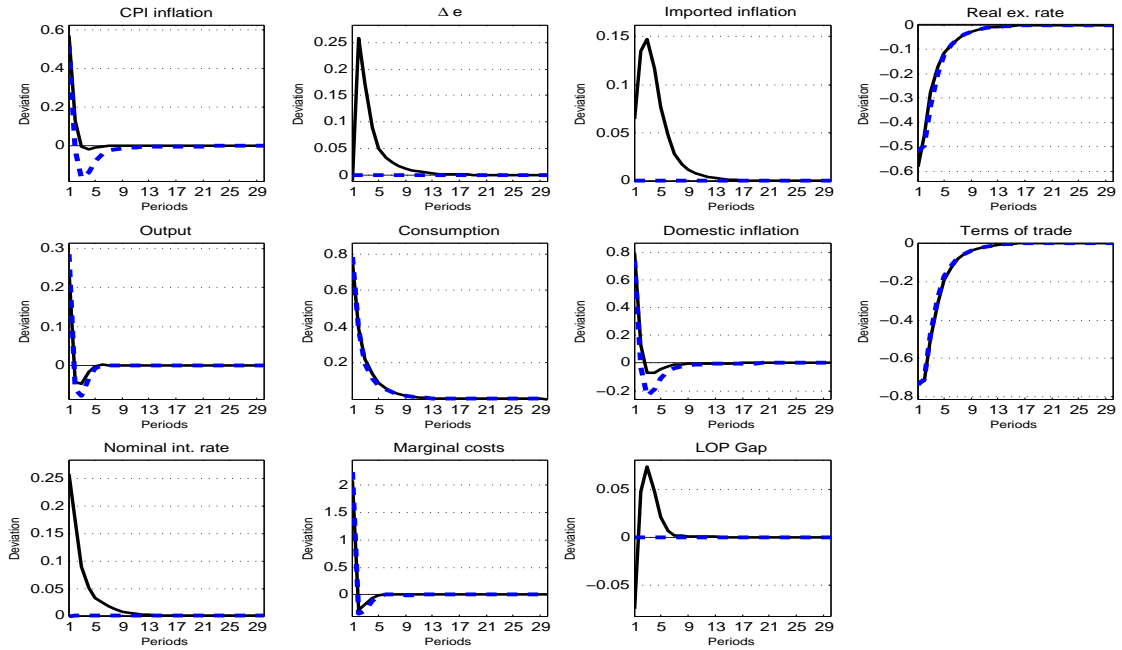
Figure 7: No change - $IT2$ (solid), $ET1$ (dashed) - response to foreign int. rate ε^i
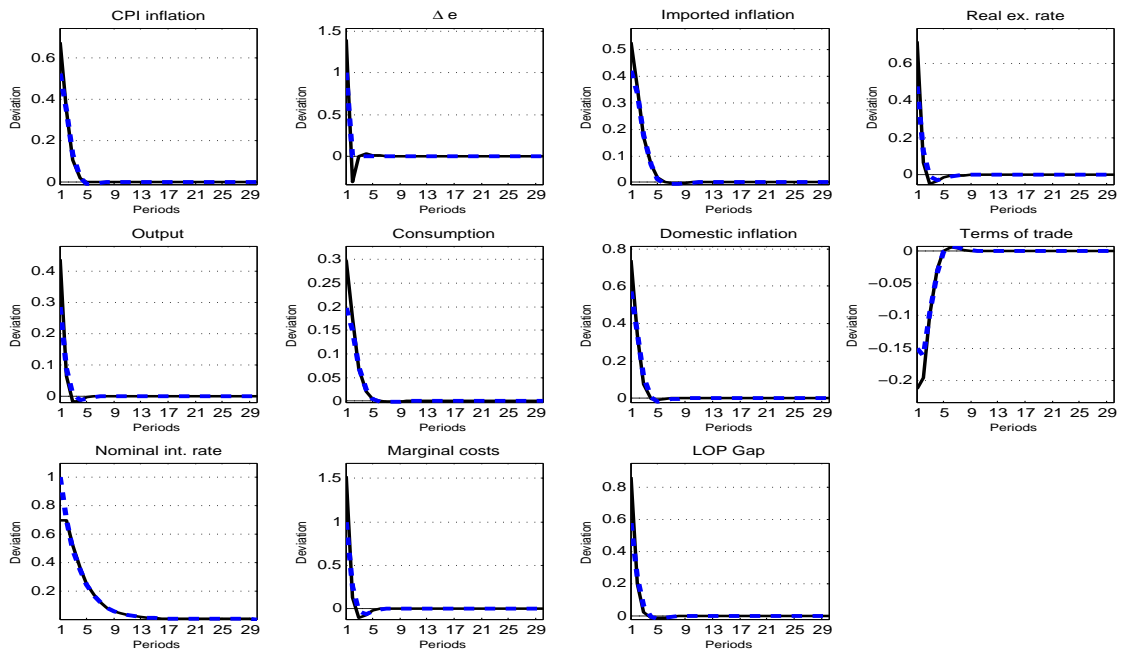
C   IRF: Regime change in 20 periods – for $IT2$

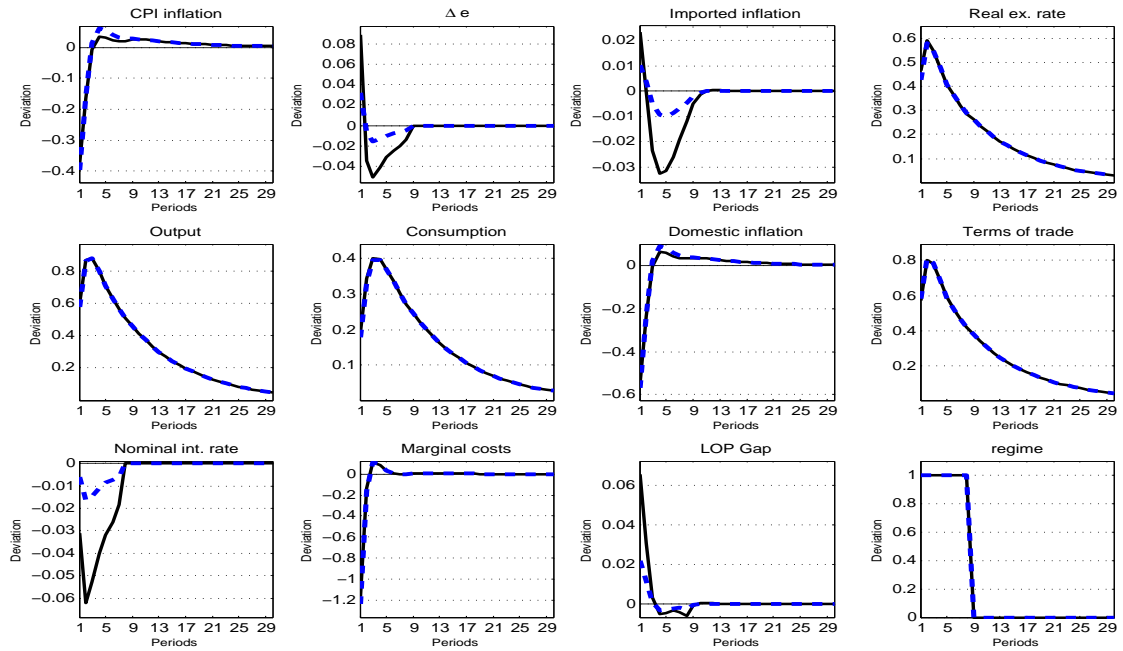Figure 8: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to technology shock ε^a
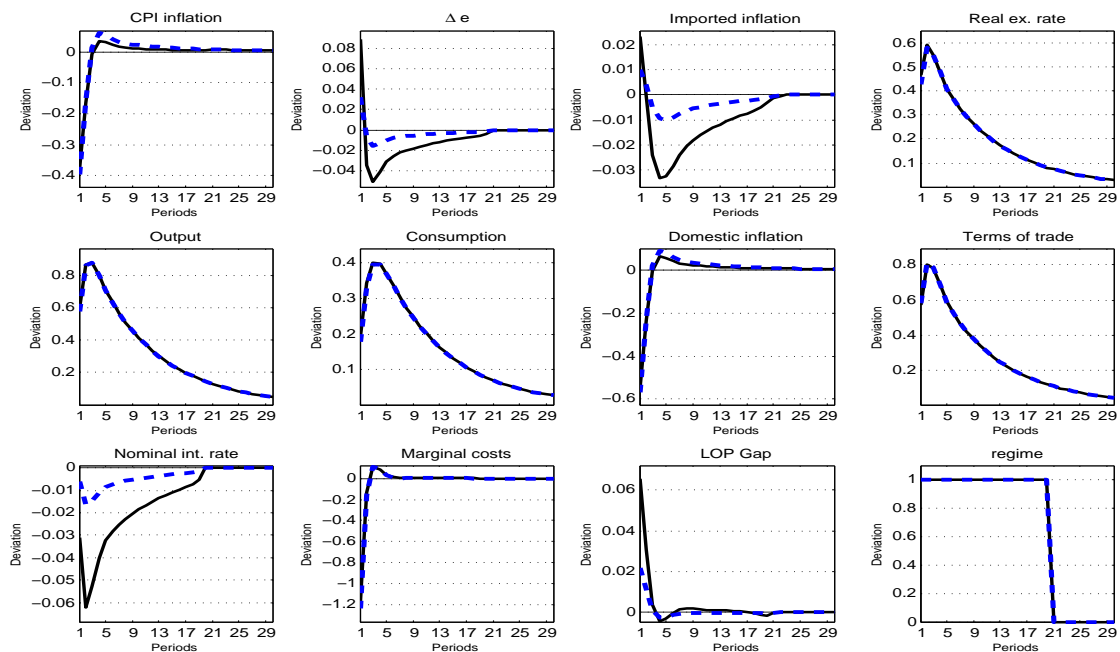
Figure 9: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to preference shock ε^g
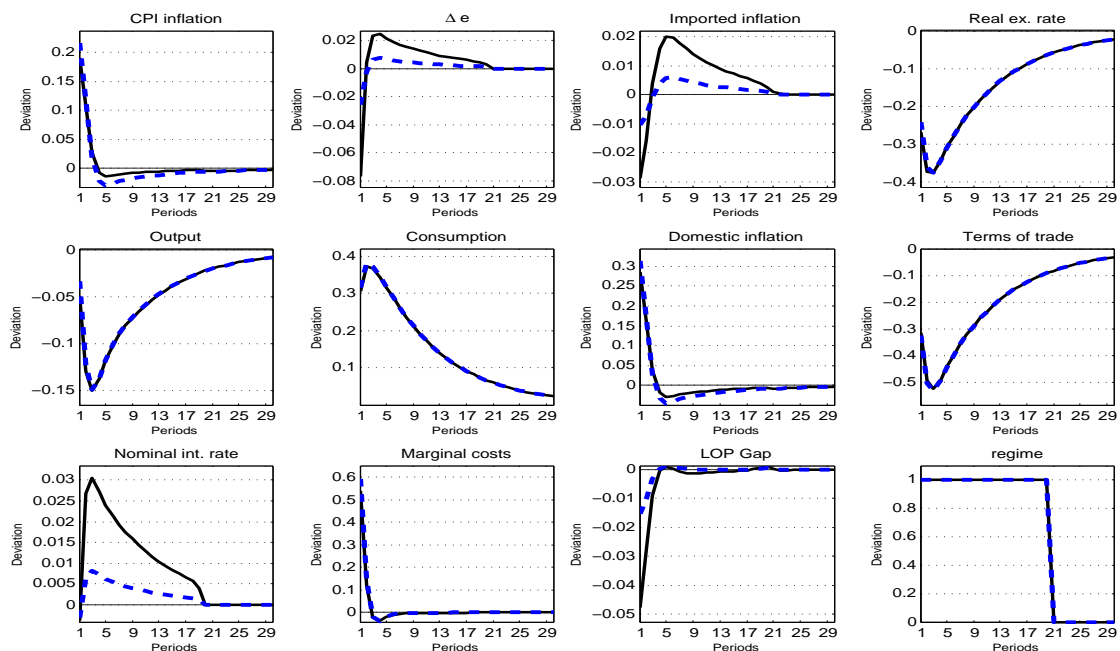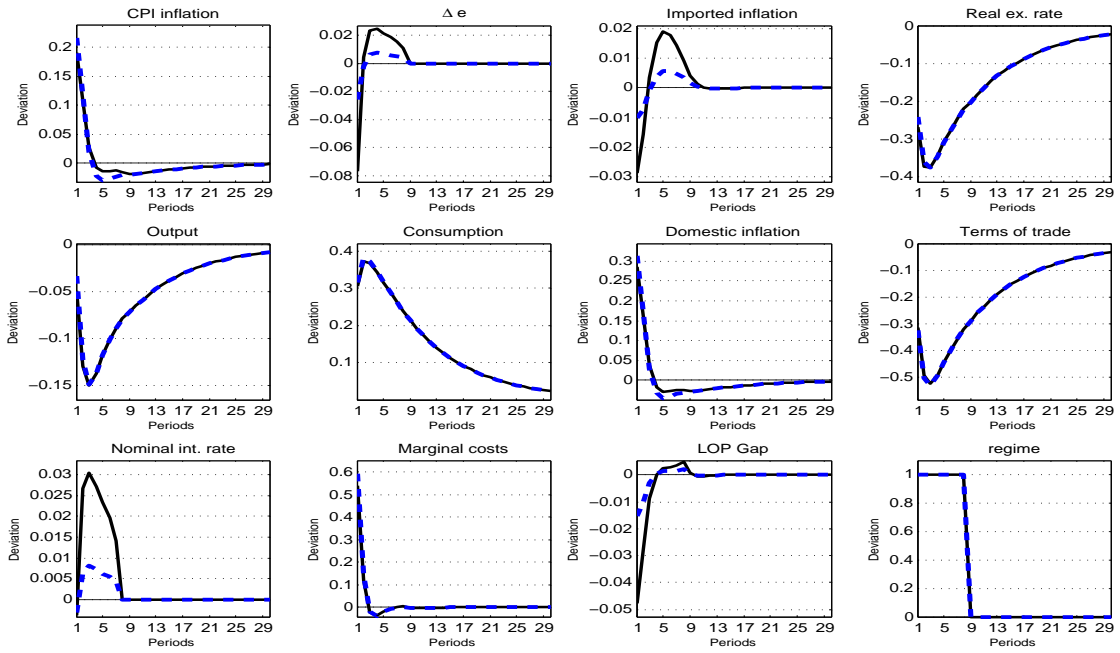
Figure 10: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to risk prem. shock ε^s
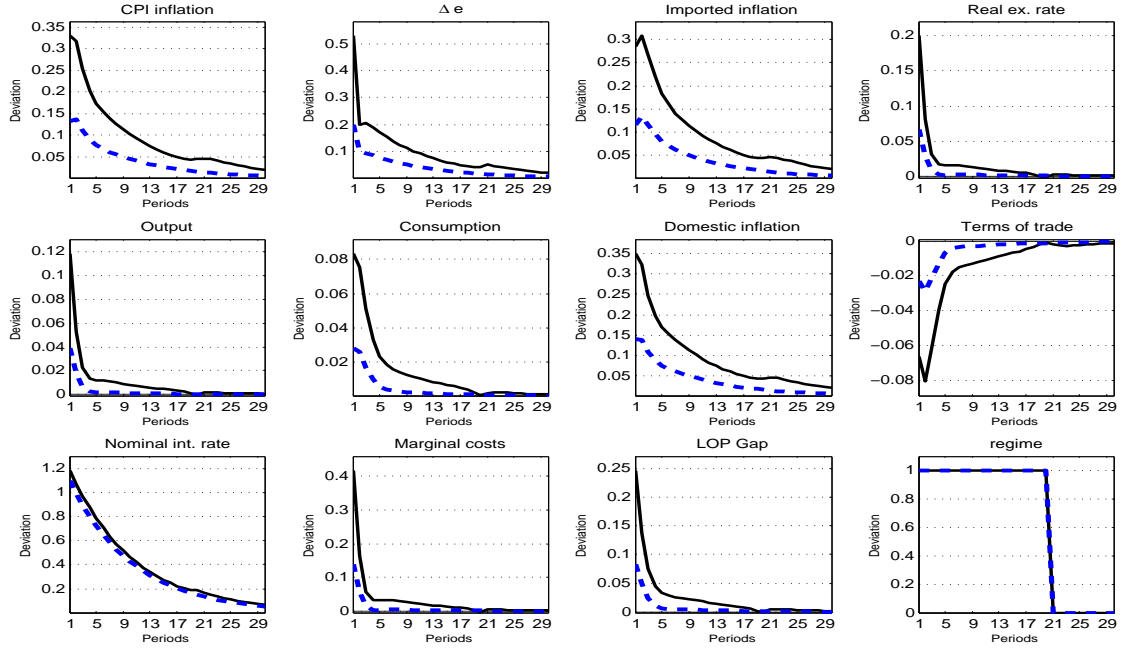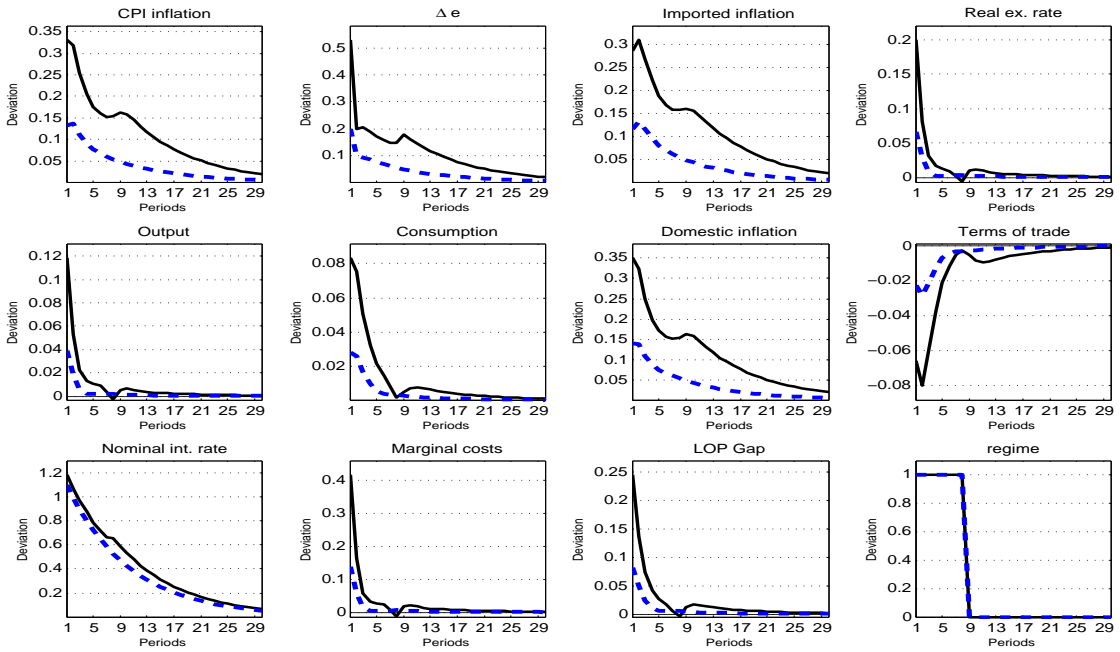

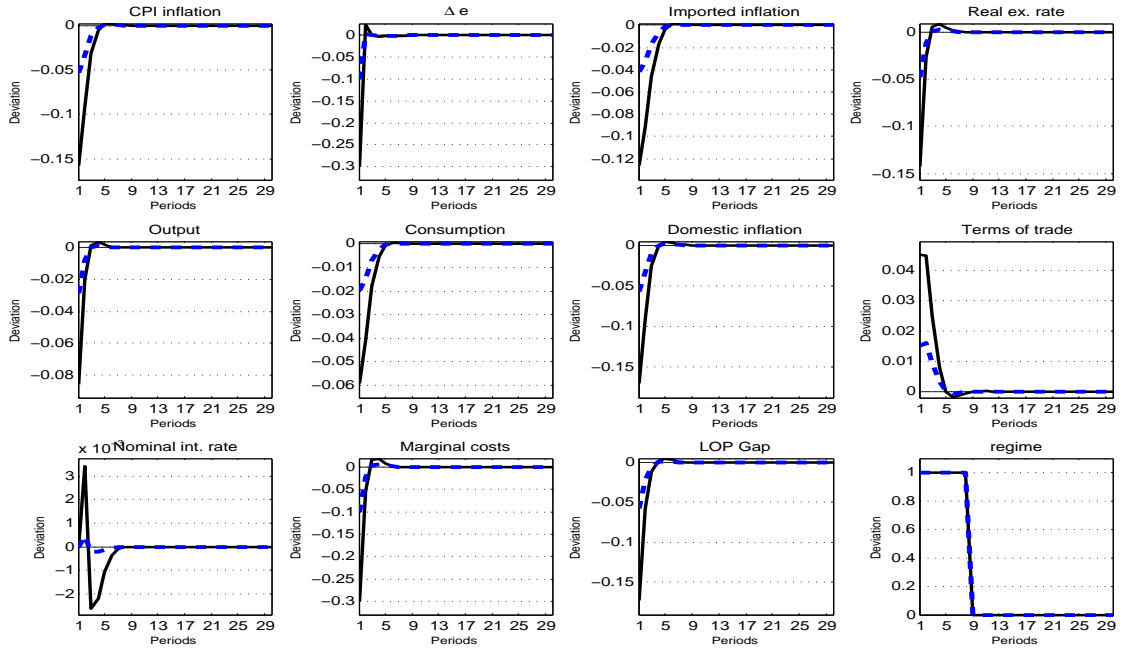Figure 11: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to policy shock ε^m
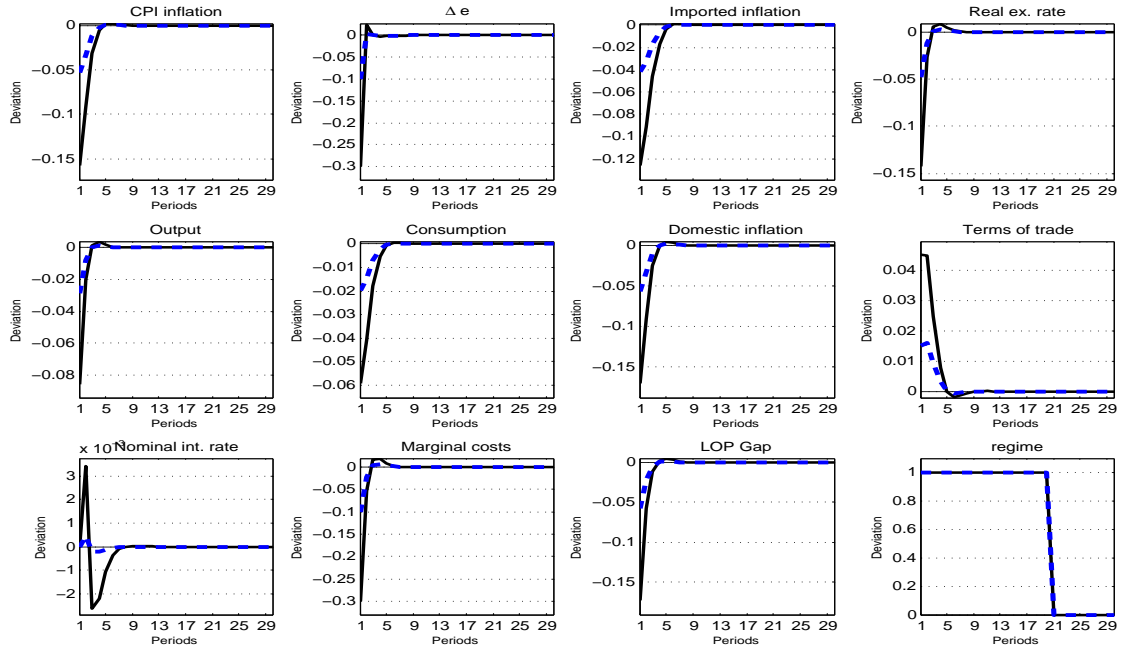
Figure 12: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign inflation ε^{π}
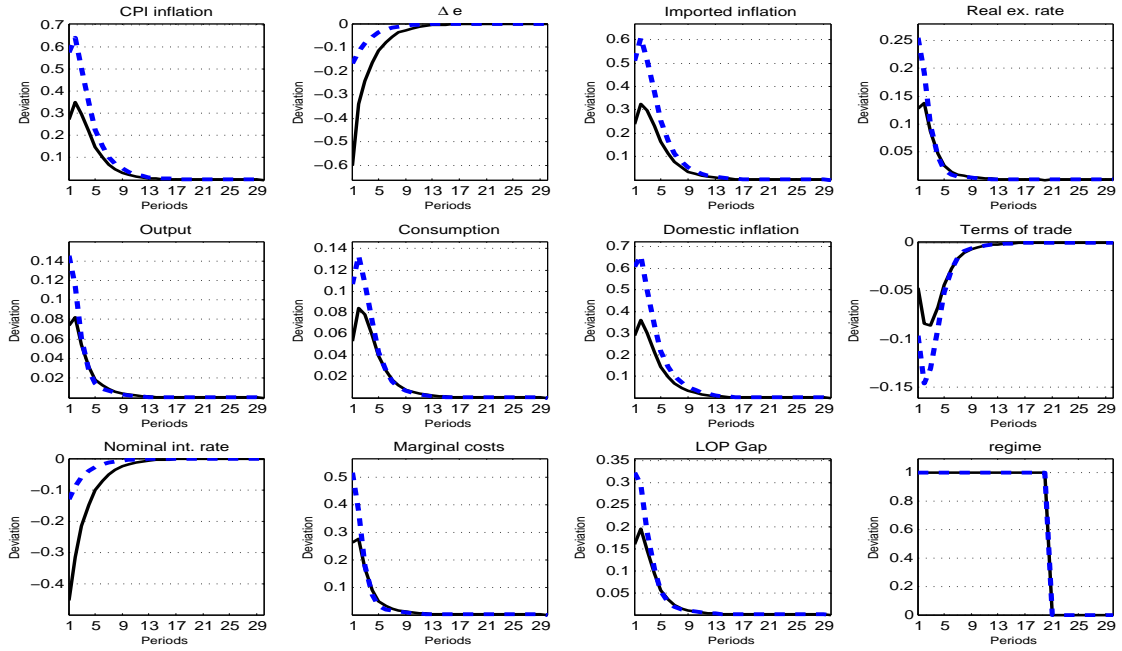
Figure 13: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign output ε^{y}
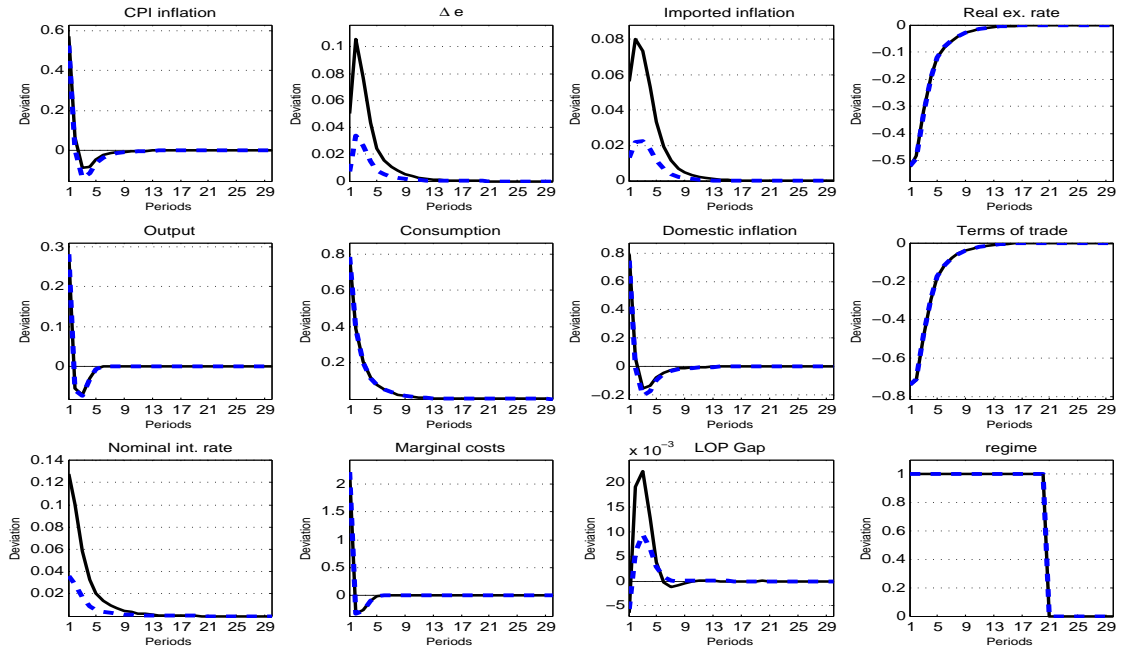
Figure 14: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign int. rate ε^i
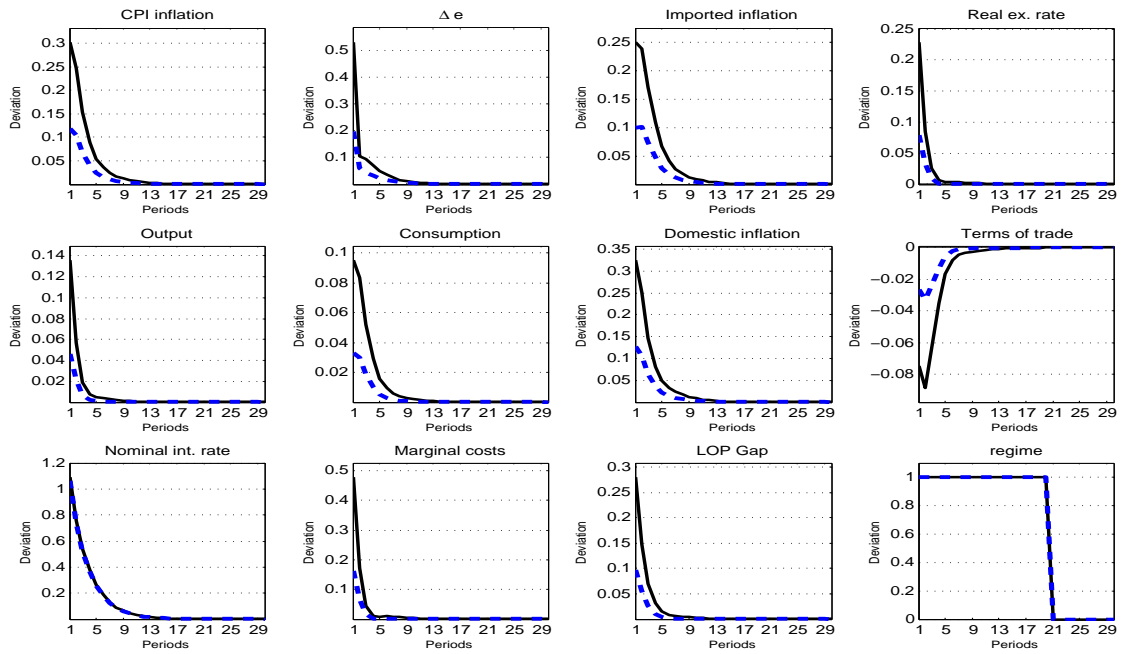
D   IRF: Regime change in 8 periods – for $IT2$

Figure 15: $IT2\to ET3$ (solid), $IT2 \to ET10$ (dashed) - resp.to technology shock ε^a

Figure 16: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to preference shock ε^g

Figure 17: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to risk prem. shock ε^s

Figure 18: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to policy shock ε^m

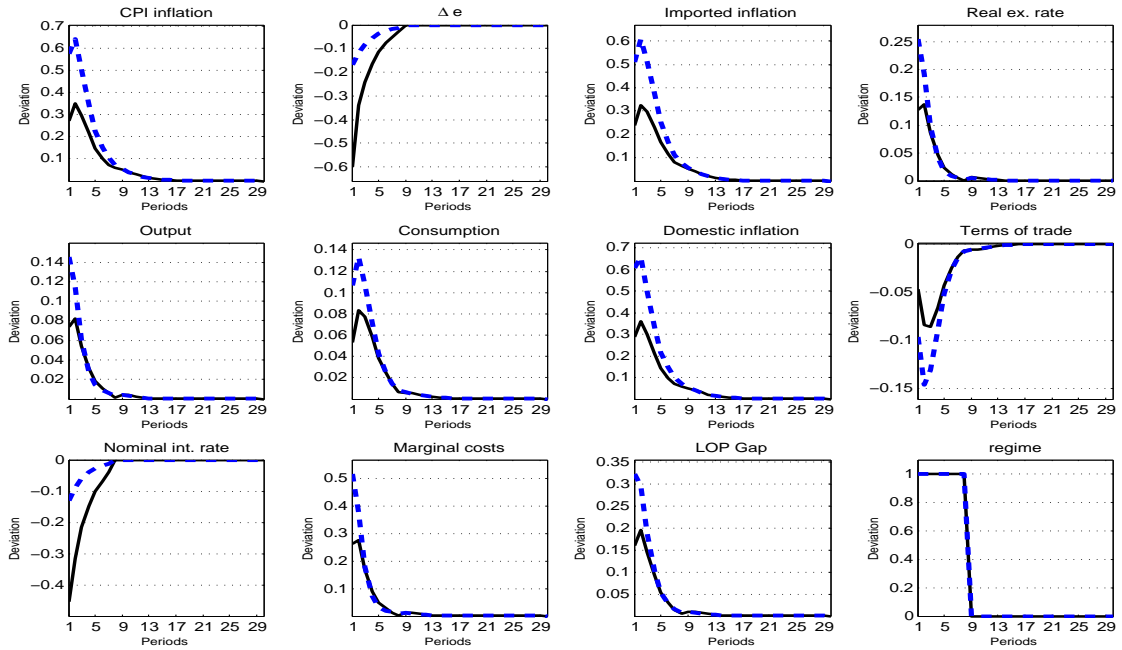Figure 19: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign inflation ε^π

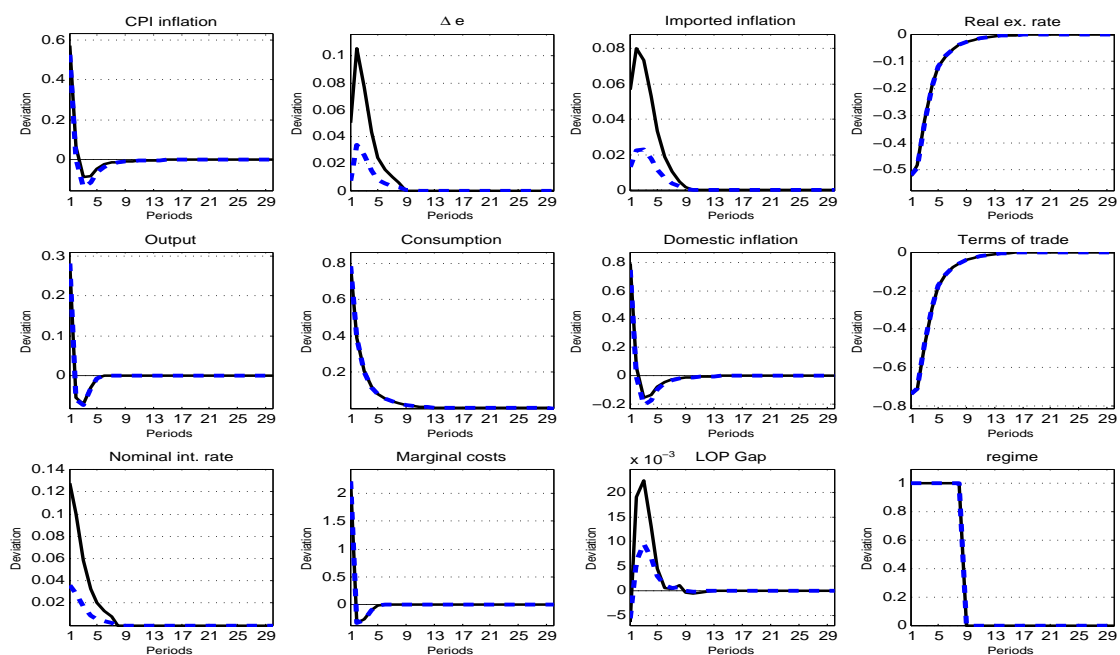Figure 20: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign output ε^y
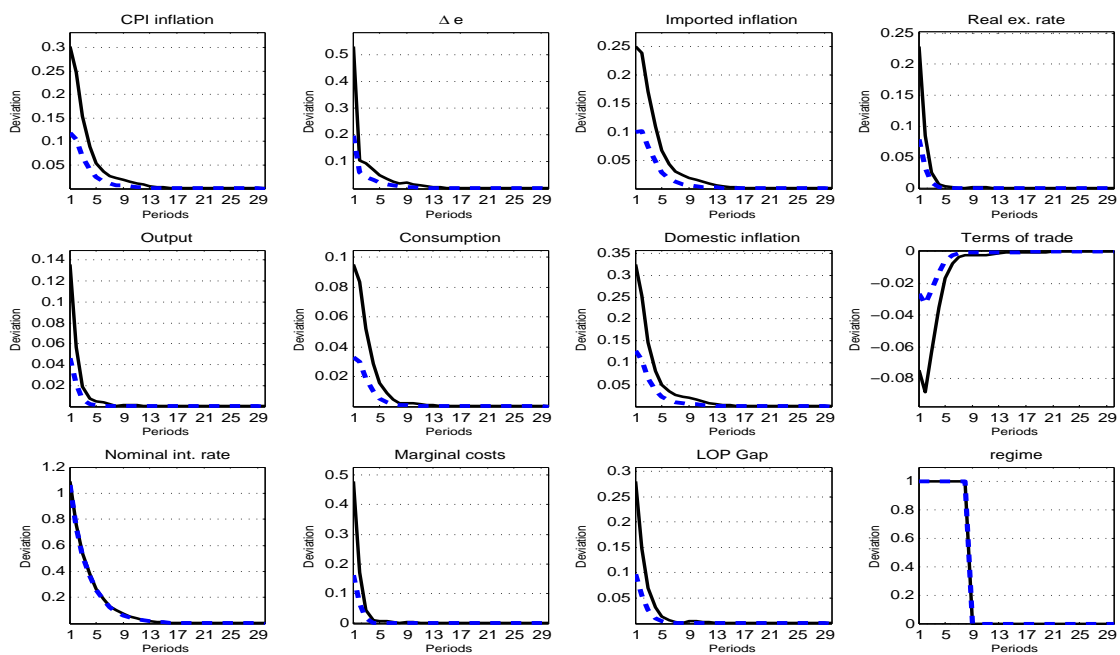

Figure 21: $IT2 \rightarrow ET3$ (solid), $IT2 \rightarrow ET10$ (dashed) - resp.to foreign int. rate ε^i

E   IRF: Regime change in 20 periods – for $ET1$

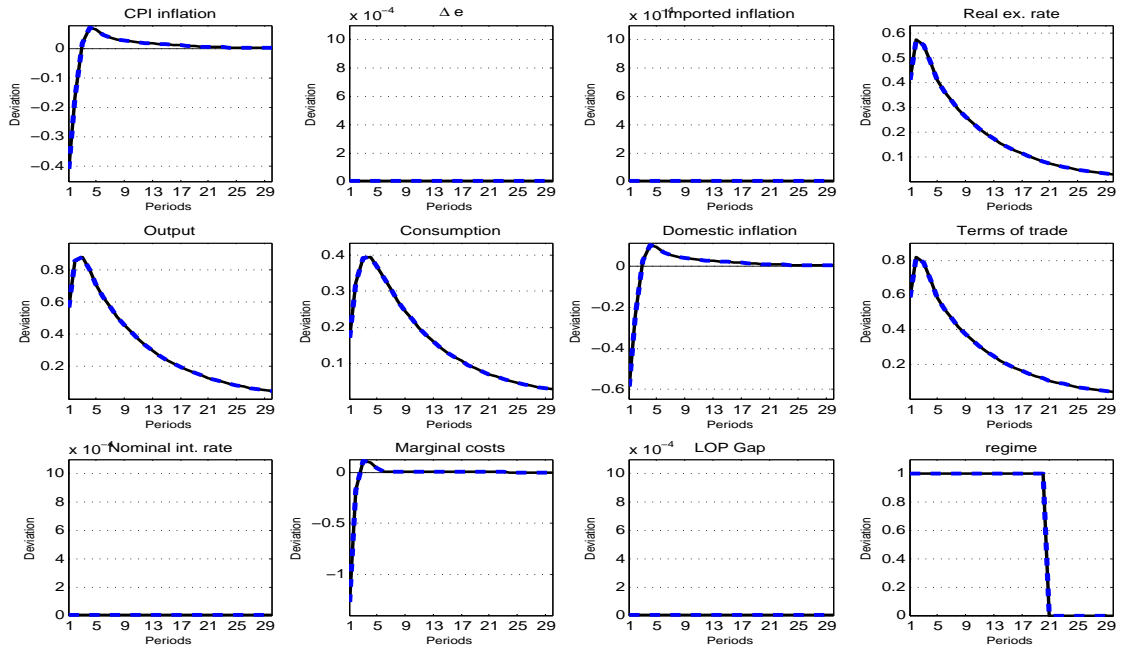Figure 22: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to technolog. shock ε^a

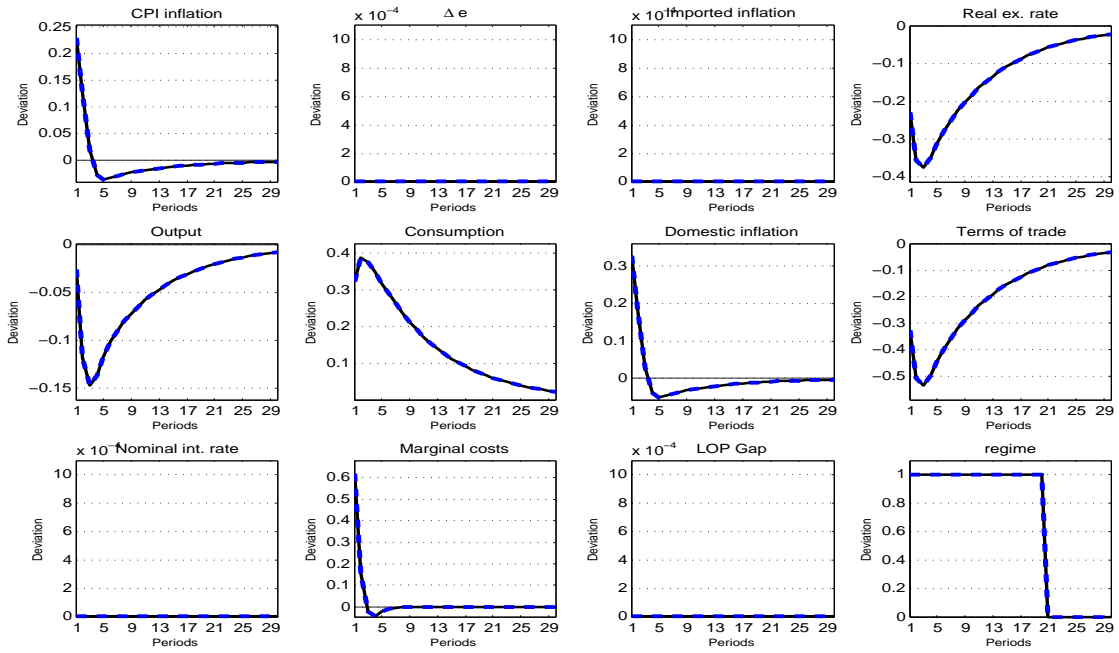Figure 23: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to preference shock ε^g

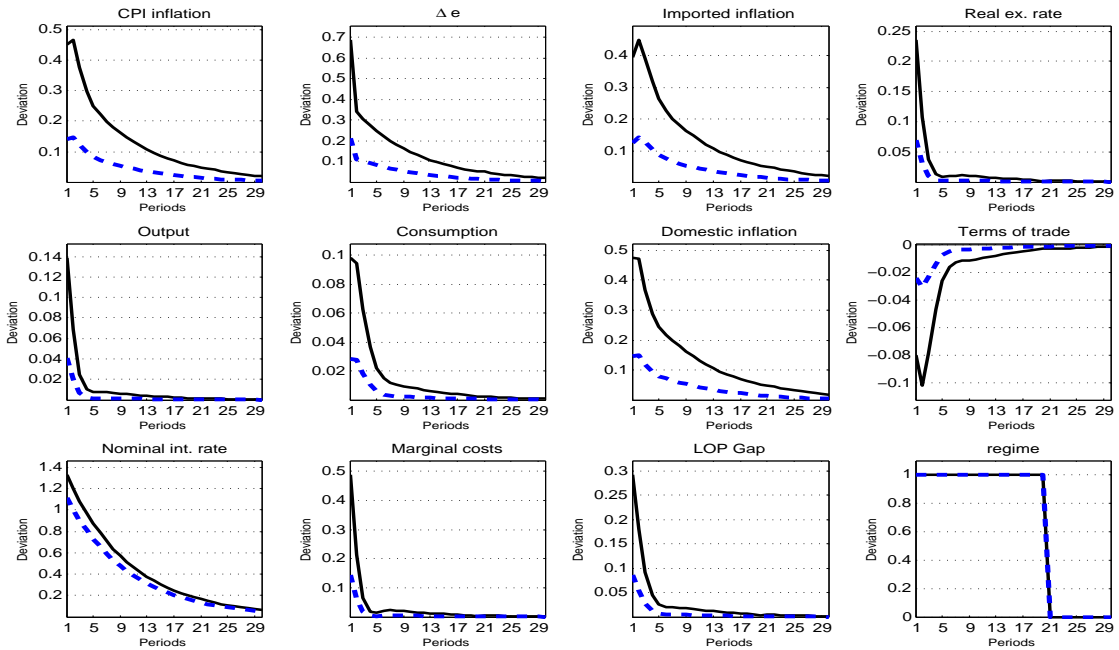Figure 24: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to risk prem. shock ε^s

Figure 25: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to policy shock ε^m
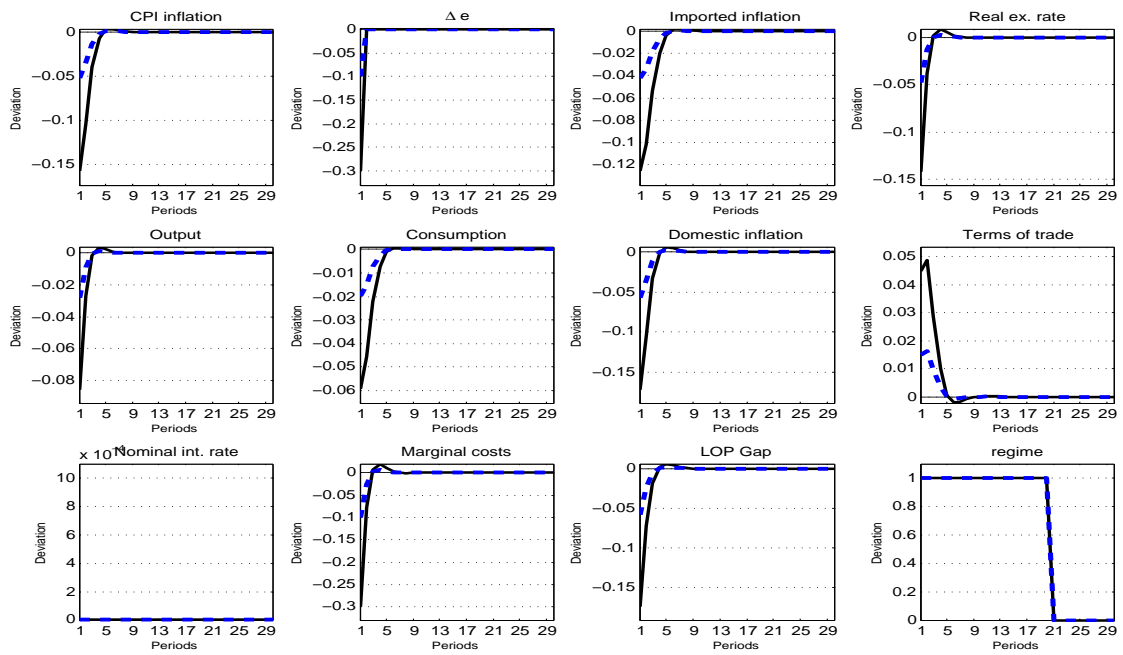
Figure 26: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to foreign inflation ε^π
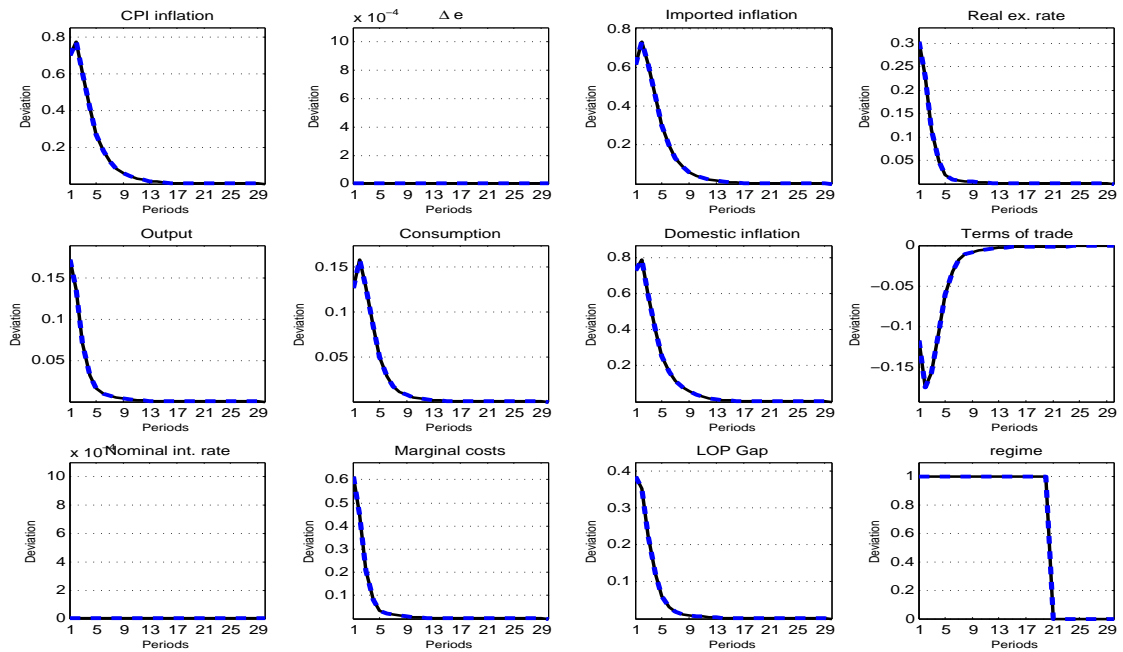
Figure 27: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to foreign output ε^y
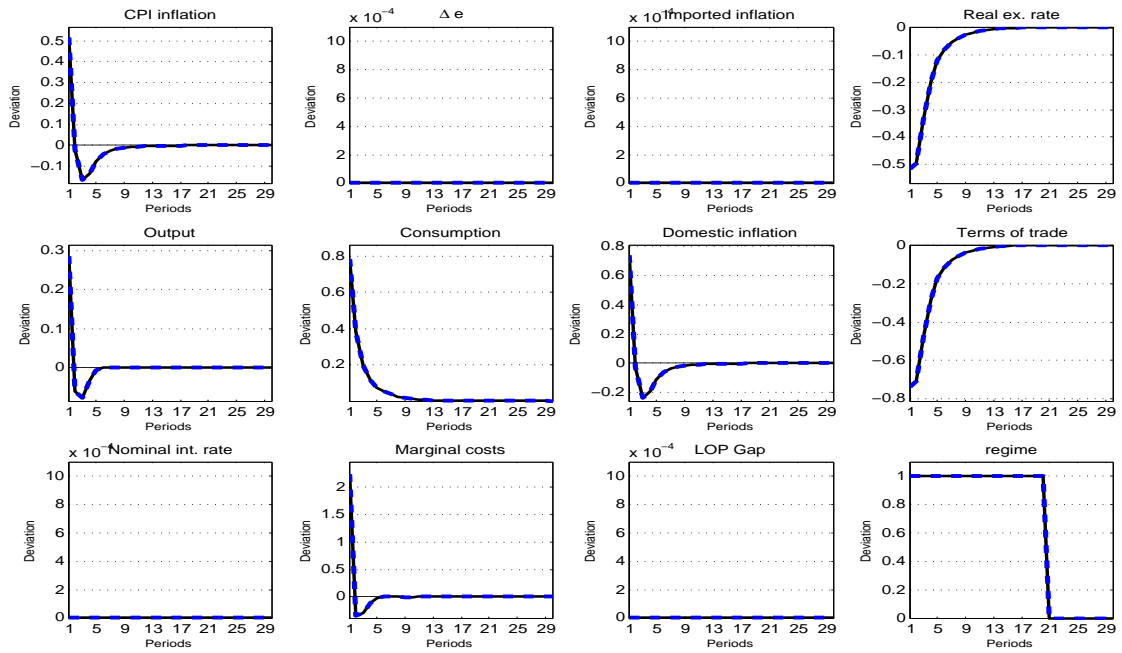
Figure 28: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to foreign int. rate ε^i
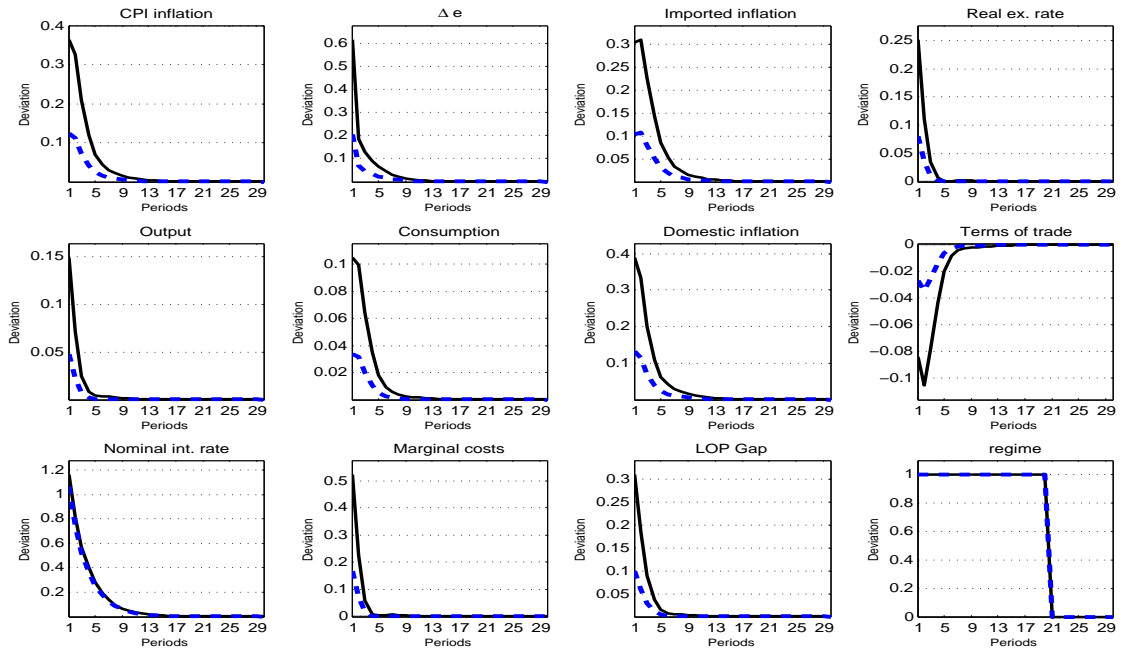
F   IRF: Regime change in 8 periods – for $ET1$

Figure 29: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to technolog. shock ε^a
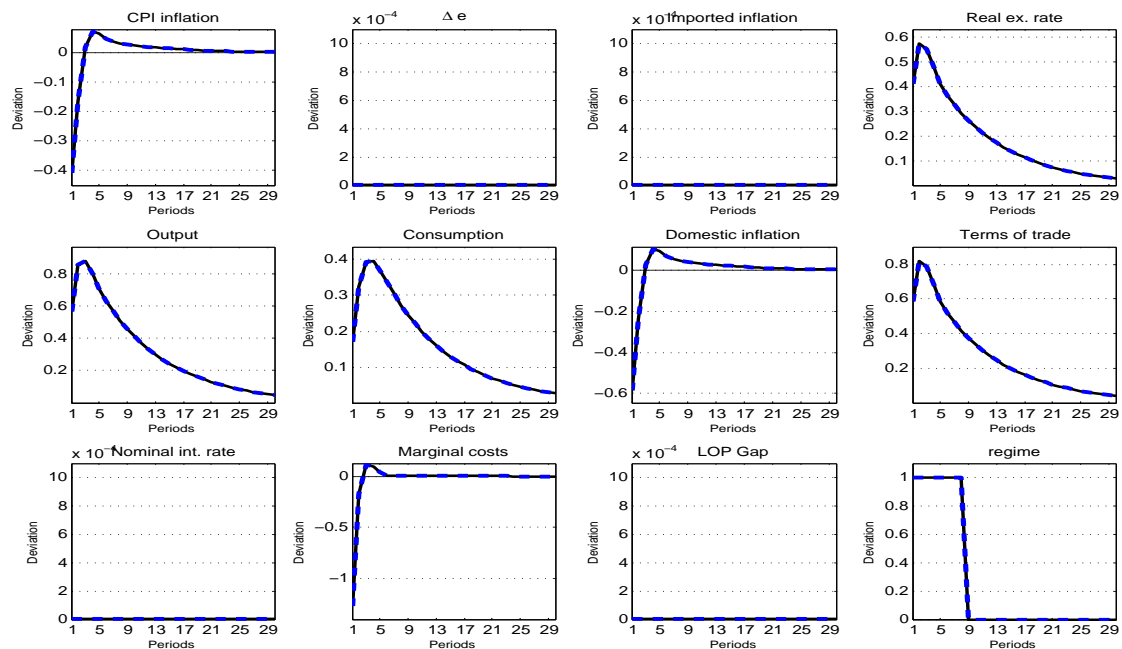
Figure 30: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to preference shock ε^g
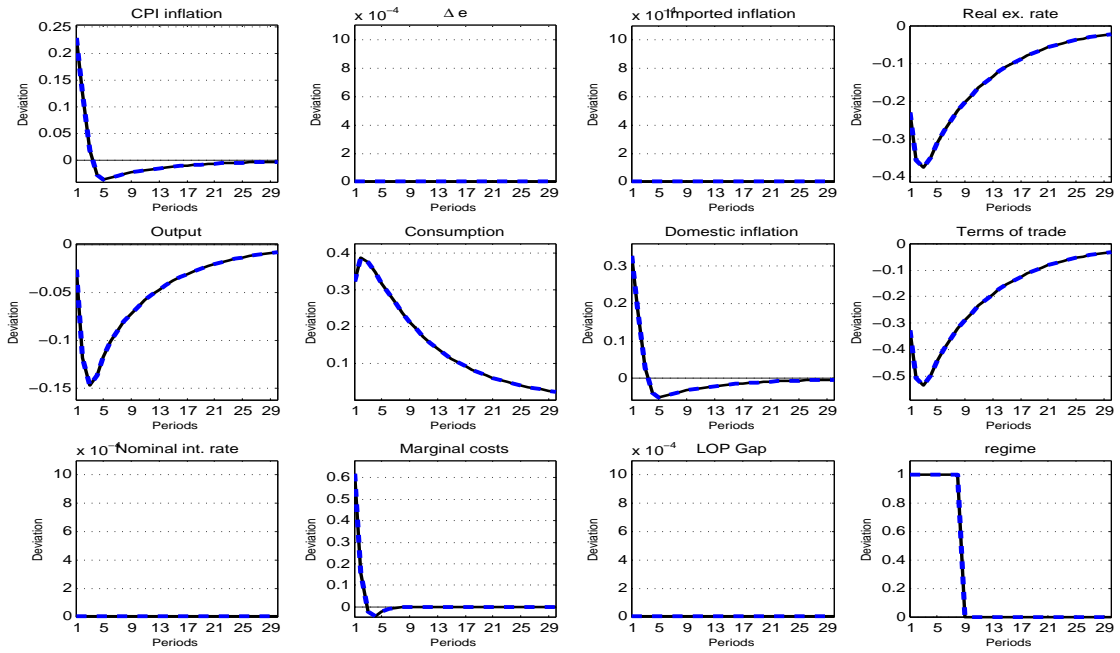
Figure 31: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to risk prem. shock ε^s
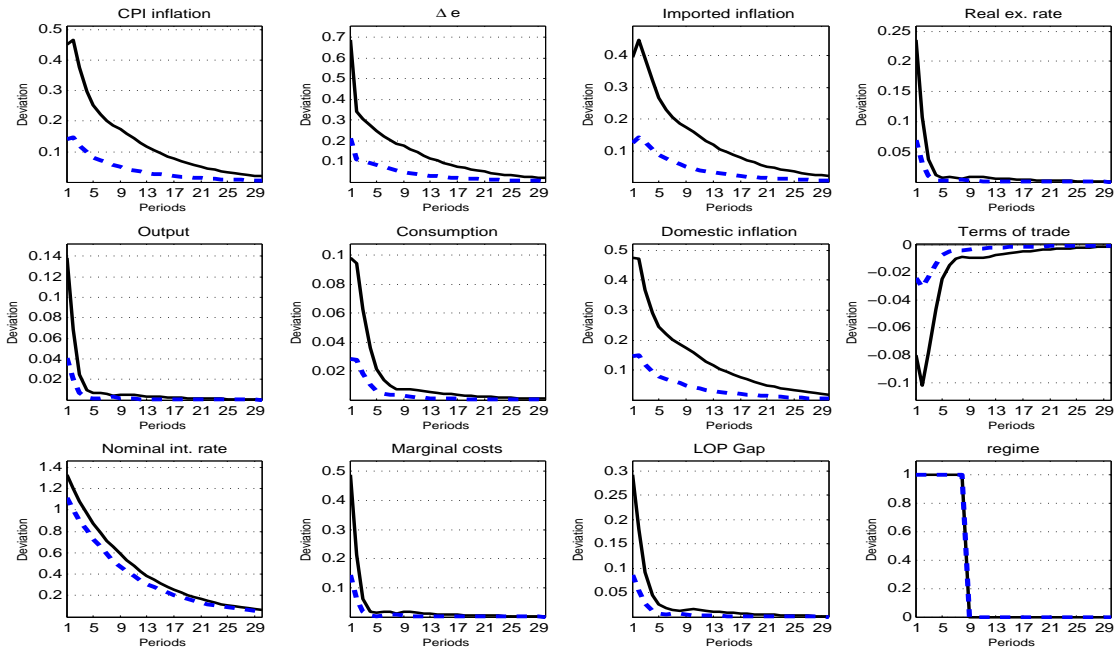
Figure 32: ET1→ $ET3$ (solid), $ET1 → ET10$ (dashed) - resp.to policy shock ε^m
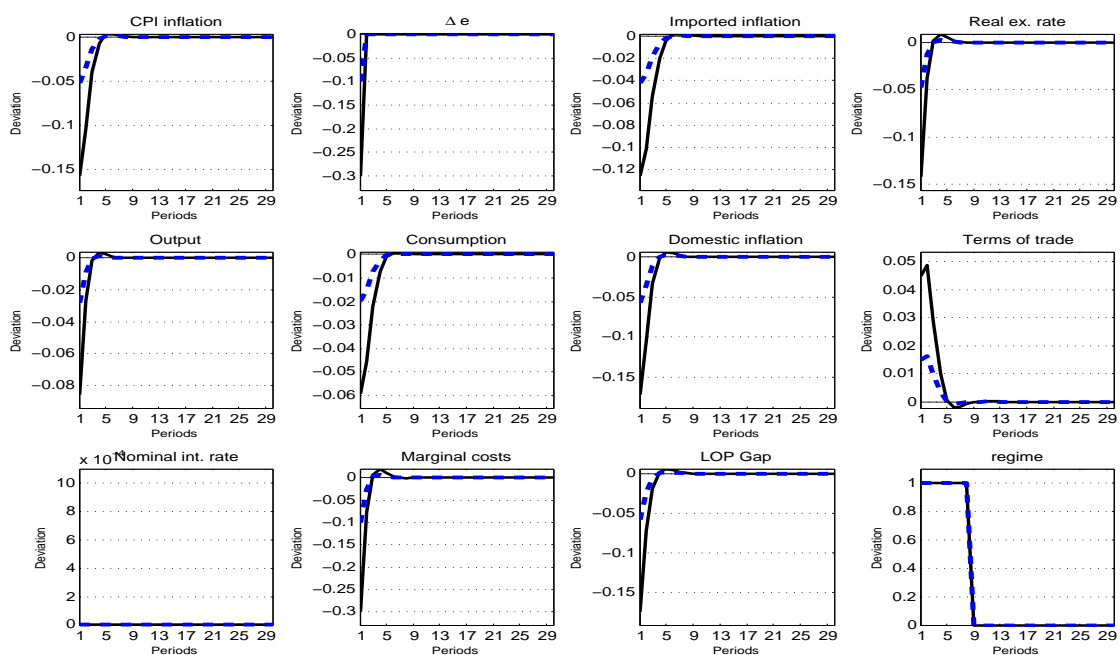
Figure 33: ET1→ $ET3$ (solid), $ET1 → ET10$ (dashed) - resp.to foreign inflation ε^π

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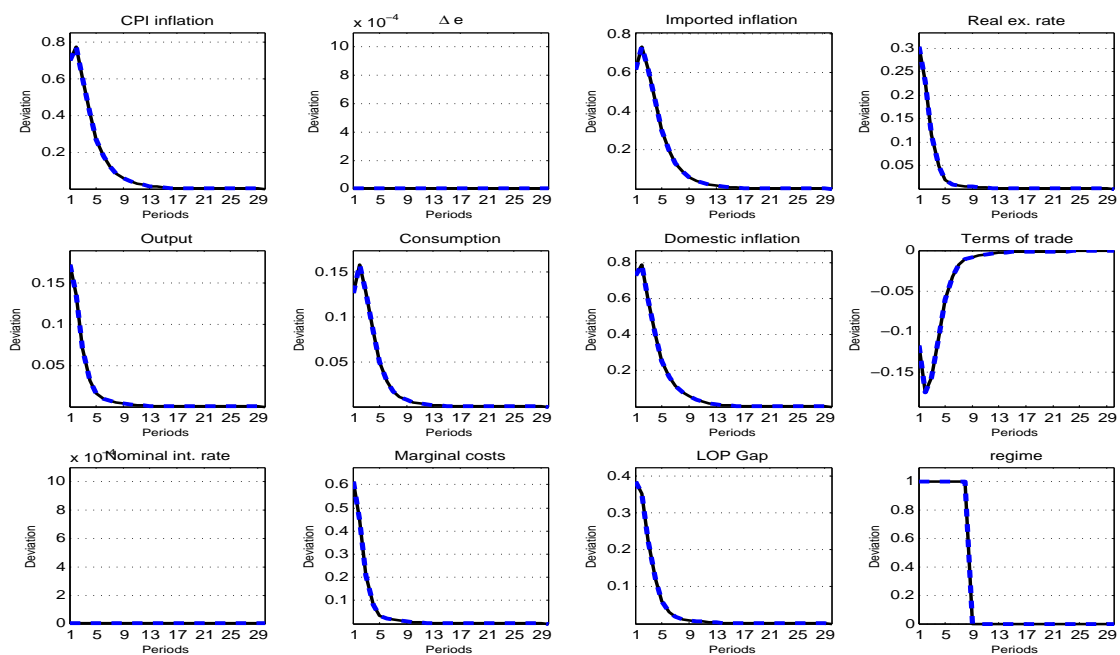
Figure 34: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to foreign output ε^y
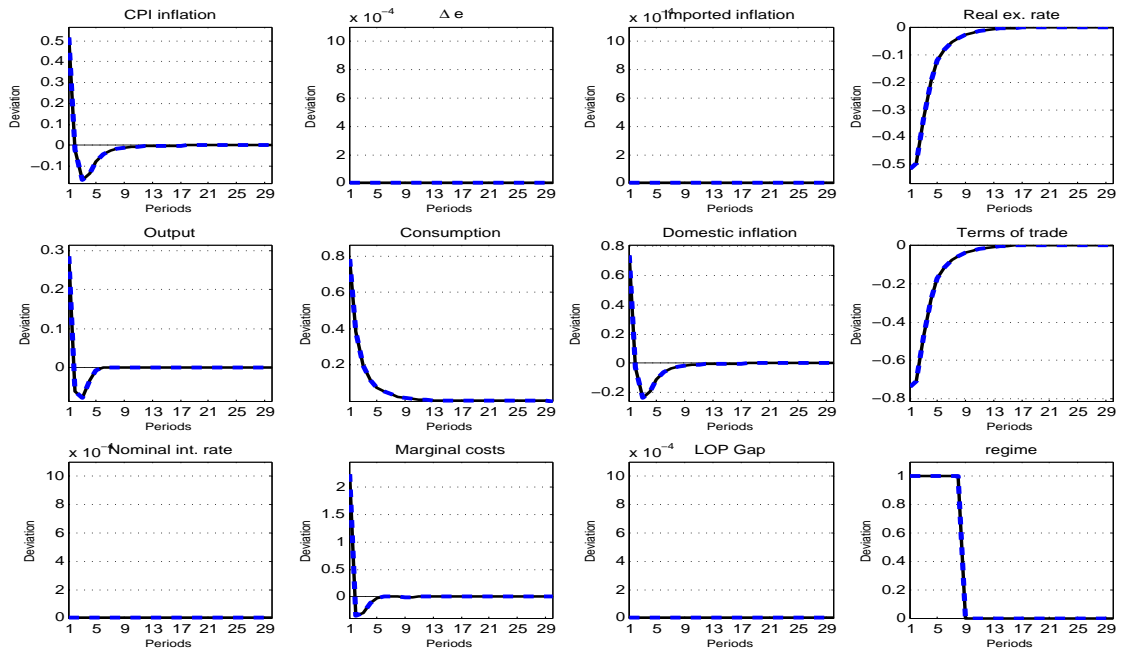
Figure 35: ET1→ $ET3$ (solid), $ET1 \rightarrow ET10$ (dashed) - resp.to foreign int. rate ε^i
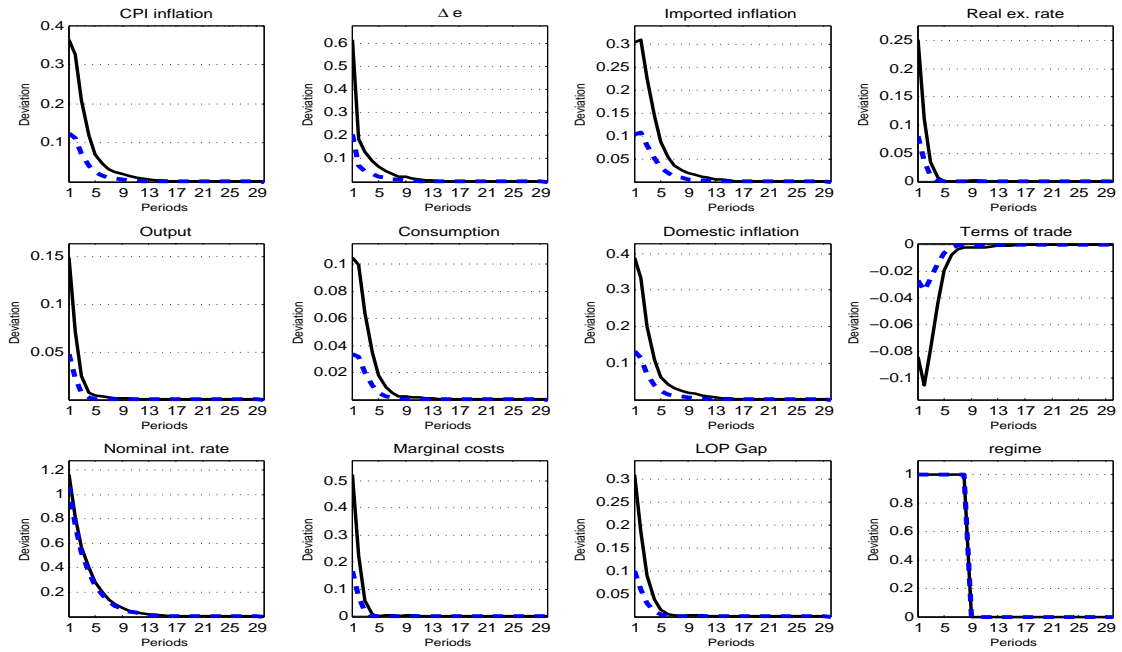
G Std.err: Regime change in 8 and 20 periods

Figure 36: Std.errors: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 20 periods)
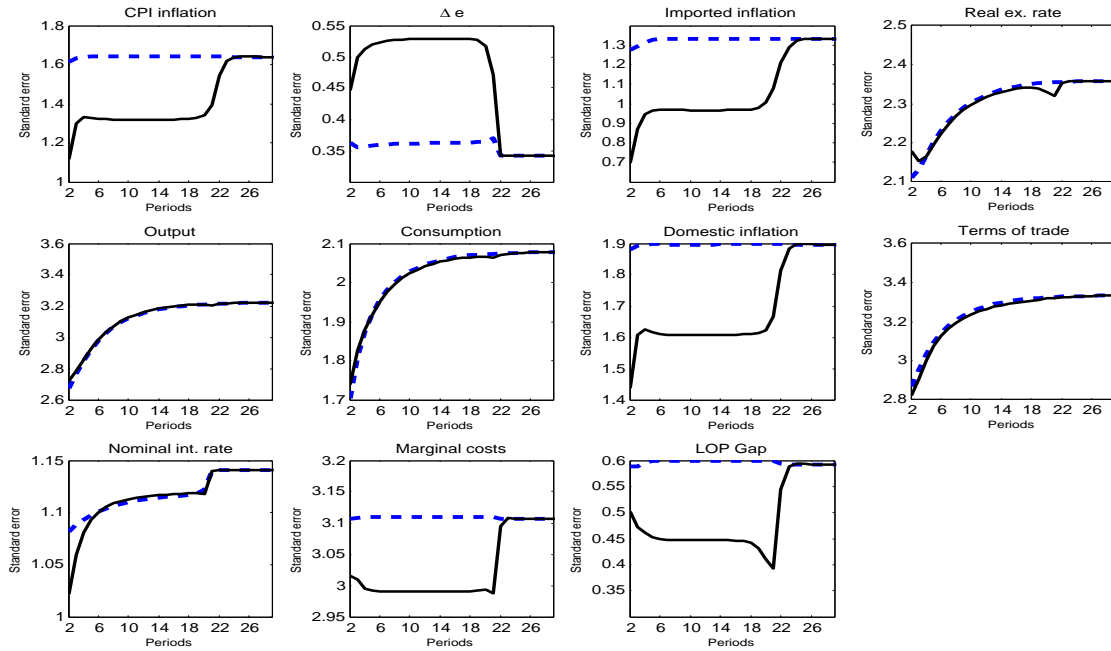
Figure 37: Std.errors: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 8 periods)
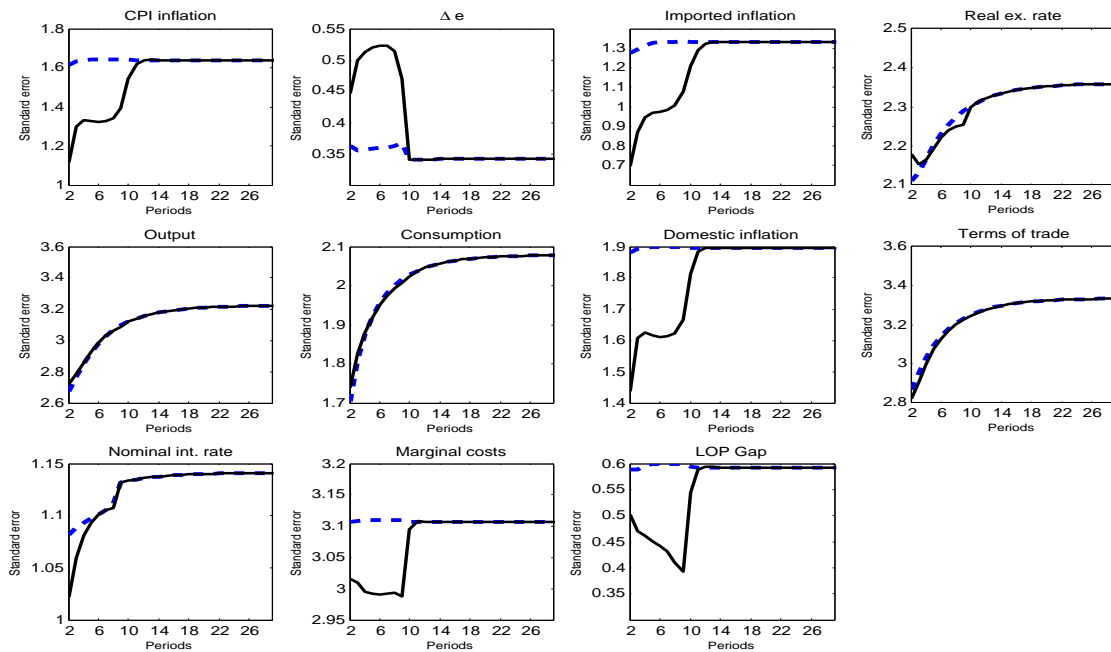
Figure 38: Std.errors: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET10$ (after 20 periods)
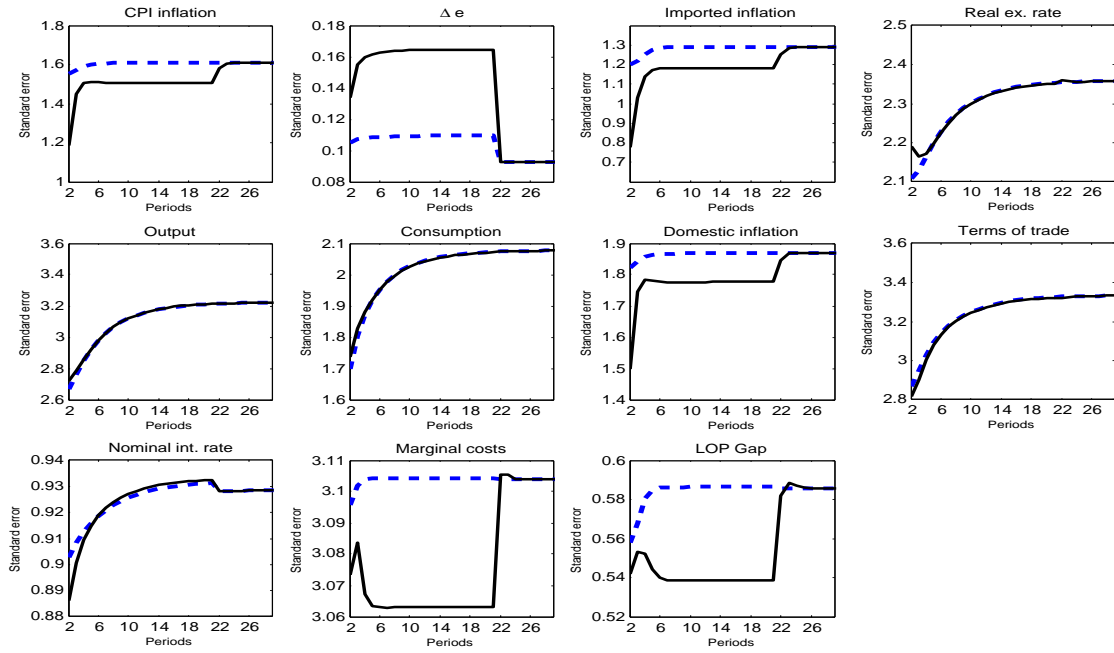
Figure 39: Std.errors: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET10$ (after 8 periods)

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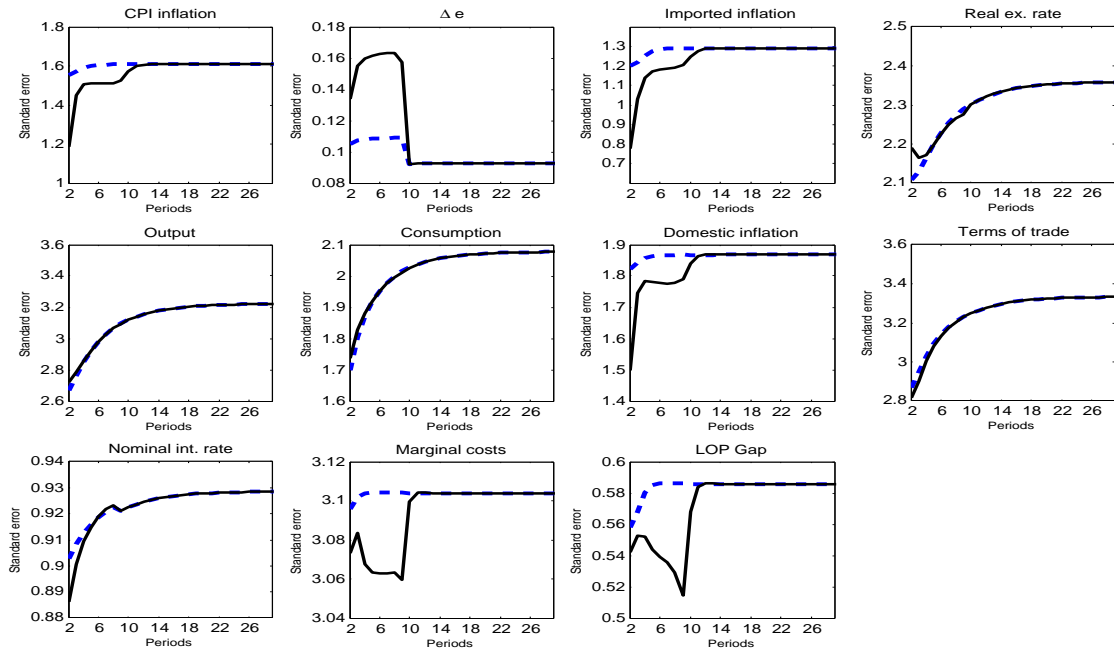
H Loss functions: Change to $ET3$ in 20 periods

Table 3: Loss1: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 20 periods)

$\lambda = 0.0$ $\lambda = 0.2$
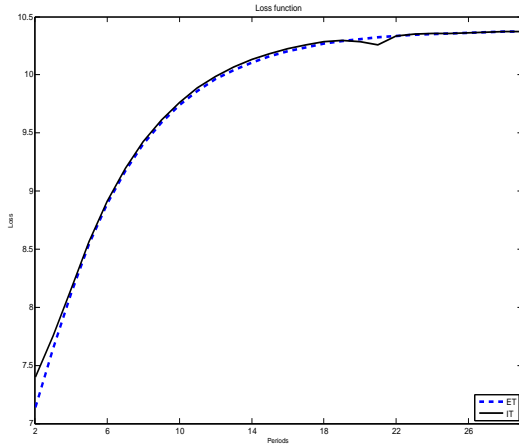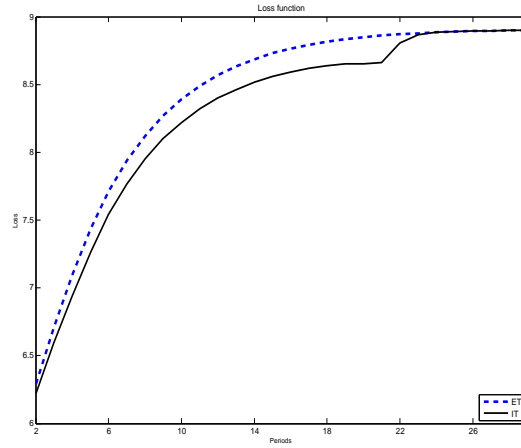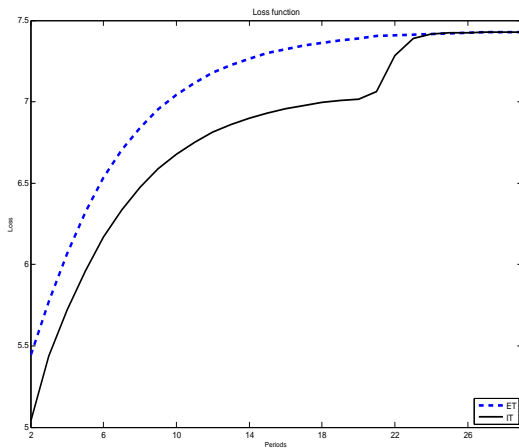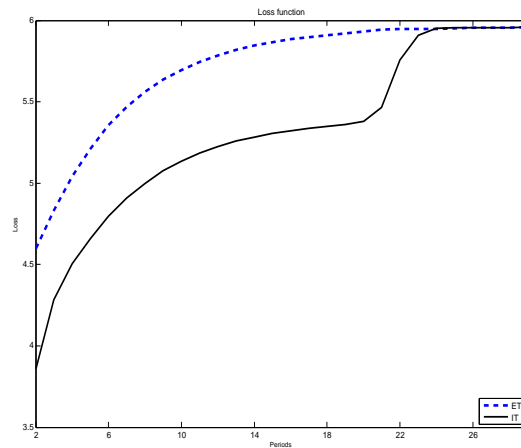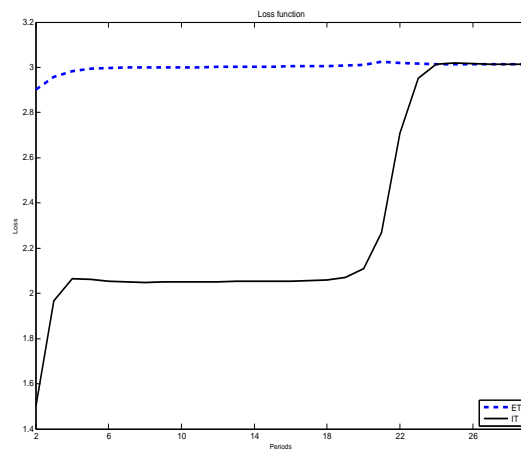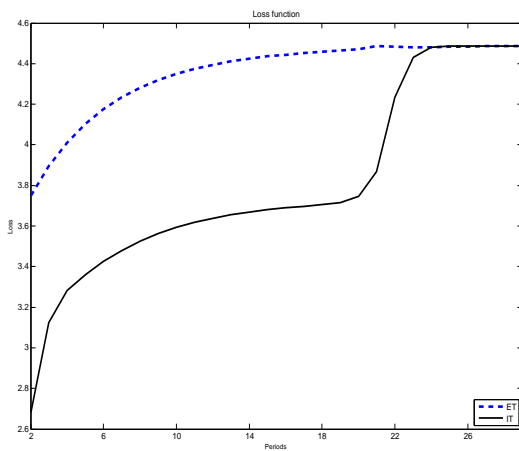
$\lambda = 0.4$ $\lambda = 0.6$

$\lambda = 0.8$ $\lambda = 1.0$

Figure 40: Loss2: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 20 periods)
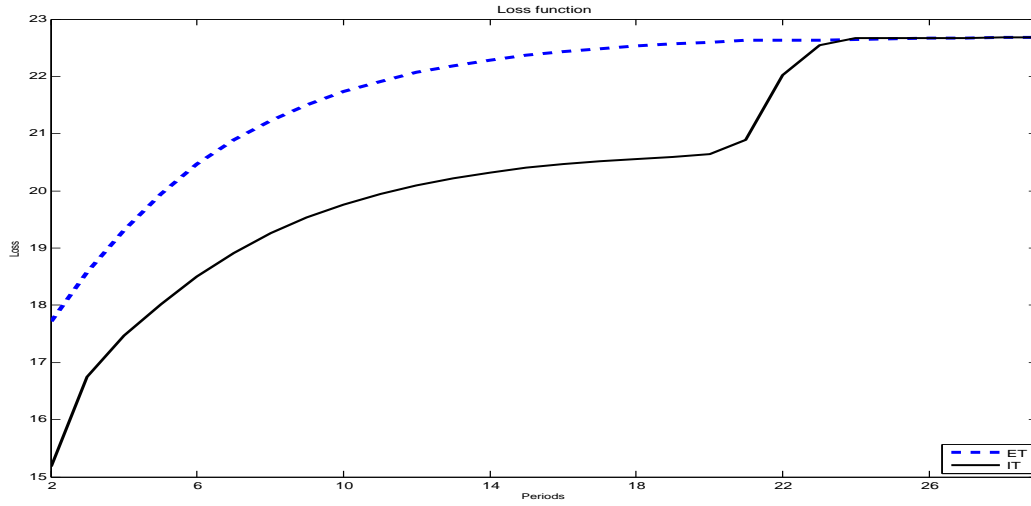
Figure 41: Terms of trade variance: Difference from IT
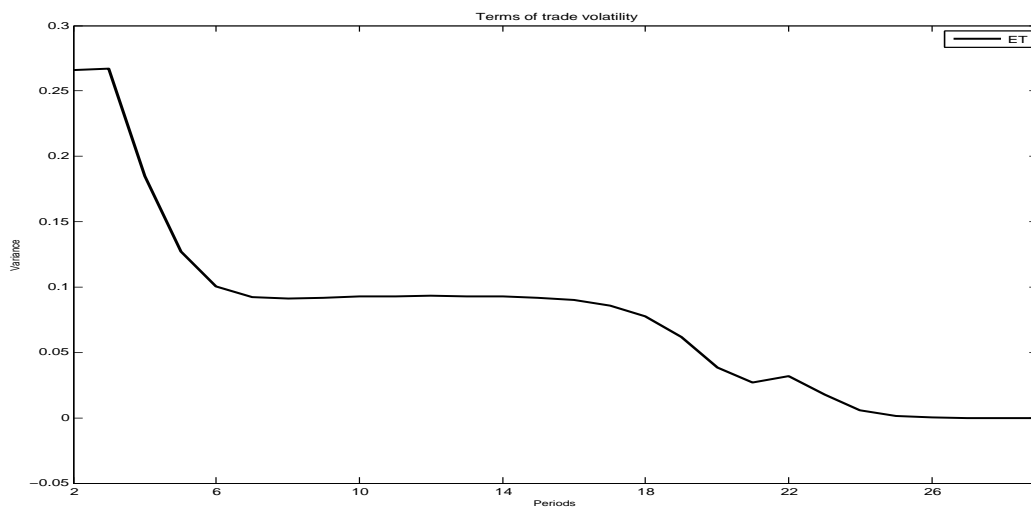
I   Loss functions: Change to $ET3$ after 8 periods

Table 4: Loss1: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 8 periods)

$\lambda = 0.0$ $\qquad\qquad\qquad\qquad\qquad$ $\lambda = 0.2$
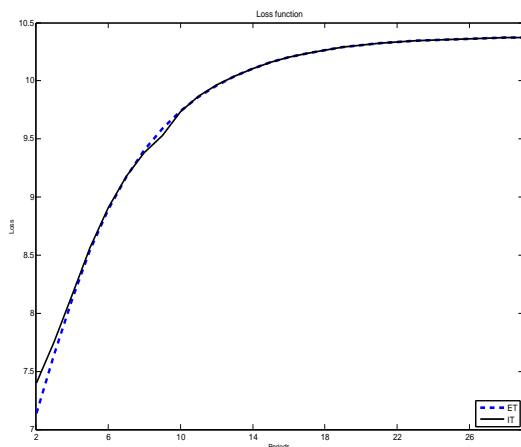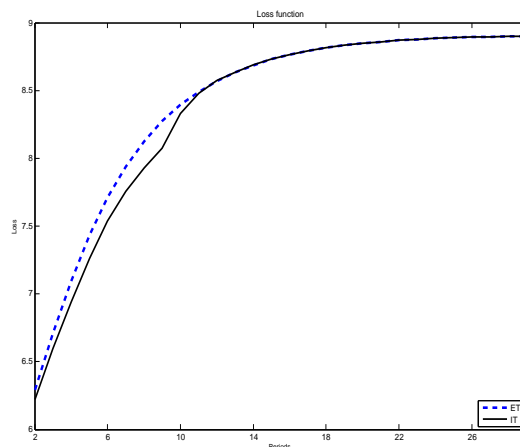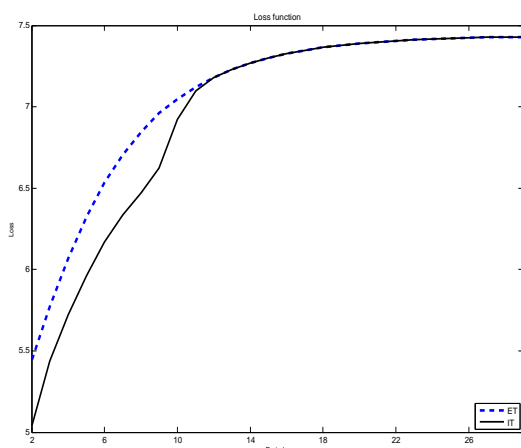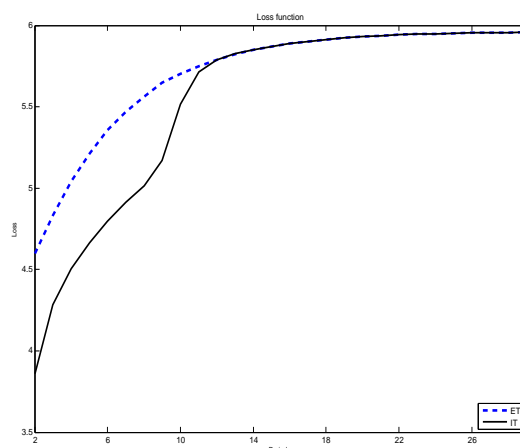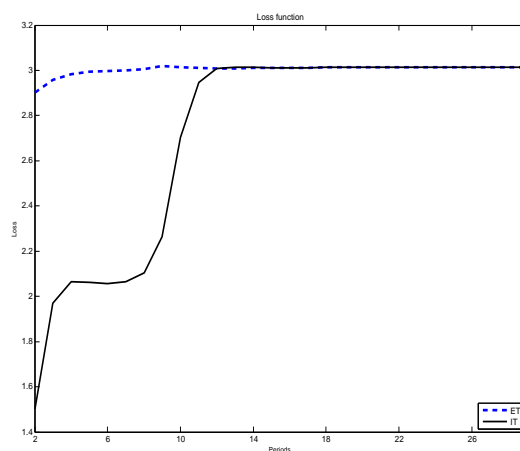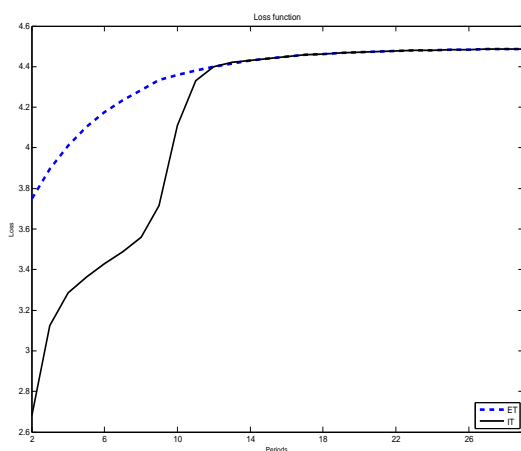
$\lambda = 0.4$ $\qquad\qquad\qquad\qquad\qquad$ $\lambda = 0.6$

$\lambda = 0.8$ $\qquad\qquad\qquad\qquad\qquad$ $\lambda = 1.0$

Figure 42: Loss2: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET3$ (after 8 periods)
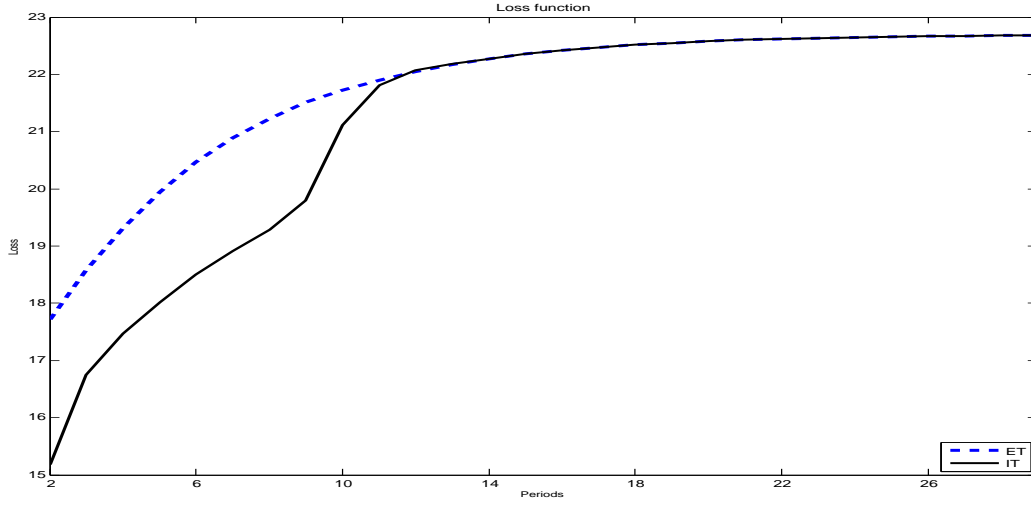
Figure 43: Terms of trade variance: Difference from IT
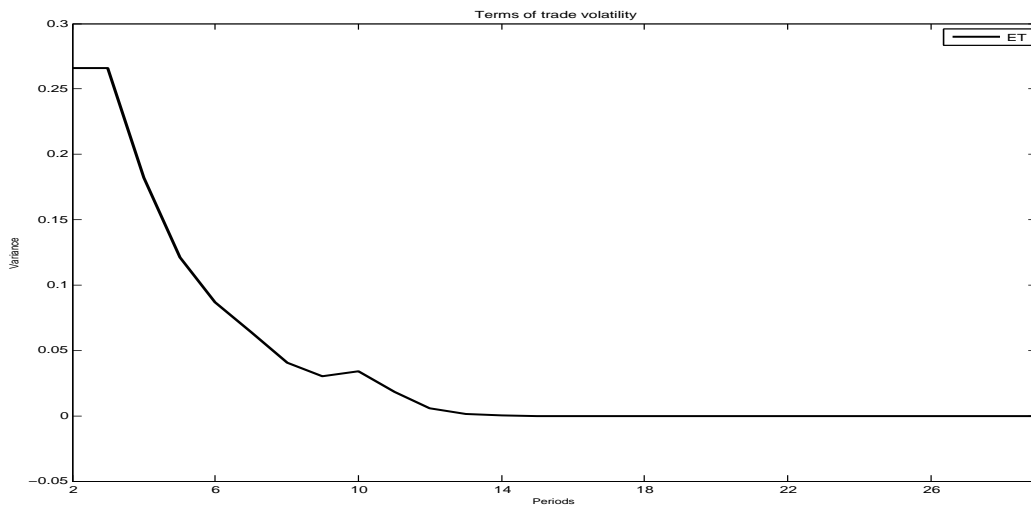
J Loss functions: Change to $ET10$ after 20 periods

Table 5: Loss1: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET10$ (after 20 periods)

$\lambda = 0.0$ $\qquad\qquad\qquad\qquad\qquad\qquad$ $\lambda = 0.2$
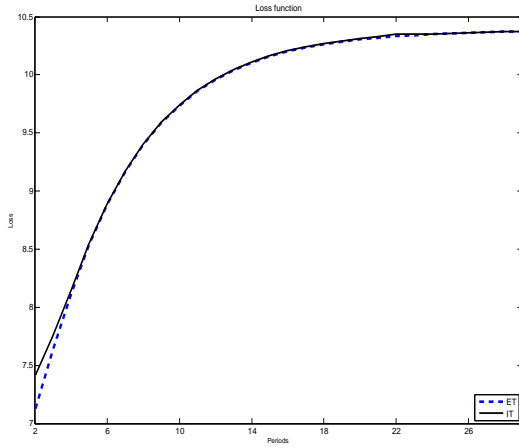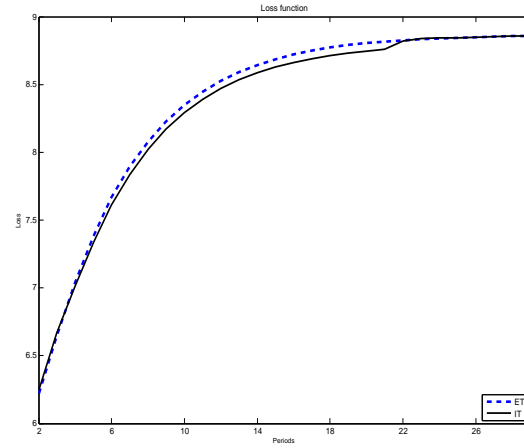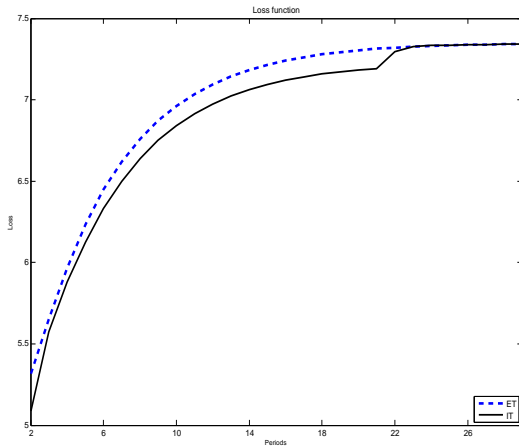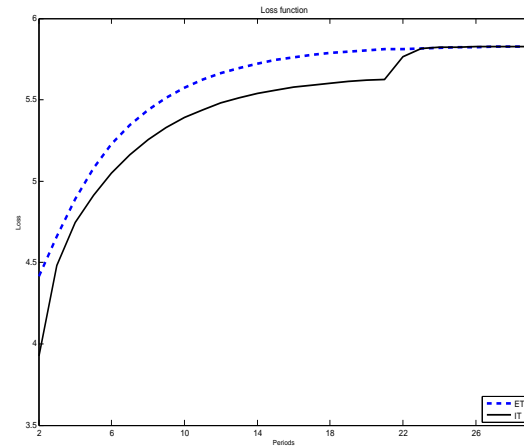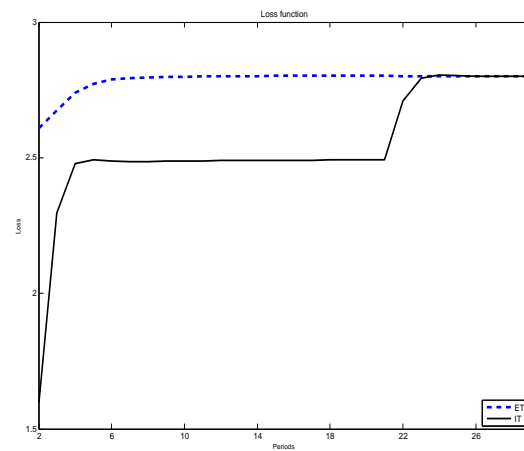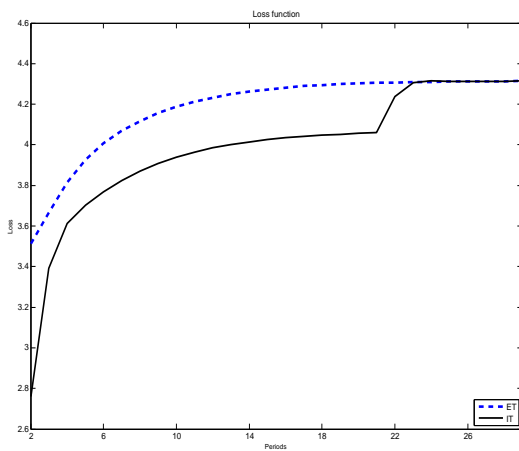
$\lambda = 0.4$ $\qquad\qquad\qquad\qquad\qquad\qquad$ $\lambda = 0.6$

$\lambda = 0.8$ $\qquad\qquad\qquad\qquad\qquad\qquad$ $\lambda = 1.0$

Figure 44: Loss2: $IT2$ (solid), $ET1$ (dashed)$\rightarrow$$ET10$ (after 20 periods)
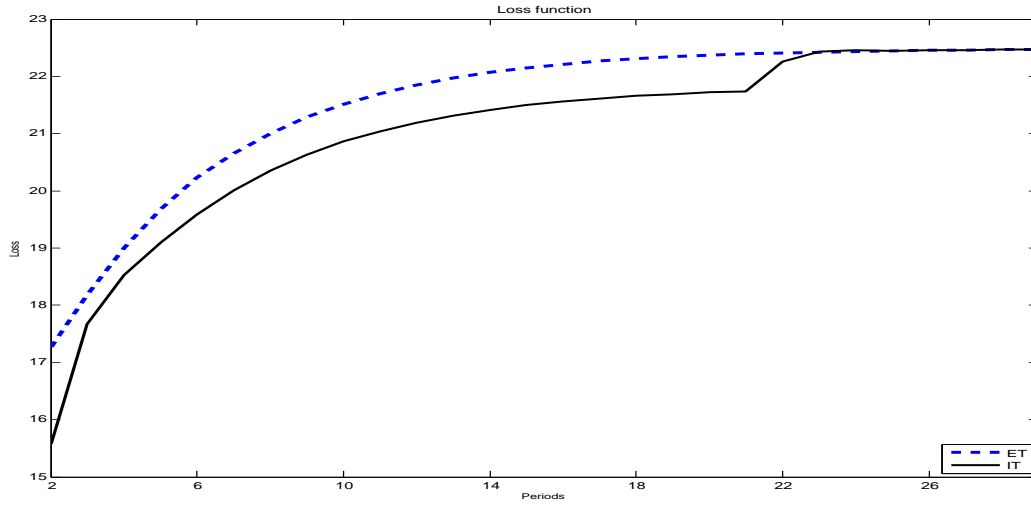
Figure 45: Terms of trade variance: Difference from IT
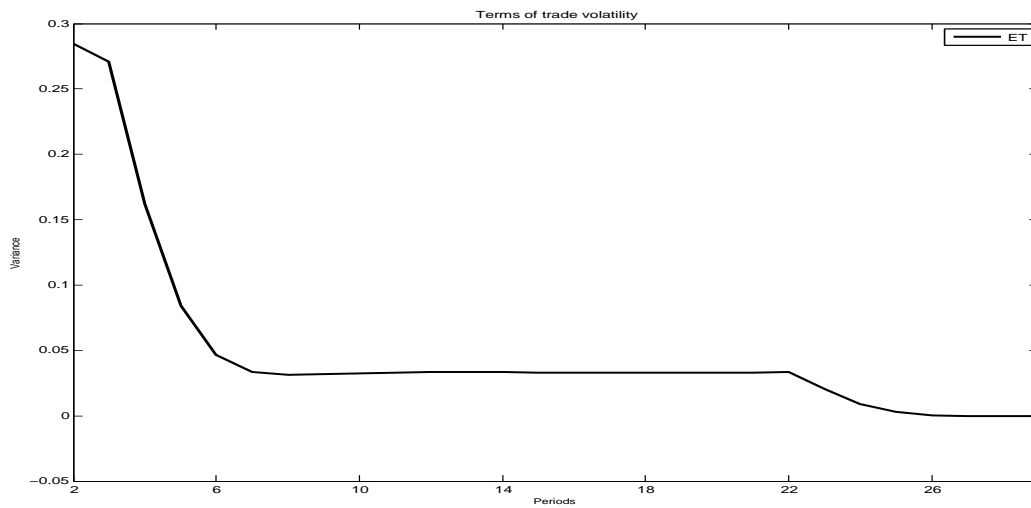
K   Loss functions: Change to $ET10$ after 8 periods

Table 6: Loss1: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET10$ (after 8 periods)

$\lambda = 0.0$ $\lambda = 0.2$
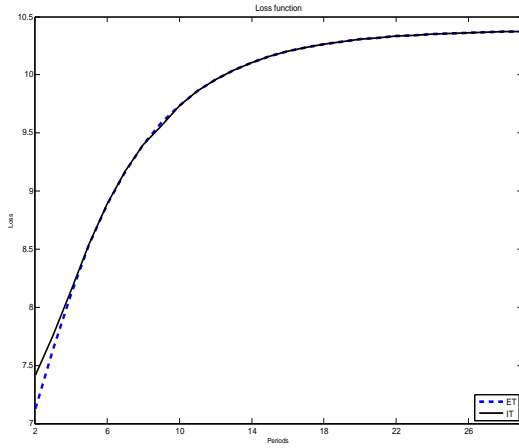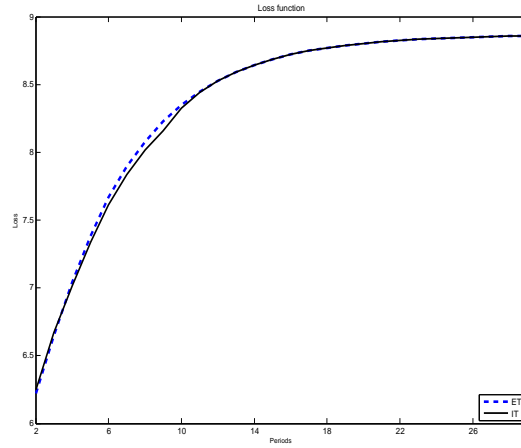
$\lambda = 0.4$ $\lambda = 0.6$
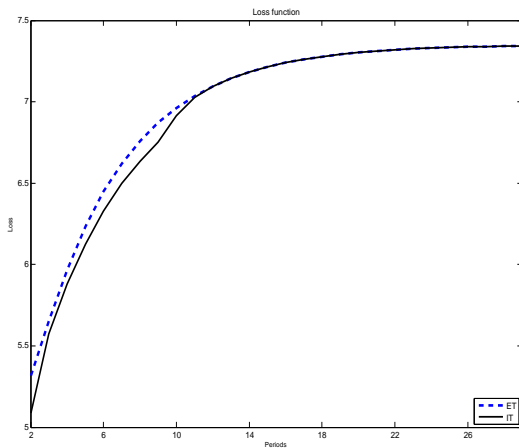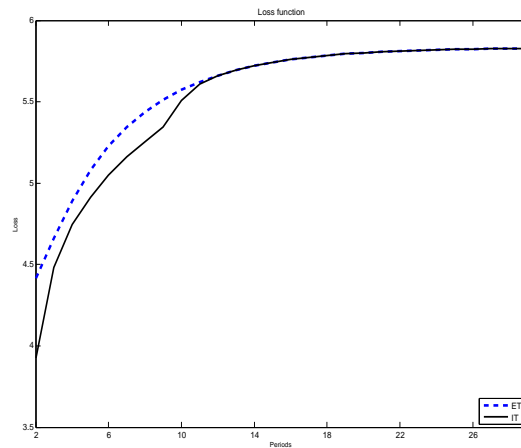
$\lambda = 0.8$ $\lambda = 1.0$
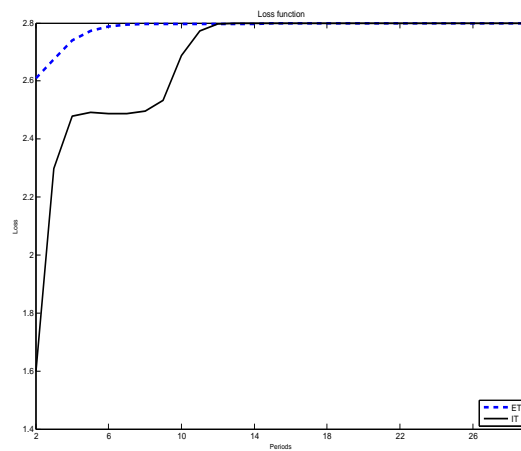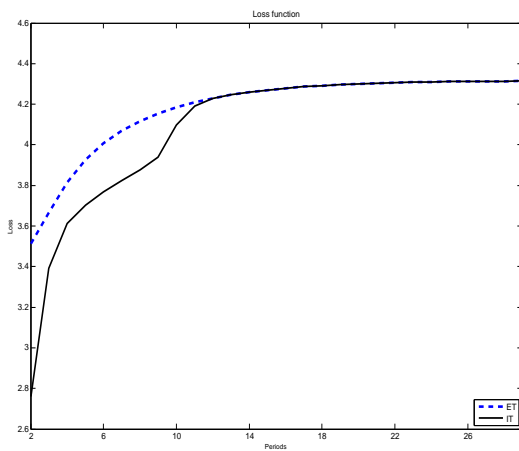
Figure 46: Loss2: $IT2$ (solid), $ET1$ (dashed)$\rightarrow ET10$ (after 8 periods)
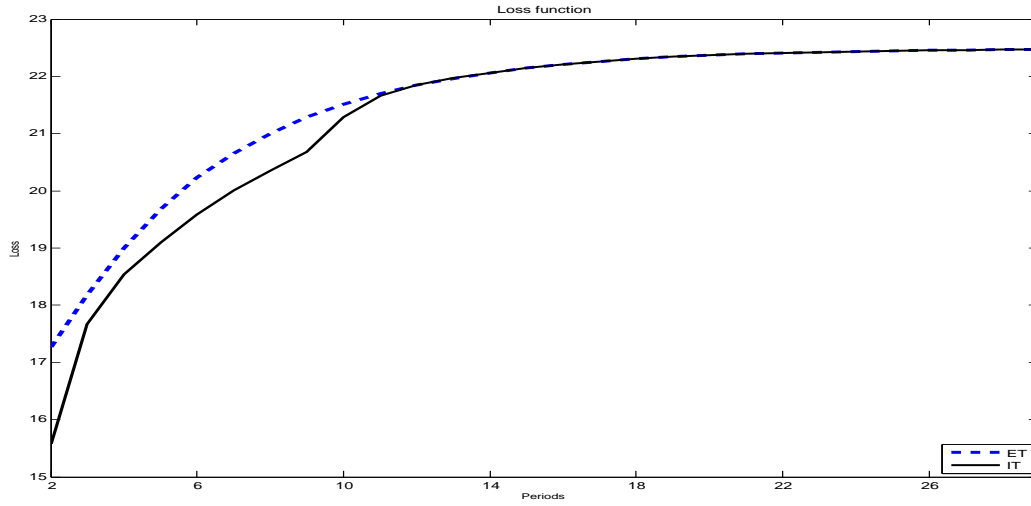
Figure 47: Terms of trade variance: Difference from IT
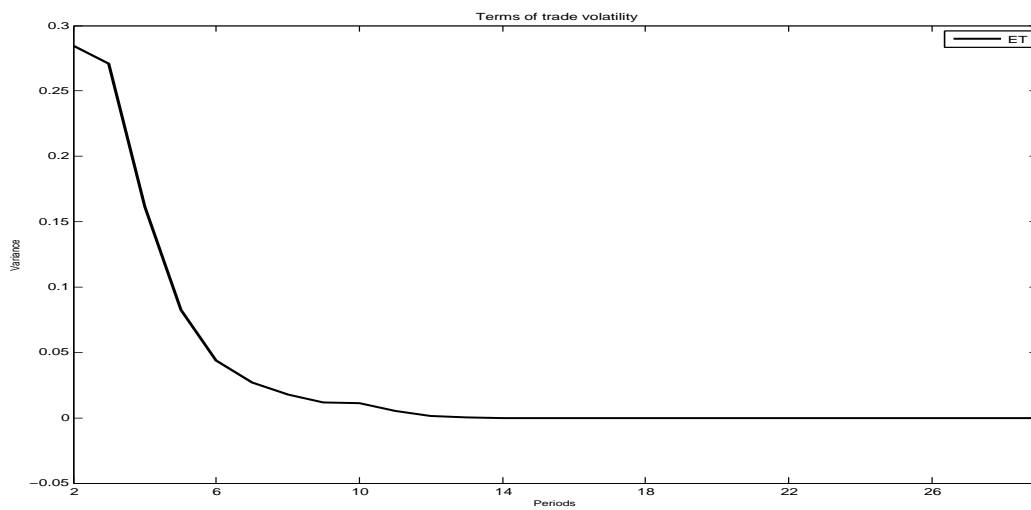
2. Second chapter – Strategic behavior of political parties after the fall of communist regimes

Communist regimes constituted about one-third of the world's regimes in the late eighties. The breakup of those regimes caused a completely new situation for the whole world, including communist parties and political parties entering new post-communist governments. Right after the breakup, communist parties typically lost their governing power. They became the opposition parties, and new democratic parties entered governments and thus were responsible for economic and other reforms. Regarding communist parties, they were typically disorganized and weak, and the transformation into social democrats might have turned out to be a plausible strategy for them. However, the communist parties in many countries did not transform but remained orthodox. As for democrats, they did not implement a common, dominant or prevalent way of reform in every economy but rather various alternative reforms were adopted. In any case, the ownership structure has changed rapidly and significantly in post-communist economies. The magnitude of privatization is unprecedented, with more that fifty thousand medium and large scale operations privatized in less than a decade. This is almost ten times the number of privatizations than in the rest of the world for the previous ten years.

In this chapter I focus on how the incentives of post-communist governments in choosing a particular privatization method interact with the incentives of communist parties to transform into social democrats, given the preferences of voters and budget constraints. Thus I will analyze the strategic behavior of the political parties after the fall of the communist empire.

The evidence reveals that incumbent democrats tended to implement the privatization method of direct sales in countries where communist parties transformed into social democrats. This occurred in Bulgaria, Estonia, Hungary, Latvia, Poland and Slovakia. In all these countries transformed communist parties came to power sooner or later (typically sooner). The only economy with direct sales as a primary method of privatization and with untransformed communists is Kazakhstan's, where one party has dominated from the beginning of the post communist era.

On the other hand, incumbent democrats tended to implement mass privatization (privatization by vouchers) in countries where communist parties did not transform into social

democrats and rather preferred to stay orthodox. This is the case of Armenia, Azerbaijan, Czech Republic, Georgia, Kyrgyzstan, Russia and Ukraine. In all these countries communist parties have remained in opposition after the breakup of communism. The only country implementing voucher privatization where the communist party transformed into social democrats is Lithuania, where they came to power right after the electoral term, in which privatization was implemented. The last country where voucher privatization is reported as a primary method of privatization is Moldova, a country with untransformed communists still in power. The last country with untransformed communists is Belarus, which is implementing MEBO as the primary method of privatization. In the other post communist countries, communists transformed and management-employee buyout (MEBO) type of privatization is reported as the primary privatization method.

Given the evidence, I study the incentives of both communists and democrats by using a strategic form game between communists and democrats reflecting the preferences of voters and budget constraints. I analyze the strategic behavior of both democrats and communists and show that the Nash equilibria are consistent with the prevalent evidence.

The chapter proceeds as follows. Section 2 reviews the literature. Section 3 documents and describes the evidence. Section 4 provides the model of strategic games. Section 5 concludes.

2.1 Related Literature

Many authors have studied the effects of privatization methods. Bortolotti and Pinotti (2005) analyzed the impact of political institutions along with their partisan orientation on privatization decisions. They argue that the more fragmented are the democracies, the "war of attrition" among different veto players tends to delay the privatization based on large-scale methods. Furthermore, right-wing incumbent parties that significantly value re-election opt for privatization method that leads to the ownership spread among domestic voters. Marcincin and Wijnbergen (1997) studied the effect of the privatization methods on enterprise performance in the Czech Republic. They argue that the voucher method was viewed as a tool to ensure the political feasibility of the political program and the fairness of privatization, while direct sales created concentrated ownership structures as a base for following corporate control and restructuring. Empirical evidence tends to support the view that the two objectives of mass privatization, political feasibility and building appropriate incentives of new owners

contradict one another. The key point of the authors is that the firms' performance is affected by the selection process and the combination of voucher privatization method with outsider owners is preferred to the method of overall voucher privatization. Bennett J., Estrin, S. and G. Urga. (2004) investigate the impact of differences in privatization methods, private sector and capital market on economic growth in transition countries. They use the dynamic panel method and find growth to be positively associated with capital market development.

The integration of hypothesis-testing and a cross-national comparison of communist and post-communist party systems into a historical perspective is comprehensively analyzed in Kitschelt et al (1999). The central argument of the book is that the historical legacies of both pre-communist and communist regimes have shaped the post-communist politics of these countries.

Corruption in post communist countries was studied for example by Sajo (1998). The author argues that corruption in Eastern Europe is dominated by the regional clientelistic social structures emerging in those countries. According to Sajo, an analysis of corruption requires an understanding of clientelism, pointing out that clientelism is a form of social organization, whereas corruption is an individual social behavior. Corruption thus may or may not become a mass phenomenon. It is possible to have clientelism without corruption, however the two typically go hand in hand. Sajo concludes that corruption is a consequence of the misuse of power in a regime with clientelistic social structures.

Regarding theoretical literature, Hotelling (1929), in his early paper analyzed the equilibrium of spatial economic competition between two firms that chose the location and then the price. He concludes that the firms would locate right next to each other, because both firms could be better off by moving in the direction of the other firm. The equilibrium location is found at the center of the interval, which is the location of the median consumer. Although Hotelling analyzed spatial differentiation, he stressed that the model can be applied to other differentiation, such as differentiation of political programs. The results would be analogous – political parties tend to offer programs that resemble one another, instead of offering quite different alternatives, which is the location of the median voter.

The spatial theory of voting has developed to the point where it can be broken down into fields such as agenda theory and probabilistic theory, as mentioned in the book by Enelow and Hinich (1990). The book consists of seven essays investigating the issues in the spatial theory of voting.

Most of the literature on electoral competition focuses on the study of static models. They typically stick to the Dawnsian tradition, in that parties are only office motivated and they do not care about the quality and level of public goods provision. There are interesting models that implement more dimensions into the electoral models. Besley and Coate (2000) develop a multi-dimensional model of electoral competition in which they provide explanations for why policy outcomes on certain issues may diverge from the majority of preferences in representative democracies. Cantillon and Rangel (2000) build the model on the Hotelling-Downs framework of party competition over the unit line. They examine how new issues in politics such as ethnic identity or concern for the environment affect the equilibrium outcomes. They model the emergence of this new issue as the emergence of a new dimension of political differentiation. This transforms the unit line into a rectangle. The authors point out that the model departs from standard spatial electoral models in two respects. First, the model allows for entry in a two-dimensional issue space, while in most articles one dimensional issue space or no entry or both is assumed. Second, parties can choose a single-issue platform rather than take a position on all issue dimensions (xenophobic, green or independents parties are examples of single-issue platform parties).

Aragones (1997) focuses on a dynamic voting model. In static models, parties decide strategically which policy to advocate in order to win the election. Voters decide which party they like best and the models typically predict only the election outcome. These static models capture some of the important features of party competition; they ignore some others, though. In reality, elections are repeated over time. In dynamic models the circumstances under which elections as well as voters' preferences are held are changed. Moreover, the distinction between a candidate and his party, as separate decision makers with potentially different goals, arises. Aragones in her dynamic setting treats past performance of the incumbent parties as the most reliable information that is available to the voters. In fact, voters usually tend to express dissatisfaction with the parties in office. This was supported by several studies, finding that negative information is weighted more intensively than positive information. This tendency is called the negativity effect.

Aragones (1995) builds a dynamic model of political competition, taking the negativity effect of the voters' decision rule into account. Moreover, she allows the voters' preferences to change over time according to the past performance of the political parties while in office. This model is able to explain the emergence of ideologies and it allows the formation of ideological political parties

In two papers ((1995) and (1997)), Aragones assumes that dissatisfaction rather than satisfaction drives voters' choices. As a result, voters vote against parties, rather than for them.

The model I use was inspired by the electoral competition models such as those in Persson and Tabellini (1999) and by Cantillon and Rangel (2000), who introduce a new dimension in political differentiation. Electoral competition models are also presented in the book by Persson and Tabellini (2000). They point out that if voters have ideological preferences, forming the new dimension in political space, parties are not perfect substitutes and thus they can profit from rents (corruption). Even if voters observe that their preferred party is corrupt (or they observe that less public goods were provided), they may vote for it because ideological preferences might outweigh the negative experience with corruption (less public goods). Hence, ideological preferences create an ideological dimension that matters in voters' decision making. If there were no ideological differences among parties, parties would be perfect substitutes and if there were complete information, no rents could be appropriated by any party.

Persson and Tabellini treat the ideological dimension as exogenous. In my model this dimension also appears, but here parties are able to behave strategically and they can make the ideological dimension disappear. In other words, parties can affect the polarization of the political arena. I treat the ideological dimension not generally but as a result of different preferences of voters for communism and democracy, which is a specific feature of the political arena in the transition economies. Moreover, the contribution of this chapter is also in providing evidence that is in line with theoretical conclusions.

2.2 Evidence

In Table 1 I summarize evidence relevant for the analysis. The primary method of privatization was published in Bennett et al (2004). The other data are my own. Election results in the early years of transition period are summarized in the appendix. Armenia, Azrbaijan, Belarus, Georgia, Moldova, Russia and Ukraine have been excluded because the cabinets are not generally lined up by partisan arrangements but by presidential decision.

We observe that in 10 out of 23 post-communist countries, the communists have remained orthodox. In several countries they are weak but in others they formed strong opposition (Czech Republic, Kyrgyzstan, Russia and Ukraine). In two countries they

remained in power (Belarus and Moldova). No communist party except for those two has entered government after the fall of communism so far. The governing parties in those countries typically dominate the political arena or at least remained in power for quite a long time. In the Czech Republic and Georgia, the government that implemented privatization stayed in power for three electoral terms in a row.

Those countries typically implemented privatization based on vouchers. This is a method in which a government distributes or sells vouchers that are to be used to buy shares in firms. This method was very rarely used elsewhere in the world before the transformation

Table 1- Post-communist countries

Country	Unreformed communists % (election year) / power	Year of privatization	Primary method of privatization	# of terms in power of "privatization gov't"
Armenia	2,1% (2003) / weak	1994	Vouchers	One party domination
Azerbaijan	6,3% (2000) / weak	1997	Vouchers	One party domination
Belarus	16% (1995) / in power	1994	MEBO	One party domination
Czech	13,2% (1990) / strong opp.	1992	Vouchers	3
Georgia	3% (1995) / weak	1995	Vouchers	3
Kazakhstan	3,4% (2004) / weak	1994	Direct sales	One party domination
Kyrgyzstan	25% (1995) / strong	1996	Vouchers	One party domination
Moldova	46% (2005) / in power	1995	Vouchers	One party domination
Russia	11% (1993) / strong opp.	1993	Vouchers	One party domination
Ukraine	25% (1998) / strong opp.	1994	Vouchers	2
	Reformed communists in power after privatization			
Albania	2 terms after privatization	1995	MEBO	2
Bulgaria	1 term after privatization	1993	Direct sales	1
Croatia	2 terms after privatization	1992	MEBO	2
Estonia	privatization term	1993	Direct sales	1
Hungary	1 term after privatization	1990	Direct sales	1
Latvia	3 terms after privatization	1992	Direct sales	1
Lithuania	1 term after privatization	1991	Vouchers	1
Macedonia	privatization term	1993	MEBO	2
Poland	2 terms after privatization	1990	Direct sales	1
Romania	privatization term	1992	MEBO	1
Slovakia	1 term after privatization	1995	Direct sales	1
Slovenia	privatization term	1998	MEBO	2
Uzbekistan	?	1996	MEBO	?

in the post-communist countries. It gives the public the opportunity to get shares in firms (or in investment funds) by exchanging their vouchers. All citizens had the same opportunities, and the buying power from the vouchers was the same. However, the voucher privatization

created the contradictory conditions, since it generated a large number of poorly informed shareholders, without efficient markets for selling shares.

The other 13 countries experienced the transformation of the communist party into social democrats. All those parties came to power in the following periods. In Bulgaria, Hungary, Lithuania and Slovakia right after the election following the privatization term, in Albania, Croatia and Poland two terms after the privatization year, in Latvia it took three terms after the privatization year. The transformed communist parties participated in governments during the year of privatization in Estonia, Macedonia, Romania and Slovenia. Macedonia, Romania and Slovenia implemented management-employee buyout (MEBO) methods, while Estonia used direct sales. Only Lithuania implemented voucher privatization, the other countries with transformed communist parties opted for either direct sales or the MEBO method.[1]

Direct sales were implemented by negotiated trade sales, called case-by-case privatization, by holding public offering for the shares of firms to be privatized, or by bunching companies in a multi-enterprise tender. The initial objective was to sell state assets to outside investors. The inadequacy of domestic stock markets and the lack of domestic capital turned out to be problematic. Furthermore, the direct sales approach was slow and costly.

Under the MEBO approach, shares of an enterprise are sold or given to a combination of managers and employees, who got the chance to become the new owners. The method was fast, easy to implement and moreover it was politically popular. However, the support of insider interests often led to poor management and large inefficiencies.

It turns out that incumbent democrats tended to implement the privatization method of direct sales in countries where communist parties transformed into social democrats. This occurred in Bulgaria, Estonia, Hungary, Latvia, Poland and Slovakia. In all these countries transformed communist parties came to power sooner or later (typically sooner) participating in government. The only economy with direct sales as a primary method of privatization and untransformed communists is Kazakhstan, where one party has dominated from the beginning of the post communist era. A common feature of communist parties in the vast majority of those countries was that they were liberal rather than conservative.

On the other hand incumbent democrats tended to implement mass privatization (privatization by vouchers) in countries where the communist parties did not transform into

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[1] Notice that most countries implementing the MEBO method experienced outside threat from a neighbouring country.

social democrats and rather preferred to stay orthodox. This is the case of Armenia, Azerbaijan, Czech Republic, Georgia, Kyrgyzstan, Russia and Ukraine. In all these countries communist parties have remained in opposition after the communism breakup. The only economy implementing voucher privatization where the communist party transformed into social democrats is Lithuania, where they came to power right after the electoral term in which privatization was implemented. The last economy where voucher privatization is reported as a primary method of privatization is Moldova, a country with untransformed communists still in power. The last country with untransformed communists is Belarus, implementing MEBO as a primary method of privatization. A common feature of communist parties prevailing in this group of countries is that they have been conservative rather than liberal.

2.3 Model

In this section I analyze the strategic behavior of communists and democrats based on micro-foundations in the unique early transition period. As already described, the fall of communism was typically accompanied by the communist parties shift to the opposition and by the new democrats' entry into new governments. Several communist parties transformed to social democrats while the others did not. The new governments implemented a particular privatization method. Voucher privatization dominated in countries where communist parties did not transform, whereas direct sales were observed mainly in countries with transformed communist parties. I attempt to build a simple model that would be able to fit the data and to generate a plausible theoretical explanation of this observation. The following five key assumptions suitable for the early transition period are applied.

First, we assume privatization offers a unique opportunity for incumbent democrats to provide public goods and appropriate rents. If the direct sales method of privatization is implemented, incumbent democrats receive money revenues and use them for public goods provision and rent appropriation. If voucher privatization is implemented, the privatized property takes a form of public good or rents directly. Vouchers can be thus viewed as a public good as they are available to everybody and the owners of vouchers benefit from the property they get in exchange for the vouchers. Analogically, rents can take the form of privatized property if the property is transformed to incumbent democrats in a nontransparent way, profitable to the rent appropriator at the expense of voters. Since the privatized property

is less liquid than money, the transaction cost associated with rent extraction is higher under voucher privatization than under direct sales. In other words, the incumbents have better access to rents (provisions or bribes) from the property privatized for money, by means of direct sales, than from the property itself, privatized by means of mass privatization with vouchers.

Second, the incumbent democrats value rents, provisions or bribes (they are rent-seeking) more than public goods. Since incumbent democrats have the discretion to extract rents, assumed to be more valuable than public goods, and since budget constraint dictates that public goods are in trade-off with rents, public goods do not need to enter their utility function.

Third, the communist party in opposition values public goods[2] and benefits from voucher privatization rather than from direct sales due to the following four reasons. Firstly, communist leaders had insider information about the property to be privatized and investment opportunities and this information is valuable especially for voucher privatization. In this privatization method the relative knowledge about the future prospects of privatized firms matters. Communists can benefit from clientelistic and personalistic ties. Next, communists can participate in voucher privatization even if they are in opposition. Thirdly, the communist party has a large number of members and voucher privatization allows a much greater participation by the general population than the other privatization methods. This method is thus a sort of reward for the members. Finally, voucher privatization formed contradictory conditions since it generated poorly informed shareholders, and inefficient asset markets. This induced such shareholders to sell their assets to better informed investors, who had better knowledge about the value of the shares, in a non-transparent way. Moreover, the lack of institutional mechanisms and financial markets contributed to the political contest, and communists might have benefited from this situation as well.

Fourth, voters value consumption are public goods, but they have also preferences for the regime type ideology. We assume that from the voters' point of view the communist ideology is less attractive than a democratic system in this early transition period. In fact, this is why the communist regimes collapsed and new democracies were established. Furthermore, we assume that if communists shed the ideology and transform themselves, the parties become perfect substitutes from the voters' point of view. This is to reflect the role of ideology dimension. Thus, we assume that if the communist party did transform, the ideology

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[2] Since communists do not have discretion to appropriate rents that are in trade-off with public goods, public goods enter their utility function.

dimension disappears. On the other hand if it did not transform, the ideology dimension still matters.

Fifth, I assume that there are two types of communists, conservative and liberal. Conservative communists threaten voters more than liberal ones, thus the ideology dimension matters more for conservative than for liberal communists. In other words, there is higher ideological preference for incumbent democrats if communists are conservative. Furthermore, I assume that more discrediting and compromising information is available if communists are orthodox than if they are liberal.

Sixth, the privatization method does not enter the utility function of voters. Voters do not care whether voucher privatization or direct sales delivered more public good; they care only about how much public goods were delivered (plus who delivered it, which is the ideology).

In the model I define two players, communists and democrats, $M = \{C, D\}$, reflecting the preferences of the opponent party, those of voters, and reflecting the budget constraint. Democrats are in power; they are incumbents, and communists are in opposition. These two parties run general elections at the end of the first period. Both communists and democrats have two feasible actions. Communists can either transform to social democrats, $\{T\}$, or stay orthodox, $\{O\}$, $A_C = \{T, O\}$, while democrats can choose the privatization method using vouchers, $\{V\}$, or direct sales, $\{DS\}$, $A_D = \{V, DS\}$.

The corresponding payoffs depend on the preferences of both parties and on the preferences of voters given the budget constraint. Let us define the objective functions and the constraint.

Parties

The expected utility function of the incumbent democrats is,

$$EV_D(r, R) = \gamma r + P_D R_D \qquad (1)$$

with expectations taken over the election outcome. The parameter $\gamma \in [0;1]$ measures the transaction costs associated with rent appropriation. The higher the parameter γ, the lower the transaction costs for rent appropriation, r. Since we assume that the transaction cost

associated with rent extraction is higher under voucher privatization than under direct sales, lower rent extraction cost for direct sales dictates $\gamma^{DS} > \gamma^{V}$. The politician has full discretion over current rents r. Future rents, R_D, can be interpreted as the expected present value of holding office from the next period and on. The probability that the incumbent democrats will be reelected in the next election is denoted by P_D. The expected utility is subject to the following government budget constraint,

$$\tau y = \theta g + r , \tag{2}$$

where y is exogenously given income of voters plus the state property to be privatized, θ is the cost of transforming private output into public good g, τ is the tax rate. I assume that the cost θ is a random variable, $\theta > 1$; a high value of θ means that public goods have become more costly.[3] Rents appropriated under direct sales and voucher privatization method will be denoted as r^{DS} and r^{V}, respectively.

The expected utility function of communists is

$$E V_C \left(r^{V}, R \right) = \gamma r^{V} + H\left(g \right) + \left(1 - P_D \right) R_C . \tag{3}$$

where $H(g)$ is a concave and increasing function of public good g. I assume that communists benefit from voucher privatization (due to the reasons already described) and office holding.

Thus the model is a post-election politics model. Voters select the party based on the behavior of incumbent democrats. However, communists do not play a passive role because their decision to transform or stay orthodox affects the optimal strategies and equilibrium outcomes.

Voters

Let us assume that voters are homogenous, maximizing the following utility function:

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[3] For example θ might be the provision of external or internal security and since the state of international or national environment could shift, it might be more or less costly to provide the same level of security.

$$U\left(C,g,\kappa\right)=C+H\left(g\right)+D\kappa\,,\tag{4}$$

subject to the constraint (2), where C is consumption, $H(g)$ is a concave and increasing function of public good, g, $\kappa>0$ if democrats are in power, $\kappa<0$ if communists are in power, the dummy variable $D=0$ if communists decided to transform and $D=1$ if communists remained orthodox.

Voting strategy leads to setting the probability P_D to 1 if $U\left(C,g,\kappa\right)\geq\bar{U}\left(\theta\right)$ and to 0 otherwise, where $\bar{U}(\theta)$ is voters' reservation utility, conditioned on the realized (and observable) state θ.

One option for the incumbent democrats is to please voters and deliver the reservation utility to them to be reelected. In this case incumbent democrats maximize rents r subject to the constraint of generating $P_D=1$. Solving this problem, using $C=\left(1-\tau\right)y$, we get $\bar{U}=\left(1-\tau\right)y+H(g)+D\kappa$, and using the budget constraint (2) we get $r+\bar{U}=\tau y+\left(1-\tau\right)y-\theta g+H(g)+D\kappa$. Thus the optimally chosen rents become

$$r\left(\theta\right)=y-\bar{U}\left(\theta\right)+H\left(g^{*}\left(\theta\right)\right)+D\kappa-\theta g^{*}\left(\theta\right).\tag{5}$$

Incumbent democrats satisfy the constraint for reelection, deliver the required utility to voters and appropriated any remaining tax revenue.

The second alternative is not to satisfy voters, forego reelection, fully tax voters, provide zero public goods, and appropriate maximum rents $r=y$. Reflecting (1), incumbent democrats prefer to satisfy voters if

$$\gamma r+R_D\geq\gamma y\,.\tag{6}$$

If incumbent democrats are better off with current rents plus future exogenous rents gained after reelection, they do not exploit their discretion fully but satisfy voters. Since voters prefer to minimize rents, they set the reservation utility $\bar{U}$ so as to satisfy (6) with equality if the parties are perfect substitutes, that is if $D=0$. This gives the optimal level of rents,

$$r(\theta) = Max\left[0; y - \frac{R_D}{\gamma}\right] \equiv r^*(D=0). \qquad (7)$$

Optimal rent under perfect substitutability of parties, $r^*(D=0)$, leaves enough revenue for

the optimal supply of public good, g^*, if $\frac{R}{\gamma} \geq \theta g^*$, since using (2) and (7) we get

$r^* = y - \frac{R}{\gamma} = \tau y - \theta g^*$, resulting in $(1-\tau) y = \frac{R}{\gamma} - \theta g^* \geq 0$.

Using (2) and (7) we get $g^* = \frac{1}{\theta}\left[(\tau - 1) y + \frac{R_D}{\gamma}\right]$. Using (5), the reservation utility of

voters is then

$$\bar{U}(\theta) = y - r^* + H\left(g^*(\theta)\right) + D\kappa - \theta g^*(\theta). \qquad (8)$$

However, if the parties are not perfect substitutes due to the untransformed communists, the optimal rent r^* changes. Minimizing rents is no longer the only objective of voters since the ideological dimension arises. This is because democrats deliver higher utility to voters than communists do given the same delivery of public goods. As a result democrats can afford to appropriate some extra rents still tolerated by voters. Voters will thus tolerate democrats the rents up to the extent equalizing the utility delivered by incumbent democrats and the utility delivered by communists if they come to power. Thus, the optimal rents of democrats given unreformed communists are $r_D^*(D>0) = Max\left[0; y - \frac{R_D}{\gamma} + \kappa\right]$. If democrats appropriate more rents than r_D^*, communist start to be a better alternative for voters, if democrats appropriate less than r_D^*, they can still afford to appropriate some more rents and remain preferable to communists. Thus the equilibrium rents satisfy

$$r(\theta) = Max\left[0; y - \frac{R_D}{\gamma} + D\kappa\right] \equiv r^*. \qquad (9)$$

Higher intrinsic value of public office (higher R_D) or higher rent extraction costs (lower γ) decrease the equilibrium rents. Direct sales allow for higher rent extraction than voucher

privatization since $\gamma^{DS} > \gamma^V$. Higher tax base or higher stock of public property to be privatized (higher y) increases the equilibrium rents. A larger available stock of property to be privatized makes the discretion to appropriate rents more threatening and thus the voters have to abandon larger rents. Also greater ideological preference for incumbent democrats (higher κ) increases the equilibrium rents. Democrats are therefore allowed to extract more rents if communists remained orthodox and given orthodox communists, democrats can extract more rents if communists are conservative than if they are liberal.

2.3.1 Strategic Game

Let us assume that parties chose the actions simultaneously and thus we study their decisions within a strategic game. Tables 3 and 4 represent the strategic game between democrats and communists. Liberal communists are studied in Table 3, while conservative communists in Table 4.

Liberal communists

Since communists are liberal, we assume that γ is high relative to κ. Incumbent democrats prefer direct sales to voucher privatization because $\gamma^{DS} > \gamma^V$ and equilibrium rents under direct sales are larger than under voucher privatization, given by the derived equilibrium condition for rents (9). Hence, the vouchers strategy is dominated by the direct sales strategy.

Table 2 – Strategic game (D-democrats and C-liberal communists)

D	C	Transformed (T)	Orthodox (O)
Vouchers (V)		T,V	O,V
Direct sales (DS)		T,DS	O,DS

If communists remain orthodox, the equilibrium rents become higher (the level of public goods lower) than if communists transform. Communists therefore prefer to transform since under either privatization method they get higher payoff due to the higher level of public

goods provision. The strategy to remain orthodox is dominated by the strategy to transform. Thus (T, DS) is a Nash equilibrium.

Conservative communists

Now we assume that γ is low relative to κ, which is due to conservative communists. Incumbent democrats again prefer direct sales to voucher privatization no matter what is the strategy of communists as $\gamma^{DS} > \gamma^V$. The voucher strategy is dominated by the direct sales strategy, given by (9).

Table 3 – Strategic game (D-democrats and C-conservative communists)

D	C	Transformed (T)	Orthodox (O)
Vouchers (V)		T,V	O,V
Direct sales (DS)		**T,DS**	O,DS

Likewise liberal communists and also conservative communists prefer to transform since for either strategy of democrats, they get more public goods which makes them better off. Thus (T, DS) is again a Nash equilibrium. However, both parties now might be better off with the strategy (O,V) and thus they might face a Prisoner`s dilemma game. Democrats might get more rents if communists are orthodox, due to a large κ relative to γ, driven by conservative communists, which outweigh the lower rents on behalf of voucher privatization due to $\gamma^{DS} > \gamma^V$. And conservative communists might benefit from voucher privatization more than liberal communists since the reasons for valuing voucher privatization are more profound for conservative communists than for liberal communists. Since we assume that under conservative communists there can be more punishment and control in place, the parties can or are forced to cooperate and suboptimal outcome (O,V) can prevail. Moreover, the fact that the outcome (T, DS) is irreversible makes the tendency towards cooperation more intensive. Thus, if democrats and conservative communists are able to cooperate or are forced to

collaborate, the combination of voucher privatization and orthodox communists can succeed, which is the typical observed outcome.

The observation that the outcome of direct sales and transformed liberal communists was accompanied by short lived governments as opposed to the outcome of voucher privatization and orthodox conservative communists, accompanied by long lived governments was not modeled. However, these observations seem to be intuitive since orthodox communists keep the ideological dimension open, which might lead to more frequent reelection of ideologically preferred incumbent democrats. On the other hand, once communists have transformed, the parties become substitutable and voters might be more willing to vote against democrats.

2.4 Conclusion

We observe that the direct sales method of privatization was implemented typically in countries with transformed liberal communists, where privatization governments were short lived. On the other hand voucher privatization was popular in countries with orthodox conservative communists, where governments were or have been long lived. This is consistent with my model, finding a Nash equilibrium in a game in which liberal communists transformed and democrats implemented the direct sales method of privatization. The second suboptimal outcome of the Prisoner's dilemma game might prevail under conservative communists remaining orthodox and democrats, implementing voucher privatization.

Thus, the model is able to support the evidence and find a plausible theoretical explanation of observed facts. Different types of communists drive these different choices of both democrats and communists, even though democrats are the same and voters do not prefer either privatization method.

So even if preferences of democrats are the same in all countries, their strategies might differ if the types of communists differ across countries. The behavior of democrats in terms of the privatization method after the fall of communism might not be the consequence of the differences among them, but rather the consequence of different communists across countries.

2.5 Appendix

Albania		
Elections (bold)	**Government – coalitions**	**remarks**
From Jan 18, 1982 to Feb 22, 1991	PPS	*communist*
1991, Mar 31 and Apr 7/14		
From Jun 5, 1991 to Dec 6, 1991	PSS + PDS + PSDS + PRS + PAS	*center*
From Dec 11, 1991 to Apr 2, 1992	non-party ministers	*center*
1992, Mar 22/29		
From Apr 13, 1992 to Jul 11, 1996	PDS + PRS + PSDS	PRS resigned on Dec 5, 1994. *center-right*
1996, May 26 and Jun 2/16		
From Jul 11, 1996 to Mar 1, 1997	PDS + PRS + SDUP + CDP	*center-right*
From Mar 11, 1997 to Jul 24, 1997	PSS + PDS + SDUP + LM + CDP + PBK + PSDS + PRS + PMDN	Government of national union. *Center*
1997, Jun 29 and Jul 6		
From Jul 29, 1997	PSS + PSDS + PADS	*left-center*

PPS: Albanian Workers' Party (converted into PSS on Jun 13, 1991) (communist); **PSS**: Albanian Socialist Party (socialist); **PDS**: Albanian Democratic Party (conservative); **PSDS**: Albanian Social Democratic Party (social-dem.); **PRS**: Albanian Republican Party (conserv./liberal); **SDUP**: Social Democratic Unity Party; **LM**: Legality Movement; **PBK**: National Front Party (nacionalist); **PMDN**: Union for Human Rights (greek minority); **CDP**: Christian Democratic Party (conservative); **PADS**: Party of the Democratic Alliance of Albania (liberal); **PAS**: Albanian Agrarian Party (pro-market reformist).

Bulgaria		
Elections (bold)	**Government - coalitions**	**Remarks**
From Mar 21, 1986 to Feb 3, 1990	BCP	*Communist*
From Feb 3, 1990 to Nov 29, 1990	BCP > BSP	*Left*
1990, Jun 10/17		
From Dec 7, 1990 to Nov 8, 1991	BSP + SDS + BZnS	*center-left*
1991, Oct 13		
From Nov 8, 1991 to Oct 28, 1992	SDS	*right-center*
From Dec 30, 1992 to Jan 25, 1995	non-party ministers	Government supported by BSP and the movement for Rights and Freedom (DPS). *Center*
1994, Dec 18		
From Jan 25, 1995 to Dec 21, 1996	BSP + BZnS(AS) + DE	*left-center*
From Feb 13, 1997 to May 21, 1997	non-party ministers	*Center*
1997, Apr 19		
From May 21, 1997	SDS + DP	The 15 parties comprising SDS decided on Feb 15, 1997 to merge into a sole party, SDS, which along with DP, BZnS and the Bulgarian Social Democratic Party (BSDP) run under an United Democratic Forces (OnS) umbrella in the Apr 19, 1997 elections. *right-center*

BCP: Bulgarian Communist Party (transformed into BSP on Apr 3, 1990); **BSP**: Bulgarian Socialist Party (socialist); **SDS**: Union of Democratic Forces (coalition - christian-dem); **BZnS**: Bulgarian People's Farmers Union (christian-dem.); **BZnS(AS)**: Bulgarian People's Farmers Union (Aleksandar Stambolijski) (agrarian); **DE**: Ekoglasnost movement (green); **DP**: Democratic Party (christian-dem.).

Croatia		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, Apr 22 and May 6		Yugoslav Republic; independence was proclaimed on May 25, 1991.
From Aug 24, 1990 to Jan 27, 2000	HDZ	Government of national union comprising HDZ and other seven parties and non-party ministers. Identity of these parties is not available. *Nationalist*
1992, Aug 2		
1995, Oct 29		
2000, Jan 3		
From Jan 27, 2000	SDP + HSLS + HNS + LS + IDS + HSS	IDS left the Government on Jun 3, 2001. *Center*

HDZ: Croatian Democratic Union (nationalist); **SDP**: Social Democratic Party of Croatia; **HSLS**: Croatian Social Liberal Party (liberal); **HNS**: Croatian People's Party (liberal); **LS**: Liberal Party (liberal-conserv.); **IDS**: Istrian Democratic Union (regionalist); **HSS**: Croatian Peasant Party (agrarian-conserv.).

Czech Republic		
Elections (bold)	**Government - coalitions**	**Remarks**
From Dec 7, 1989 to Jun 27, 1990	KSC + CSS + CSL + independents	CSS and CSL belonged to the so-called national Front of Czechs and Slovaks (NF), dominated by the KSC. CSL became KDU-CSL in 1992. Four of the seven "independent" ministers were in fact linked to OF. *center-right*
1990, Jun 8/9		Czechoslovak republic
From Jun 27, 1990 to Jun 26, 1992	OF + VPN + KDH	Both OF and its Slovak partner VPN desintegrated in Apr 1991. From OF emerged ODS, the Civic Democratic Alliance (ODA) and the Civic Movement (OH). From VPN the Civic Democratic Union (ODU-VPN) and then the Movement for a Democratic Slovakia (HZDS). *center-right*
1992, Jun 5/6		Czechoslovak Republic, the Czech Republic was born on Jan 1, 1993
From Jul 1, 1992 to Dec 31, 1992	ODS + HZDS + KDU/CSL	Divided the Czechoslovak Republic. *right-center*
From Jan 1, 1993 to Jul 2, 1996	ODS + KDU/CSL + ODA + KDS	KDS merged with ODS in Mar 1996. *Right*
1996, May 31 and Jun 1		
From Jul 4, 1996 to nov 30, 1997	ODS + KDU/CSL + ODA	KDU/CSL and ODA resigned on Nov 29, 1997. *Right*
From Jan 2, 1998 to Jul 22, 1998	US + KDU/CSL + ODA	The four ministers of US belonged to ODS in origin, but as members of a dissident faction. Party chairman V. Klaus did not recognize their appointments. Some of these ministers figured as members of the US when this party was founded on 17 Jan 1998. *Right*
1998, Jun 19 and 20		
From Jul 22, 1998	CSSD	Minority cabinet, supported by ODS. *left-center*

KSC: Communist party of Czechoslovakia; **CSS**: Czechoslovak Socialist Party (communist/socialist); **CSL**: Czechoslovak People's Party (communist/conserv.); **OF**: Civic Forum (Czech lands-based - center) ; **VPN**: Public Against Violence (Slovakia-based - center); **KDH**: Christian Democratic Movement (Slovakia-based – christian dem.); **HZDS**: Movement for a Democratic Slovakia (center/nationalist); **ODS**: Civic Democratic Party (conserv./liberal); **KDU/CSL**: Christian Democratic Union /Czech People's Party (conservative); **ODA**: Civic Democratic Alliance (liberal); **KDS**: Christian Democratic Party (conservative); **CSSD**: Czech Social Democratic Party; **US**: Union of Freedom (liberal).

Estonia		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, Mar 21		Soviet republic
From Apr 3, 1990 to Jan 30, 1992	'Rahavarinne' + non-party	*Center*
From Jan 30, 1992 to Oct 19, 1992	non-party ministers	*Center*
1992, Sep 20		
From Oct 21, 1992 to Sep 26, 1994	RK 'Isamaa' + ERSP + M + Liberals	*center-right*
From nov 8, 1994 to Apr 5, 1995	RK 'Isamaa' + ERSP + M + Liberals + Rightists	*center-right*
1995, Mar 5		
From Apr 17, 1995 to Oct 11, 1995	KMU + K	KMU withdrew on Oct 11, 1995. *right-center*
From nov 7, 1995 to nov 21, 1996	KMU + RE	RE withdrew on nov 21, 1996. *Right*
From Dec 1, 1996 to Feb 25, 1997	KMU	*Right*
From Mar 17, 1997 to Mar 25, 1999	KMU + EA	*right-center*
1999, Mar 7		
From Mar 25, 1999	IERSP + M + RE	*center-right*

'Rahvarinne': Popular Front of Estonia (center); **RK 'Isamaa'**: National Coalition Party Pro Patria (conserv.); **ERSP**: Estonian national Independence Party (nationalist); **M**: Moderates (social-dem.); **KMU**: Coalition Party and Rural Union (comprising Estonian Coalition Party (**KE** or **KMU-K**), Estonian Rural Union (EM or KMU-M), Estonian Country People's Party (EME), Estonian Pensioners' and Families' League (EPPL) and Farmers' Assembly (PK) (liberal); **K**: Estonian Center Party (center); **RE**: Estonian Reform Party (liberal); **EA**: Progressive Party (center); **IERSP**: Pro Patria Union (*'Isamaaliit'*, merger of RK *'Isamaa'* and ERSP since 2 Dec 1995), (conserv.).

Hungary		
Elections (bold)	**Government - coalitions**	**Remarks**
From Nov 23, 1988 to May 3, 1990	MSzMP (-> MSzP)	*communist/social-dem.*
1990, Mar 25 and Apr 8		
From May 3, 1990 to Jul 15, 1994	MDF + FKgP + KdNP	*Right*
1994, May 9 and 28		
From Jul 15, 1994 to Jul 6, 1998	MSzP + SzDSz	*center-left*
1998, May 10 and 24		
From Jul 6, 1998	Fidesz-MPP + FKgP + MDF	*Right*

MSzMP: Hungarian Socialist Workers' Party (communist, transformed into MSzP on October 7, 1989); **MSzP**: Hungarian Socialist Party (social-dem.); **MDF**: Hungarian Democratic Forum (conserv.); **FKgP**: Independent Smallholders Party (agrarian-conserv.); **KdNP**: Christian Democratic People's Party (christian-dem.); **SzDSz**: Free Democrats Alliance (liberal); **Fidesz-MPP**: Federation of Young Democrats-Hungarian Civic Party, (conserv.).

Latvia		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, Mar 21		Soviet Republic
From May 5, 1990 to Jul 8, 1993	backed by the LFT	
1993, Jun 5/6		
From Jul 8, 1993 to Jul 14, 1994	LC + LZS	LZS resigned on Jul 14, 1994. *Right*
From Sep 15, 1994 to Dec 21, 1995	LC + TPA	*Right*
1995, Sep 30 and Oct 1		
From Dec 21, 1995 to Jan 20, 1997	LC + LZS + LNNK + TB + DPS + LVP	LC, LZS, LNNK and TB comprised the so-called National Bloc. LZS resigned from the government on Feb 26, 1996. *Right*
From Feb 13, 1997 to Jul 28, 1997	LC + LNNK + TB + DPS + LKDS/LZS	LNNK and TB announced their merger into LNNK/TB on Jun 21, 1997. *Right*
From Aug 7, 1997 to Apr 29, 1998	LC + TB/LNNK + DPS + LKDS/LZS	DPS resigned on Apr 8, 1998. *Right*
From Apr 29, 1998 to Nov 26, 1998	LC + LNNK/TB + LKDS + LZS + LZP + LNRP	*Right*
1998, Oct 3		
From Nov 26, 1998 to Jul 6, 1999	LC + TB/LNNK + JP + LSDA	LSDA entered on Feb 4, 1999. *center-right*
From Jul 16, 1999 to Apr 12, 2000	TP + LC + TB/LNNK	*Right*
From May 5, 2000	LC + TP + TB/LNNK + JP	*right-center*

LTF: Latvian Popular Front; **LC**: Latvian Way (liberal); **LZS**: Latvian Farmers Union (conserv.); **TPA**: Political Union of Economists (liberal); **LNNK**: Latvian National Independence Party (nationalist); **TB**: For the Fatherland and Freedom (conserv.); **TB/LNNK**: Fatherland ana Freedom Union (merger of TB and LNNK 21 Jun 1997) (national conserv.); **DPS**: Democratic Party Saimnieks (liberal); **LVP**: Latvian Unity Party (nationalist); **LKDS**: Latvian Christian Democratic Union (christian dem.); **LZP**: Latvian Green Party (green); **LNRP**: Latvian National Reform Party; **JP**: New Party (center); **LSDA**: Latvian Social Democratic Union (social-dem.); **TP**: People's Party (center).

Lithuania		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, Feb 24 and Mar 4 and 10		
From Mar 17, 1990 to Jan 13, 1991	Sajudis-supported + LKDP + LKP	*Center*
From Jan 13, 1991 to Nov 26, 1992	Sajudis-supported + LKDP	*center-right*
1992, Oct 25 and Nov 15		
From Dec 2, 1992 to Nov 27, 1996	LDDP	*Left*
1996, Oct 20 and Nov 10		
From Dec 10, 1996 to Oct 19, 2000	TS(LK) + LKDP + LCS	*Right*
2000, Oct 8		
From Oct 26, 2000 to Jun 20, 2001	LLS + NS	NS resigned on Jun 18, 2001. *Right*
From Jun 20, 2001	LLS	*Right*

Sajudis: "Unity" (multi-party coalition) (center); **LDDP**: Democratic Labour Party of Lithuania (merged with LSDP in 2001) (social-dem.); **LKP**: Communist Party of Lithuania (converted into LDDP in 1990); **TS(LK)**: Homeland Union (Conservatives of Lithuania) (conserv.); **LKDP**: Lithuanian Christian Democratic Party (christian dem.); **LSDP**: Lithuanian Social Democratic Party (merged with LDDP in 1991); **NS**: New Union (social liberal); **LLS**: Lithuanian Liberal Union (liberal); **LCS**: Center Union of Lithuania (liberal).

Macedonia		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, 11, 25 Nov and 9 Dec		Yugoslav Republic; independence was proclaimed on Sep 18, 1991.
From Mar 20, 1991 to Aug 17, 1992	SKM-PDT + PDP/PPD + NDP + VMRO-DPMNE	*center-left*
From Sep 4, 1992 to Nov 28, 1994	SDSM + PDP/PPD + NDP + LP + SPM	*left-center*
1994, 16, 30 October and 13 Nov		
From Nov 28, 1994 to Nov 30, 1998	SDSM + PDP/PPD + LP + SPM	SDSM, LP and SPM comprised the coalition Union for Macedonia (SM). LP resigned on Feb 8, 1996. *Center-left*
1998, 18 Oct and 1 Nov		
From Nov 30, 1998 to Nov 30, 2000	VMRO-DPMNE + DA + PDPA/PDSh	VMRO-DPMNE and DA comprised the electoral coalition "For Change". *Right*
From Nov 30, 2000 May 13, 2001	VMRO-DPMNE + PDPA/PDSh	*Right*
From May 13, 2001	VMRO-DPMNE + PDPA/PDSh + SDSM + LP + PDP/PPD + LDP	*Center-right*

SKM-PDT: League of Communists of Macedonia-Party of Democratic Transformation (then SDSM);
PDP/PPD: Party of Democratic Prosperity (Albanian min.); **NDP**: People's Democratic Party (Albanian min.); **VMRO-DPMNE**: Internal Macedonian Revolutionary Organization-Democratic Party of Macedonian National Unity (conserv.); **SDSM**: Social Democratic Union of Macedonia; **SPM**: Socialist Party of Macedonia; **DA**: Democratic Alternative (conserv.); **PDPA/PDSh**: Party of the Democratic Prosperity of the Albanians (Albanian minority): **LP**: Liberal Party ; **LDP**: Liberal Democratic Party.

Poland		
Elections (bold)	**Government - coalitions**	**Remarks**
From Aug 24, 1989 to Nov 26, 1990	Solidarity + PZPR (-> SdRP) + PSL + SD	Mazowiecki (prime minister) fired the ministers coming from the late PZPR on Jul 6, 1990. *Center*
From Jan 4, 1991 to Nov 25, 1991	KLD + Solidarity	Intending the "Solidarity" presence as those non-KLD ministers who also served in Mazowiecki's cabinet under the Solidarity brand. By late 1990 the Solidarity trade movement began to break up in several parties and political organizations. *Right*
1991, Oct 27		
From Dec 6, 1991 to Jul 2, 1992	PC + PSL + PL + ZChN	*Right*
From Jul 8, 1992 to Oct 26, 1993	UD + KLD + PL + ZChN + PChD + SLCh + PPG	PL resigned on Apr 28, 1993. *Right*
1993, Sep 19		
From Oct 26, 1993 to Mar 1, 1995	SLD + PSL + UP	*left-center*
From Mar 6, 1995 to Oct 31, 1997	SLD + PSL	*left-center*
1997, Sep 21		
From Oct 31, 1997	AWS + UW	UW resigned on Jun 6, 2000. *Right*

PZPR: Polish United Workers' Party (communist, ceased to exist on Jan 28, 1990); **SdRP**: Social Democracy of the Republic of Poland (born on Jan 27, 1990 from the PZPR); **PSL**: Polish Peasant Party (agrarian); **SD**: Democratic Party; **KLD**: Liberal Democratic Congress (liberal); **PC**: Center Alliance (christian-dem.); **PL**: Peasant Alliance (agrarian); **ZChN**: Christian-National Union (christian-dem.); **UD**: Democratic Union (since 1994, UW) (liberal); **PChD**: Christian-Democratic Party; **SLCh**: Peasant-Christian Alliance; **PPG**: Polish Democratic Programme; **SLD**: Democratic Left Alliance (coalition, with SdRP as main partner, to Apr 27, 1999, when constitued itself as a party properly) (social dem.); **UP**: Workers' Union (social dem.); **AWS**: Solidarity Electoral Action (coalition) (conservative); **UW**: Freedom Union (liberal); **RS AWS**: Social Movement of AWS.

Romania		
Elections (bold)	**Government – coalitions**	**Remarks**
From Dec 26, 1989 to Sep 26, 1991	FSN	*Left*
1990, May 20		
From Oct 1, 1991 to Nov 4, 1992	FSN + PNL + MER + PDAR	*Left*
1992, Sep 27 and Oct 11		
From Nov 4, 1992 to Mar 6, 1994	FDSN (> PDSR)	On 7 Apr 1992 the part of FSN (pro-Iliescu) separated and formed the FDSN. On 10 Jul 1993 FDSN merged with other parties and they formed the current PDSR. *Left*
From Mar 6, 1994 to Sep 3, 1996	PDSR + PUNR	PUNR left the Government on 2 Sep 1996. *Left*
From Sep 3, 1996 to Nov 19, 1996	PDSR	*Left*
1996, Nov 3		
From Dec 12, 1996 to Mar 30, 1998	CDR (PNTCD, PNL, FER, PER) + UDMR + PD	PD left the Governmentn 28 Jan 1998. *center-right*
From Mar 30, 1998 to Apr 2, 1998	CDR (PNTCD, PNL, FER, PER) + UDMR	*right-center*
From Apr 2, 1998 to Dec 22, 1999	PNTCD + PSDR + PNL + UDMR	*Center*
From Dec 22, 1999 to Dec 28, 2000	PNTCD + PSDR + PNL + UDMR + PD	PSDR left the Governmentn on 8 Sep 2000. *center-left*
2000, Nov 26		
From Dec 28, 2000	PDSR (> PSD)	*Left*

FSN: National Salvation Front (then FDSN) (socialist); **PNL**: National Liberal Party (liberal); **MER**: Romanian Ecologist Movement; **PDAR**: Agrarian Democratic Party of Romania; **FDSN**: Democratic National Salvation Front (then PDSR) (socialist); **PDSR**: Party of Social Democracy in Romania (then PSD) (socialist); **PUNR**: Party of Romanian National Unity (nationalist); **CDR**: Democratic Convention of Romania (alliance) (christian-dem.); **UDMR**: Hungarian Democratic Federation of Romania (Hungarian min.); **PNTCD**: National Peasant Party Christian Democratic (christian dem.); **PSDR**: Romanian Social Democratic Party; **PD**: Democratic Party (social dem.); **FER**: Romanian Ecologist Federation; **PER**: Romanian Ecologist Party; **PSD**: Social Democratic Party (merger of PDSR and PSDR on 16 Jun 2001) (socialist).

Slovakia		
Elections (bold)	**Government – coalitions**	Remarks
1990, Jun 8 and 9		Czechoslovak Republic
From Jun 10, 1990 to Jun 6, 1992	VPN+KDH	*center-right*
1992, Jun 5 and 6		
From Jun 7, 1992 to Dec 31, 1992	HZDS	Czechoslovak Republic; Slovakia proclaimed became as an independent state on Jan 1, 1993. *Center/nationalist*
From Jan 1, 1993 to Nov 17, 1993	HZDS	*Center/nationalist*
From Nov 17, 1993 to Mar 14, 1994	HZDS + SNS	*Center/nationalist*
From Mar 16, 1994 to Dec 13, 1994	DU + SDL + KDH + DNS	DU was created on April 23, 1994 as a merger of the Alliance of Democrats and the Democratic Union of Slovakia, both of them splinters factions of HZDS allied to then as Center Bloc. DNS was created in Feb 1994 by SNS splinters and joined DU on 25 Mar 1995 *Center*
1994, Sep 30		
From Dec 13, 1994 to Oct 30, 1998	HZDS + SNS + ZRS	ZRS is a SDL splinter party dated from April 1994. *center-left/nationalist*
1998, Sep 25 and 26		
From Oct 30, 1998	SDK + SDL + SMK + SOP	*Center*

VPN: Public Against Violence (Slovakia-based - center); **HZDS**: Movement for a Democratic Slovakia (center/nationalist); **SNS**: Slovak National Party (nationalist); **DU**: Democratic Union of Slovakia (liberal); **SDL**: Party of the Democratic Left (social dem.); **KDH**: Christian Democratic Movement of Slovakia (christian dem.); **DNS**: National Democratic Party (conserv.); **ZRS**: Association of Workers of Slovakia (socialist); **SDK**: Slovak Democratic Coalition. SDK was born on July 4, 1998 by the union of five parties: Democratic Party (DS) (liberal), Social Democratic Party of Slovakia (SDSS) (social dem.), Slovak Green Party (SZS) and the above highlighted DU and KDH. Prime minister Dzurinda was originally a member of KDH, then chairman of SDK and since 14 Feb 2000 leader of his new SDKU, which is minded to replace the SDK in time (in the meantime, Dzurinda has a double party membership). On 4 Nov 2000 members of SDK formed the Liberal Democratic Union, which eventually became a new coalition partner. (conserv./liberal); **SMK**: Hungarian Coalition Party (minority); **SOP**: Party of Civic Understanding (social dem.); **SDKU**: Slovak Democratic Christian Union (conserv./liberal).

Slovenia		
Elections (bold)	**Government - coalitions**	**Remarks**
1990, 8/22 Apr		as Yugoslav Republic; the independence was proclaimed on May 25, 1991
From May 16, 1990 to Apr 22, 1992	DEMOS coalition	*Center*
From May 14, 1992 to Jan 12, 1993	LDS + SDS + ZL + ZS + DS	*Center*
1992, Dec 6		
From Jan 12, 1993 to Jan 30, 1996	LDS + SDS + ZLSD + ZS + SKD	ZS and DS joined LDS on Mar 12, 1994. SDS left the government on April 7, 1994 and ZLSD on Jan 26, 1996. *center-right*
From Jan 30, 1996 to Feb 27, 1997	LDS + SKD	*Right*
1996, Nov 10		
From Feb 27, 1997 to Apr 8, 2000	LDS + SLS + DeSUS	The government fell when SLS left the coalition. *right-center*
From May 3, 2000 to Nov 17, 2000	(SLS+SKD) + SDS + NSi	SKD and SLS merged to form a joint party ("Coalition Slovenia") on Apr 15, 2000. On Aug 4, 2000 Prime M inister Bajuk founded NSi as his own party. Up to then he belonged to SLS+SKD. *center-right*
2000, Oct 15		
From Nov 17, 2000	LDS + ZLSD + (SLS+SKD) + DeSUS	*right-center*

DEMOS: Democratic Opposition of Slovenia (coalition - center); **LDS**: Liberal Democracy of Slovenia (up to 1994, Liberal Democratic Party); **SKD**: Slovene Christian Democrats; **DS**: Democratic Party (liberal); **ZLSD**: United List of Social Democrats (called United List, **ZL**, to 1993; a party properly since then) (social dem.); **ZS**: Greens of Slovenia; **SDS**: Social Democratic Party of Slovenia (originally Social Democratic League of Slovenia, **SDZS**); **DeSUS**: Democratic Party of Slovenian Pensioners; **SLS**: Slovene People's Party (conserv.); **SLS+SKD**: merger of SLS and SKD, also known as Slovenian Coalition (KS) (conserv.); **NSi**: New Slovenia-Christian People's Party.

3. Third chapter – The effects of media on corruption

Media plays an important role in transmitting information to voters and supplies most of the information people use in voting, including information about the corruption of politicians. The tendency of politicians to be corrupt thus depends on the incentives of the media to publish news on corruption. What are the incentives? How does private media inform the public about corruption and how does the public respond? What is the role of ownership concentration within the media? What is the resulting corruption of politicians? Those are questions I would like to answer in this paper.

I model post-election politics with an incumbent politician. The politician has complete discretion in office, he provides the public good and extracts rents for himself. Voters can either vote for or against the incumbent politician in the next election. The opponent running against the incumbent politician is identical in all respects from the viewpoint of the voter. Hence, the only reason for not re-appointing the incumbent politician is to punish him ex post.

The summary of the post-election game (along the lines of the second chapter)

The politician cares about remaining in office and about extracting rents. The utility of voters increases with the public good provision. Voters thus desire to limit the rent (corruption) of the politician to maximize the public good provision. Hence, they set the reservation utility for re-electing the politician so that he marginally prefers being reelected to extracting the whole public budget. If the reservation utility is below this optimal level, the politician is allowed to appropriate more rent than necessary for his re-election. If the reservation utility is above the optimal level, the politician chooses to extract the whole public budget. He would ruin his reputation and he would not be re-elected. In this case the politician chooses to extract the entire budget because voters allow him to extract too little rent. However, since the politician is an office-seeker,[1] he is willing to trade-off current corruption for re-election. There is always a particular level of

corruption and public good provision, lower than the entire budget, which makes the politician prefer re-election to complete budget extraction. The more the politician values reelection to current rents, the higher the level of current corruption he is willing to trade-off for re-election, and thus the higher the optimal reservation utility.

Suppose that the transformation of private output to the public good is costly and that voters observe the cost -- the information is symmetric. In this case either the public good provision or corruption must decrease so that the budget constraint is satisfied.[2] Let the public good provision decrease and the corruption remain unchanged. The equilibrium reservation utility must decrease because the politician gets the same level of rent, and the utility of voters decreases below the reservation utility. If the equilibrium reservation utility did not decrease (the public good provision would remain unchanged), the politician would have to decrease corruption in order to be re-elected. However, he would not be willing to do so because the equilibrium reservation utility was set to make the politician marginally prefer re-election to public budget extraction. The politician would prefer complete public budget extraction and no re-election. However, voters prefer re-election of the politician, and they decrease the equilibrium reservation utility.

If the public good provision remains unchanged as the cost increases, corruption decreases. If the equilibrium reservation utility does not decrease, the politician will again prefer complete budget extraction. Therefore, the reservation utility must decrease with the cost increase -- it is a decreasing function of the cost.[3]

Imagine for a moment the world without media, where the cost is not observed by voters but only by politicians. The information is asymmetric. In this case the equilibrium corruption is a function of the cost, whereas the equilibrium reservation utility is not. Since voters do not observe the cost, the best they can do is to choose a cut-off level of reservation utility, which is not dependent on the cost. The politician just prefers satisfying voters and gaining re-election to public budget extraction when it is cheap enough to do so, namely when the cost is low. The politician satisfies voters in the cheapest possible way and extracts the remainder for himself. When the cost is high,

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[1] Every politician is an office-seeker because re-election enables the politician to be corrupt after the election or to implement the desired policy.

[2] I assume that the budget revenues are given because I allow media to have preferences for the public good for given taxes.

satisfying voters becomes too expensive relative to the public budget extraction. In this case the politician prefers extracting the public budget to gaining re-election.

Hence, each level of the cut-off reservation utility implies the critical state of the cost, below which the politician just satisfies the cut-off reservation utility to be re-elected and uses its informational advantage to collect additional rents, and above which he prefers not to be re-elected and extracts the entire public budget. We can treat the choice of the reservation utility as a choice of the critical level of the cost. Voters thus face a trade-off. If they raise the cut-off reservation utility, they get it less often. If they drop the cut-off reservation utility, they would trade-off lower utility for a decrease in the probability that the politician extracts the whole public budget. As a result, corruption is higher under asymmetric information for all but the critical level of the cost.

In many papers authors[4] model post-election politics with symmetric or asymmetric information, with the properties I just described. In this paper I assume that information is asymmetric, voters observe neither the cost of transforming the private output to public good, nor the corruption of the incumbent politician. However, in my model there is media which transmits the information. Media owners maximize the public good provision if they inform voters about the cost. They may inform voters directly about it or they may inform voters about corruption and make voters infer the cost, given that the voters know the budget constraint. I show that the public goods maximization lowers the media profits and thus it seems reasonable to assume that media owners care about both profits and public goods. Media profits are in trade-off with public good provision and corruption, and I investigate what are the effects of profit versus public goods orientation of media owners. To what extend the media would inform the public about corruption in order to decrease it depends on the profit orientation relative to the public good orientation of the media owners.

I show that the more profit oriented are the media owners, the higher politicians' corruption. Moreover, the higher the number of owners in the media firms (the lower the ownership concentration), the lower the political corruption. Thus, I hypothesize that countries with a domination of public media with dispersed ownership exhibit lower

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[3] Note that equilibrium corruption is independent of the cost.
[4] I review the literature in the next section.

corruption than countries with private, concentrated media ownership, no matter what is the profit orientation of the media owners. I suspect that the second conclusion of this paper, which is that profit orientation of media owners raises the political corruption, even reinforces this tendency because the public media tends not to face as hard budget constraint as private media does, suggesting that public media tends to be less profit and more public good oriented relative to private media.

In Section 2, I review the literature, In Section 3 I develop the model, and Section 4 concludes.

3.1 Related Literature

Post-election models of politics have their roots in the work of Barro (1973) and Ferejohn (1986). Barro used the infinite-horizon model with symmetric information. Ferejohn extended it and used an asymmetric information, infinite-horizon model. The incumbent politician has exogenous rents from being in office and he minimizes effort. Persson, Roland and Tabellini (1997) adjust the model to outright rent extraction.

An alternative way of modeling the conflict of interest between voters and opportunistic parties is to use pre-election models of politics. In those models, political parties commit to policies ahead of the elections. A central question here is whether electoral competition induces the parties to announce optimal policy platforms from the viewpoint of voters. The answer depends on whether or not voters perceive the parties as perfect substitutes. Downs (1957) models identical parties and the endogenous rents vanish. Electoral competition does not allow parties to extract rents, and the equilibrium outcome is optimal for voters. When instead parties are not perfect substitutes, policy is not the only determinant of elections, and then rents remain in equilibrium. The idea that political competition leads to optimal outcomes is suggested by Stigler (1972) and Becker (1983). Wittman (1989, 1995) models political competition and shows its general efficiency improving effects.

The assumption of credible commitments that pre-election models use is problematic. It is hard to enforce the electoral promises once the winning politician is in office. However, the promises in the electoral campaign are not irrelevant because of

reputational concerns. The post-election models seem to be more realistic since electoral promises are not binding and policy is formed once in office. Electoral campaigns, ignored in post-election models, has some relevance for the election outcomes and for subsequent policy choices, though. Austen-Smith and Banks (1989) try to combine the pre-election and post-election models of politics. They assume symmetric information and the voters' strategy of re-electing the incumbent depends on the observed policy outcome relative to the policy platform upon which the incumbent was elected. Harrington (1993) models politics with asymmetrically informed voters about parties' intended policies. The parties increase their chances of re-election if they truthfully reveal information to voters about their type (intended policies). The author shows that the politician is re-elected, if he sticks to the intended policies. Persson and Tabellini (2000) deal with the pre-election and post-election politics, and they discuss how to bridge these two approaches.

The literature on the effects of media on politics is quite limited. As Stromberg (1999) points out, the research in this area was perhaps discouraged by some influential papers in the early 1950's that found minimal effects of media on voting behavior. There are some recent papers though in which for example Iyengar and Kinder (1991) studied media effects in a laboratory environment, or Bartels (1993), who found statistically significant effects of media coverage on public opinion. Stromberg (1999) analyses the mass media impact on policy. He focuses on broadly targeted redistributive programs and concludes that mass media provides less news to small groups of voters and voters who are not valuable to advertisers. This news bias affects the trade-off in political competition and introduces a bias in public policy. In their empirical paper Djankov, McLiesh, Nenova and Shleifer (2001) analyze the patterns of media ownership in 97 countries around the world. They find that almost universally the largest media firms are owned by the government or by private families. They do not focus on the level of ownership concentration in media firms though.

3.2 The model

There are the following agents in the model: N voters (consumers), M owners of two competing media sources (two newspapers, two televisions or two radios),[5] $M/2$ owners of both media A and media B, and an incumbent politician. The politician is office and rent seeking.[6] He has complete discretion in office and the voters can either vote for or against the incumbent politician in the next election. Media owners have preferences for profits and public good provision, they sell media products[7] to voters, they compete for them by allocating quantities of media space to news on politics and entertainment, and they compete in pricing the media product. Voters have preferences for private and public goods and entertainment. All voters vote and each of them buys the more attractive media product in order to get informed and be attracted. Voters do not have direct preferences for news on politics but they want to be informed in order to maximize their utilities.

The politician taxes the income of voters, provides the public good and extracts the remainder for himself. I assume that the transformation of the taxed output into the public good is costly and that voters do not observe either the cost or the rents extracted. The cost is a random variable realized at the beginning of the period by the politician and by media owners. Everything else is common knowledge. If voters knew the cost, they could choose the optimal reservation public good[8] which maximizes the public good provision and makes the politician just prefer re-election.

After media owners observe the public good provided and rents appropriated by the politician, they devote some space to news on politics, and in the rest of the space available they provide entertainment and supply the media product. I assume that voters will spot some news in the media with certain probability, which is increasing with the space allocated to this news in the media. If voters do not spot news on politics, they will set the cut-off reservation level of public good that is sub-optimal. On one hand voters

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[5] Media can be represented by newspapers, television or radio stations.
[6] We can imagine that rents for the incumbent take various forms of corruption and waste in connection with public good provision.
[7] Newspapers issues, television and radio programs are media products.
[8] I assume that the tax rate is fixed. Thus, voters require the reservation public good to be satisfied in order to re-elect the politician.

demand attractive entertainment which is in trade-off with news on politics, that voters demand in order to set the reservation public good optimally.

The timing of events is as follows: (i) Voters set the reservation public good for re-electing the incumbent politician contingent on the inferred cost revealed later. (ii) The politician chooses the level of public good and extracts the remainder for himself, given the budget constraint. (iii) Media owners observe the level of rents and allocate quantities of space to news on politics (cost or corruption) and to entertainment. (iv) Each voter buys the more attractive media product and spots the news on politics with certain probability. If voters spot the news, they infer the cost, which determines the reservation public good. If they do not, they set the cut-off level of the reservation public good. (v) The election is held, in which the voters choose between the incumbent and an opponent.

The utility function of a voter j, $j = \{1,...,N\}$, consuming the media product i is

$$U_i^j\left(c, g, q_i^e, e_i^j\right) = c + \alpha G(g) + \beta K\left(q_i^e\right) + e_i^j, \tag{1}$$

where both G and K are concave and increasing functions, c is the private consumption, g is the public good provision, q_i^e is the space media i devotes to entertainment, α and β capture the preferences of voters for the public good and entertainment respectively, and e_i^j represents other aspects of media i which the voter j values (design, paper type and size, image, reporters…). Voters have different preferences for these aspects of media. The space media i devotes to news on politics is denoted by q_i^p.

The expected utility function of the incumbent politician is

$$EV_I\left(r, R\right) = \gamma r + P_I R, \tag{2}$$

with expectations taken over the election outcome. The parameter $\gamma \in [0;1]$ measures the transaction costs associated with rent appropriation. The higher the γ, the lower the transaction costs for rent appropriation. The politician has full discretion over current rents r. Future rents, R, can be interpreted as the expected present value of holding

office from the next period and on. The probability that the incumbent politician will be reelected in the next election is denoted by P_I. The government budget constraint is

$$\tau y = \theta g + r ,\tag{3}$$

where y is the income of voters, θ is the cost of transforming private output into public good $\theta > 1$, and τ is the tax rate.

A voter consumes private goods and he buys the product of media A if his utility from consuming the media product A is higher than the utility from consuming the media product B. Otherwise he buys the product of media B. Every voter buys one media product. The budget constraint of voters is then

$$(1-\tau)y = N(c + p_i),\tag{4}$$

where p_i is the price of the product of media i. The expected utility of an owner of media i is

$$EW_i(\pi_i, M, g) = \omega E\left(\frac{\pi_i}{M}\right) + \psi G(g),\tag{5}$$

where $E\left(\dfrac{\pi_i}{M}\right)$ denotes the share of expected profit of media i belonging to every media

i owner, ω and ψ captures the preferences of media for profits and public good provision.[9] Since the public good is non-excludable, all media owners consume the public good provided by the politician. They all benefit from the public good provided. However, every media owner benefits only from his share of the media profit. Thus, the number of media owners matters in the relative attractiveness of public good to profit.

Proposition 1: *A pair of strategies* $\left(\overset{*}{q}_A, \overset{*}{q}_B \right)$ *of two competing media A and B constitute a Nash equilibrium (NE) in the game of maximizing the expected utilities of all players, the media owners and the incumbent politician, if they satisfy* $\overset{*}{q}_A^p = \overset{*}{q}_B^p$ *and* $\overset{*}{q}_A^e = \overset{*}{q}_B^e$, *where* $\overset{*}{q}_i = \left(\overset{*}{q}_i^p, \overset{*}{q}_i^e \right)$. *In equilibrium the media follow the same strategy (they devote the same space to news on politics).*

Proof: Two media sources, A and B, compete for readers by allocating quantities of space to news on the rents, q_i^p, and entertainment, q_i^e. All voters are media consumers and every voter buys media product A or B. The total space of media i for news on politics and entertainment is assumed to be fixed at $q_i^p + q_i^e = 1$. Let $Z_i(c, g, q_i^e) \equiv c + \alpha G(g) + \beta K(q_i^e)$. A voter j buys media product A if it gives him higher utility than the media product B does. Thus, the voter j buys media product A if $\Delta Z \equiv Z_A - Z_B \geq e_B^j - e_A^j$. The media sources are uncertain about the utility they provide to the voter and assign a probability distribution F to the difference $e_B^j - e_A^j$. I assume that $E\left[e_B^j - e_A^j \right] = 0$ for all j (media are symmetric). Both media thus expect to have $N/2$ consumers and therefore they charge the same price $p = p_A = p_B$. The probability media attach to a voter j buying media product A is $\Pr\left(e_B^j - e_A^j \leq \Delta Z \right) = F(\Delta Z)$. Let $f(\Delta Z)$ be the probability density function of $F(\Delta Z)$.

The media sources get the payment p per consumer. The total profit[10] in the media industry is thus $\pi = Np$. Let π_i be the random profit of media i. Then $\pi_B = \pi - \pi_A$. The expected utility of an owner of media i is

$$EW_i = \omega N p F(\Delta Z) \frac{1}{M} + \psi G(g). \tag{6}$$

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[9] I do not analyze the effects of the media industry structure on political corruption in this model, and thus I do not allow media to have different preferences which would complicate the model.

[10] Let the unit cost be zero. The price p is positive because media provide differentiated products.

A Nash Equilibrium in the competition between media A and B must satisfy

$$E\left[W_A\middle|q_A,\overset{*}{q_B}\right] \leq E\left[W_A\middle|\overset{*}{q_A},\overset{*}{q_B}\right] \leq E\left[W_A\middle|\overset{*}{q_A},q_B\right], \text{ for all } q_A \text{ and } q_B, \text{ where } \overset{*}{q_A} = \left(\overset{*}{q_A^p},\overset{*}{q_A^e}\right)$$

and $\overset{*}{q_B} = \left(\overset{*}{q_B^p},\overset{*}{q_B^e}\right)$.

After solving for the best reply functions of the media,[11] we get the following equilibrium condition:

$$\frac{\partial G}{\partial g}\frac{\partial g}{\partial q_i^p}\left[\alpha + \frac{\psi M}{\omega Y}\right] = \beta\frac{\partial K}{\partial q_i^e}, \tag{7}$$

for $i \in \{A,B\}$, where $Y \equiv Npf\left(\Delta Z\right) > 0$. Thus, $\overset{*}{q_A^p} = \overset{*}{q_B^p}$, $\overset{*}{q_A^e} = \overset{*}{q_B^e}$. I have proved proposition 1.

Proposition 2: *Let* $\overset{*}{q_L} = \left(\overset{*}{q_L^p},\overset{*}{q_L^e}\right)$ *be the equilibrium strategy of the media for some* ω_L *in (5), and let* $\overset{*}{q_H} = \left(\overset{*}{q_H^p},\overset{*}{q_H^e}\right)$ *be the equilibrium strategy for some* ω_H, *such that* $\omega_L < \omega_H$. *The equilibrium strategies of media* $\overset{*}{q_L}$ *and* $\overset{*}{q_H}$ *and the equilibrium strategy of the politician* $\left(\overset{*}{g},\overset{*}{r}\right)$ *must satisfy* $\overset{*}{q_L^p} > \overset{*}{q_H^p}$. *The more profit oriented is the media, the less space devoted to news on political corruption.*

Proof: Voters set the reservation public good $\tilde{g}$, and the re-election probability is $P_I = 1$ if $g \geq \tilde{g}$, and $P_I = 0$ otherwise. The politician can either please voters to gain re-election or he can forego re-election, exploit his discretion fully and extract the entire budget. It prefers pleasing voters if

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[11] See the derivation of (7) in Appendix 5.1.

$$\gamma r + R \geq \gamma \tau y \,, \qquad\qquad (8)$$

where γ measures the transaction costs associated with rent appropriation. In equilibrium, if the politician chooses to please voters to be re-elected, he maximizes rents, r, subject to the constraint of generating $P_I = 1$, and just satisfies the reservation public good, $g = \tilde{g}$. Voters want to make the politician marginally prefer re-election and let him extract the optimal rent $r_O = \tau y - \dfrac{R}{\gamma}$, which is given by (8) with equity. If voters spot news on politics, they infer the cost. Knowing the optimal rent and given the budget constraint, they determine the optimal reservation public good which is $\tilde{g}_O = \dfrac{R}{\gamma \theta}$. If voters do not spot news on politics, they set some cut-off level of reservation public good C.

Let C_H be the cut-off level of reservation public good such that $C_H > \tilde{g}_O$. In this case the politician chooses to extract the whole budget, which is the worst outcome from the voters' point of view. Let C_L be the cut-off level of reservation public good such that $0 < C_L < \tilde{g}_O$. The outcome then is not optimal but the utility of voters with C_L is higher than the utility of voters with C_H, $U(C_L) > U(C_H)$. The optimal reservation public good $\tilde{g}_O$ is a function of the cost θ, which is a random variable. On one hand voters maximizing their utilities tend to set the cut-off level of reservation public good equal to the expected optimal reservation public good, $C = E(\tilde{g}_O)$. On the other hand, they care about the probability that the whole budget extraction outcome prevails. The lower the cut-off level of the reservation public good, the lower the probability that the politician extracts the whole budget. Therefore, the cut-off level of reservation public good that voters choose is lower than the expected optimal reservation public good, $C < E(\tilde{g}_O)$.

Both voters and politician set either C or $\tilde{g}_O$. Let $\rho(q_i^p)$ be the probability that the politician chooses the reservation public good $\tilde{g}_O$ and let $1 - \rho(q_i^p)$ be the probability that he chooses the reservation public good C. The more space media devote to news on politics, the higher the probability that voters set $\tilde{g}_O$. I assume that the higher the

probability that voters set $\tilde{g}_O$, the higher the probability that the politician chooses $\tilde{g}_O$ instead of C. Thus, $\rho' > 0$, and let $\rho'' \leq 0$. For proving proposition 2 we need to show that in equilibrium condition (7) $\dfrac{\partial \tilde{g}}{\partial q^p} > 0$, and $\dfrac{\partial^2 \tilde{g}}{(\partial q^p)^2} \leq 0$. Because of uncertainty it is sufficient to show that $\dfrac{\partial E(\tilde{g})}{\partial q^p} > 0$ and $\dfrac{\partial^2 E(\tilde{g})}{(\partial q^p)^2} \leq 0$, which is the case since $C < E(\tilde{g}_O)$ and $\rho'' \leq 0$ by assumption. Thus, I proved proposition 2.

Corollary 1: *The more profit oriented are the media owners, the greater the political corruption.*

Proof: From proposition 2 we know that the more profit oriented are the media, the less space, q^p, they devote to the news on the incumbent's corruption. I showed that in equilibrium $\dfrac{\partial \tilde{g}}{\partial q_i^p} > 0$. Hence, $\dfrac{\partial r}{\partial q_i^p} < 0$ since $\dfrac{\partial r}{\partial \tilde{g}} = -\theta < 0$, using relation (3). I have just proved that the more profit oriented are the media owners, the greater the corruption of the politician.

Proposition 2 and corollary 1 capture the tendency of media owners with public good orientation to increase the space to news on politics in order to increase the probability that voters will spot the news, which leads to the optimal reservation public good setting implying the lowest achievable corruption. In other words, the more space media devote to news on corruption of a politician, the higher the probability that voters get the information and punish the politician by not voting for him. Profit orientation of media owners leads to trading-off news on corruption for entertainment which attracts more voters and increases profits. In countries with domination of profit oriented media, politicians can afford to increase corruption since the incentives of media to inform the voters about it is relatively low and so there is relatively high probability that the corruption would not be revealed.

Proposition 3: *The higher the number of owners in media firms, the more space the media devotes to news on political corruption.*

Proof: Proposition 3 follows from equilibrium condition 7. As M increases, the left-hand side must decrease and the right-hand side must increase to equilibrate condition 7. Hence, the space devoted to news on politics q_i^p increases with M.

Corollary 2: *The more concentrated is the media ownership, the greater the political corruption.*

Proof: From Proposition 3 we get that the more concentrated is the media ownership, the more space media devotes to news on political corruption. In equilibrium $\frac{\partial \tilde{g}}{\partial q_i^p} > 0$. As in corollary 1 $\frac{\partial r}{\partial q_i^p} < 0$ since $\frac{\partial r}{\partial \tilde{g}} = -\theta < 0$. I have just proved corollary 2.

The intuition behind proposition 3 and corollary 2 is that since public goods are non-excludable all media owners consume the public goods provided by the politician. They all benefit from the public good provided. However, every media owner benefits only from his share of the media profit. Thus, the number of media owners matters in the relative attractiveness of public goods to profits. In particular, the more owners there are in media firms, the lower the share of profit that belongs to every owner and thus the lower the willingness to trade-off a unit of public good for a unit of profit that is going to be divided among owners. If there is only one owner of a media firm, then he benefits from the whole unit of profit and this makes the trade-off of public good for profit more attractive. As a result media sources with concentrated ownership tend to value profits more relative to public goods, which leads to decreasing space given to news on politics, resulting in higher political corruption.

3.3 Conclusion

In this paper I analyze how the incentives of the owners of media firms affect political corruption. I treat the media as special firms with owners' preferences for profits and public goods. The media differs from typical firms maximizing profits because they provide news on corruption to voters and thus by their willingness to mediate information about political corruption, media affect the incentives of politicians to be corrupt. Hence, the media can affect corruption and public good provision, and therefore it is worth analyzing how the incentives of media owners with preferences for both profits and public goods affect public goods provision and corruption.

I show that the more profit oriented are the media owners, the higher the political corruption. Purely profit oriented media tends to provide the most attractive media product, and thus they are not willing to devote additional space to news on corruption if it does not attract voters but only helps to decrease corruption. However, public goods orientation of media owners makes the owners increase the space given to news on political corruption in order to decrease corruption and increase the public goods provision. Politicians reflect the media incentives and they tend to be more corrupt if media owners do not care that much about public good provision and corruption and do not inform the public extensively about corruption.

Moreover, I study how the ownership concentration in media firms affects political corruption. The central prediction is that the more concentrated the ownership is in media firms, the higher the political corruption. The intuition behind this result is that the public good is non-excludable and thus all owners benefit from the public good provision. However, the profit of a media firm is divided among the owners of the firm, and each owner benefits only from his part of the profit. As a result the higher the number of owners of a media firm, the lower is the benefit from the given profit but the benefit from public good provision remains the same regardless of the number of media owners. Therefore, the more owners, the less they value profits relative to public goods and the more they are willing to trade-off an additional unit of profit for an additional unit of public good. Politicians observe the ownership concentration in media, and choose their level of corruption accordingly. The lower the media concentration, the higher the

tendency of media to reveal corruption and inform the public about it, and the lower the tendency of politicians to be corrupt. Therefore I conclude that public media tends to provide more news on political corruption than private media, which leads to lower political corruption not necessarily because public media are more public good oriented but because the ownership of public media is dispersed. Thus, the regime change from communism to democracy, leading to dispersed ownership of media, may affect the outcome regarding corruption.

3.4 Appendix

The Langrangian for the media owners A is:

$$\lambda_A = \omega NpF(\Delta Z)\frac{1}{M} + \psi G(g) - \lambda\left(q_A^p + q_A^e - 1\right).$$

The best reply functions of media owners A are then described by the following first order conditions.

$$\frac{\partial \lambda_A}{\partial q_A^p} : \omega Npf(\Delta Z)\frac{1}{M}\left[\alpha \frac{\partial G}{\partial g}\frac{\partial g}{\partial q_A^p} - \beta \frac{\partial K}{\partial q_A^e}\right] + \psi \frac{\partial G}{\partial g}\frac{\partial g}{\partial q_A^p} = \lambda \; ;$$

$$\frac{\partial \lambda_A}{\partial q_A^e} : \omega Npf(\Delta Z)\frac{1}{M}\left[(-\alpha)\frac{\partial G}{\partial g}\frac{\partial g}{q_A^p} + \beta \frac{\partial K}{\partial q_A^e}\right] - \psi \frac{\partial G}{\partial g}\frac{\partial g}{\partial q_A^p} = \lambda \; .$$

After rearranging terms we get the equilibrium condition which satisfies (7). The conditions for media owners B are the same.

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References

Aoki, K. (2001). "Optimal Monetary Policy Response to Relative Price Changes." *Journal of Monetary Economics 48:55-80*.

Aragones, E. (1995). "Negativity Effect and the Emergence of Ideologies." *Journal of Theoretical Politics.*

Aragones, E. (1997). *"Negativity Effect in Multipolitician Electoral Competition*." *UPF Working Paper 273.*

Austen-Smith, D. and Banks, J. (1989). "Electoral Accountability and Incumbency." *in P. Ordeshook, ed., Models of Strategic Choice in Politics, U. of Michigan Press 121-148.*

Becker, G. (1983). "A Theory of Competition among Pressure Groups for Political Influence." *The Quarterly Journal of Economics 98*.

Barro, R. J. (1973). "The Control of Politicians: An Economic Model." *Public Choice 14, 19-42.*

Bartels, L. M. (1993). "*Messages* Received: The Political Impact of Media Exposure." *American Political Science Review, Vol. 87., No. 2, 267-284.*

Bennett, J., Estrin, S. and Urga, G. (2004). "Methods of Privatization and Economic Growth in Transition Economies." *Economics of Transition Volume 15(4), 661-683.*

Benigno, G. and Benigno, P. (2003). "Price stability in open economies.", *Review of Economic Studies 70:743-764.*

Besley, T. and Coate, S. (2000). "Elected Versus Appointed Regulators: Theory And Evidence." *CEPR Discussion Papers 2381.*

Bortolotti B. and Pinotti, P. (2005). "The Political Economy of Privatization." *Working Papers 2003.45, Fondazione Eni Enrico Mattei.*

Cantillon, E. and Rangel, A. (2000). "A Graphical Analysis of Some Basic Results in Social Choice." *Cowles Foundation Discussion Papers 1285, Cowles Foundation, Yale University.*

Clarida, R., Gali, J. and Gertler, M. (1999). "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature 37 (4).* Available at http://ideas.repec.org/a/aea/jeclit/v37y1999i4p1661-1707.html.

Clarida, R., Gali, J. and Gertler, M. (2001). "Optimal Monetary Policy in Closed versus Open Economies: An Integrated Approach." *NBER Working Paper* 8604. Available at http://ideas.repec.org/p/nbr/nberwo/8604.html.

Clarida, R., Gali, J. and Gertler, M. (2002). "A simple framework for international monetary policy analysis." *Journal of Monetary Economics 49 (5), 879-904*. Available at http://ideas.repec.org/a/eee/moneco/v49y2002i5p879-904.html.

Devereux, M. and Engel, C. (2003). "Monetary Policy in an open economy revised: price setting and exchange rate flexibility." *Review of Economic Studies 70: 765-783*.

Djankov, S., McLiesh, C., Nenova, T. and Shleifer, A. (2001). "Who owns the Media?" *NBER Working Paper 8288*.

Downs, A. (1957). "An Economic Theory of Voting." *New York: Harper and Row.*

Enelow, J. and Hinich, M. (1984). "The Spatial Theory of Voting – An Introduction." *Cambridge University Press.*

Enelow, J. and Hinich, M. (1990). "Advances in the Spatial Theory of Voting." *Cambridge University Press.*

Ferejohn, J. (1986). "Incumbent performance and electoral control." *Public Choice, 50 (1-3), 5-25.*

Galí, J. and Monacelli, T. (2005). "Monetary Policy and Exchange Rate Volatility in a Small Open Economy." *Review of Economic Studies 72 (3), 707-734*. Available at http://ideas.repec.org/a/bla/restud/v72y2005i3p707-734.html.

Gali, J. and Monacelli, T. (2002). "Monetary Policy and Exchange Rate Volatility in a Small Open Economy." *NBER Working Paper 8905*. Available at http://ideas.repec.org/p/nbr/nberwo/8905.html.

Goodfriend, M. and King, R. (1998). "The new neoclassical synthesis and the role of monetary policy." *Working Paper 98-05, Federal Reserve Bank of Richmond.* Available at http://ideas.repec.org/p/_p/fedrwp/98-05.html.

Graber, M. (1984). "Mass Media and American Politics." *Washington D.S.: Congressional Quarterly.*

Harrington, J. (1993). "Economic Performance, and Elections." *American Economic Review 83, 27-42.*

Helpman, E. and Persson, T. (1998). "Lobbying and Legislative Bargaining." *mimeo.*

Hotelling, H. (1929). "Stability in Competition." *Economic Journal*.

Iyengar, S. and Kinder, D. (1991). "News That Matters: Television and American Opinion." *University of Chicago Press.*

Justiniano, A. and Preston, B. (2004). "Small Open Economy DSGE Models: Specification, Estimation and Model Fit." *Columbia University Department of Economics Working Paper.*

Kameník, O. (2007). "DSGE Models with Dynare++. A Tutorial." *Technical Report v. 1.3.5.* Available at http://www.cepremap.cnrs.fr/dynare/.

Kitschelt, H. et al. (1999). "Post-Communist Party Systems: Competition, Representation and Inter-Party Cooperation." *Cambridge University Press.*

Lindbeck, A. and Weibull, J. (1987). "Balanced budget redistribution as the outcome of political competition." *Public Choice 52, 273-297.*

Lubik, T. and Schorfheide, F. (2005). "A Bayesian Look at New Open Economy Macroeconomics." *Economics Working Paper archive 521*, The Johns Hopkins University. Available at http://ideas.repec.org/p/jhu/papers/521.html.

Marcincin, A. and Wijnbergen, S. (1997). "The Impact of Czech Privatisation Methods on Enterprise Performance Incorporating Initial Selection Bias Correction." CERT Discussion Paper *9704.*

Monacelli, T. (2003). "Monetary policy in a low pass-through environment." *Working Paper series 227, European Central Bank.* Available at http://ideas.repec.org/p/ecb/ecbwps/20030227.html.

Natalucci, F. and Ravenna, F. (2002). "The road to adopting the euro: monetary policy and exchange rate regimes in EU candidate countries." *FRB International Finance Discussion Paper No. 741.*

Ordeshook, P. (1999). "Game Theory and Political Theory: An Introduction," *Cambridge University Press.*

Paoli, B. (2006), "Monetary Policy and Welfare in a Small Open Economy." *CEP Discussion Papers 0639, Centre for Economic Performance*, LSE. Available at http://ideas.repec.org/p/cep/cepdps/dp0639.html.

Persson, T. and Tabellini, G. (2000). "Political Economics – Explaining Economic Policy." *Cambridge: MIT Press.*

Persson, T., Roland, G. and Tabellini, G. (1997). "Separation of powers and political accountability." *Quarterly Journal of Economics 112, 1164-1202.*

Persson, T., Tabellini, G. (1998). "The Size and Scope of Government: Comparative Politics with Rational Politicians." NBER *Working Papers 6848.*

Sajo, A .(1998). "Corruption, Clientelism, and the Future of the Constitutional State in Eastern Europe." *East European Constitutional Review*, *7(2), 37-46.*

Santacreu, A. (2005). "Reaction functions in a small open economy: What role for non-traded inflation?" *Reserve Bank of New Zealand Discussion Paper series DP2005/04.* Available at http://ideas.repec.org/p/nzb/nzbdps/2005-04.html.

Smets, F. and Wouters, R. (2003). "An Estimated Dynamic Stochastic General Equilibrium Model of the Euro Area." Journal of the European Economic Association 1 (5), 1123-1175. Available at http://ideas.repec.org/a/tpr/jeurec/v1y2003i5p1123-1175.html.

Stigler, G. (1972). "The law and economics of public policy: a plea to the scholars." *Journal of Legal Studies 1, 1-12..*

Stromberg, D. (1999a). "Mass Media Competition and Public Policy." *Mimeo.*

Stromberg, D. (1999b)."Mass Media Competition, Political Competition, and Public Policy." *Mimeo.*

Sutherland, A. (2005a). "The Expenditure Switching Effect, Welfare and Monetary Policy in a Small Open Economy." *The Institute forInternational Integration studies Discussion Paper series iiisdp022, IIIS.* Available at thttp://ideas.repec.org/p/iis/dispap/iiisdp022.html.

Sutherland, A. (2005b). "Incomplete pass-through and the welfare effects of exchange rate variability." *Journal of International Economics 65 (2), 375-399.* Available at http://ideas.repec.org/a/eee/inecon/v65y2005i2p375-399.html.

Svensson, L. (2000). "Open-economy inflation targeting." *Journal of International Economics 50 (1), 155-183*. Available at http://ideas.repec.org/a/eee/inecon/v50y2000i1p155-183.html.

Svensson, L. (2003). "Monetary Policy and Real Stabilization." *NBER Working Papers 9486, National Bureau of Economic Research, Inc.* Available at http://ideas.repec.org/p/nbr/nberwo/9486.html.

Svensson, L. and Woodford, M. (2004). "Implementing Optimal Policy Through In_ation-Forecast Targeting." *CEPR Discussion Papers 4229, C.* Available at http://ideas.repec.org/p/cpr/ceprdp/4229.html.

Vives, X. (1984). "Duopoly Information Equilibrium: Cournot and Bertrand." *Journal of Economic Theory 34, 71-94.*

Walsh, C. (2003). "Monetary Theory and Policy : Second Edition." *The MIT Press.*

Wittman, D. (1989). "Why Democracies Produce Efficient Results." *The Journal of Political Economy* 97(6), 1395-1424.

Wittman, D. (1995). "The Myth of Democratic Failure: Why Political Institutions Are Efficient." *Chicago: The University of Chicago Press.*

Woodford, M. (2001). "Inflation Stabilization and Welfare." *NBER Working Papers 8071, National Bureau of Economic Research, Inc.* Available at http://ideas.repec.org/p/nbr/nberwo/8071.html.

Woodford, M. (2003). "Interest and Prices : Foundations of a Theory of Monetary Policy." *Princeton University Press.*