Structural Shocks and Labour Market Dynamics in a Small Open-Economy: Theory and Some Evidence

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Abstract

The aim of this paper is to measure the persistence of shocks on unemployment in a small open economy and the eventual links that might exist between them. Following Blanchard and Summers (1986), we consider a rational expectations' model. Labour markets are supposed to be controlled by insider trade unions. We examine the link between structural shocks, exchange rate regime, labour market variables and exchange rate regime by theoretically and numerically solving a dynamic stochastic model. We perform parameterization and simulation for Barbados and OECS countries.

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1 Introduction

In a rational expectations model, this paper analyzes the persistence of shocks on unemployment in a small open economy and the eventual links that might exist between them.

This is an important question for many economies because a *well-behaved* labour market is a key to boosting economic growth and achieving economic integration in the global market. A usual concern in emerging economies as well as in some European economies is the relative slowness with which labour market seems to adjust to disturbances.

The unemployment persistence comes in great contrast with the labour market adjustment in many Asian economies. Despite the financial crisis, some Asian economies had an important recovery of output and employment to their initial equilibrium. For small open-economies, such as Caribbean economies and some South America countries, the constraints generated by the openness, the limited economies of scale bring into sharp focus the importance of the low performance of labour markets, more particularly, labour market rigidity.

The analysis of the role of microeconomic rigidities on labour market distortions is not new in the existing literature. Distortions have been analyzed (persistence or hysteresis), as coming from the relationship between employment and insider status (see Lindbeck and Snower (1986)). Labour market are supposed to be controlled by insider trade unions. In a dynamic perspective, adverse shocks that contribute to reduced labour demand change the number of insiders, lower the next periods employment target and affect the nominal wage rate. Membership considerations can thus explain the dependence of unemployment rate on path followed. The argument that the distortions in the labour market coming from wage setting where a trade union selects an employment target that consists only of current union membership has been provided as one explanation to the persistence of unemployment in industrialized countries (see for example Blanchard and Summers, 1986, Lockwood and Philippopoulos, 1994, Blanchard and Wolfers, 2000).

However less attention has been paid to the sources of persistence of unemployment in newly industrialized countries. We extend the discussion to the case of small open economies and particularly the case of Caribbean and South America countries, since they are particularly sensitive to both domestic and foreign shocks. Following Blanchard and Summers (1986), we consider a rational expectations' model. One notable difference from these authors is that in our framework, we analyze the role of foreign shocks in explaining the labour market dynamics.

The remainder of this paper is organized as follows. Section 2 discusses the basic framework underlying the stochastic open economy. Section 3 is devoted to the extended model. It studies the effect of international business cycles on labour market dynamics. Section 4 calibrates the model for Caribbean economies (Barbados and OECS). Section 5 concludes the paper.

2 The Basic model

We consider an augmented insider-outsider model with open-economy and stochastic process considerations. The firm maximizes its profits with respect to the labor demand taking the unions wage level as given.

2.1 Aggregate supply and labour demand relations

Let us consider an economy which is endowed with only one sector in which firms produce a consumer good denoted Y_t with a Cobb-Douglas technology $Y_t = A_t L_t^{\alpha}$, with $\alpha \in [0, 1]$. L_t and A_t are respectively employment level and technology level, the latter being:

$$A_t = A_{t-1}\bar{G}E_t^s. \tag{1}$$

From equation (1), we get the technology level in terms of the deviations from steady state:[1]

$$\widehat{a}_t = \widehat{a}_{t-1} + g + \epsilon_t^s, \tag{2}$$

where, g is the technical progress and ϵ_t^s is an i.i.d random variable satisfying $E\left[\epsilon_t^s\right] = 0$ and a constant variance. The exogenous disturbance ϵ_t^s is considered as a domestic supply shock. As firms are price-takers, real wage is equal to marginal product of labour.

[1]The basic rule followed for linear approximation is:

$$\Psi(X_t) \approx \Psi(X) + \sum_{i=0}^{n} \left(\frac{\partial \Psi(X_t)}{\partial x_{it}}\right)\left(\frac{x_{it} - x_i}{x_i}\right) x_i,$$

where $X_t = (x_{1t}, ..., x_{nt})$. As $\Psi(X) = 0$, the previous relation becomes:

$$\Psi(X_t) \approx \sum_{i=0}^{n} x_i \left(\frac{\partial \Psi(X_t)}{\partial x_{it}}\right)\left(\frac{x_{it} - x_i}{x_i}\right)\widehat{x}_{it}.$$

where $\widehat{x}_{it}$ is the percentage deviations from steady state.

Labour demand is obtain in terms of deviations from steady state:

$$\widehat{\ell}_t^d = -\frac{1}{1-\alpha}\left(\widehat{w}_t - \widehat{p}_t - \widehat{a}_t\right) \Leftrightarrow \widehat{\ell}_t^d = -\delta\left(\widehat{w}_t - \widehat{p}_t - \widehat{a}_t\right), \tag{3}$$

with $\delta = (1-\alpha)^{-1}$. As expected, labour demand is a decreasing function in real wage. Nominal wage is set by minimizing a 1-period loss function[2]:

$$\min_{\widehat{\ell}_t^d} \Omega_t = \frac{1}{2}E_{t-1}\left(\widehat{\ell}_t^d - \ell_t^\star\right)^2. \tag{4}$$

Following equation (4), insiders accept any wage in order to maintain their status[3]. $\ell_t^\star$ is the union's target rate of employment defined as:

$$\ell_{t-1}^\star = \gamma\widehat{\ell}_t^d + (1-\gamma)\,\bar{\ell} \qquad \gamma \in [0,1], \tag{5}$$

$\bar{\ell}$, is the labour force and γ is the proportion of insiders whereas $(1-\gamma)$ represents the proportion of outsiders. γ is the measure of insider power in wage setting. Remark that if $\gamma = 1$ the labour market exhibits an hysteresis phenomenon : shocks are long lasting. On the contrary, if $\gamma = 0$ union's policy is independent of history and so shocks are not persistent. The first order condition yields:

$$E_{t-1}\left(\widehat{\ell}_t^d - \ell_t^\star\right) = 0. \tag{6}$$

By replacing (2), (3) and (5) into (6), we get the nominal wage setting:

$$\widehat{w}_t = E_{t-1}\widehat{p}_t + \widehat{a}_{t-1} + g - \frac{\gamma}{\delta}\widehat{\ell}_{t-1}^d - \frac{1-\gamma}{\delta}\bar{\ell}. \tag{7}$$

Equation (7) expresses $\widehat{w}_t$ in terms of expectations' in price level, technology level, labour demand and labour force. In order to find the model we need to compute change in nominal wage. Solving (3) for a_{t-1} and substituting into (7) and solving for Δw_t, we obtain:

$$\Delta\widehat{w}_t = E_{t-1}\Delta\widehat{p}_t + g - \left(\frac{1-\gamma}{\delta}\right)\widehat{u}_{t-1}. \tag{8}$$

Using (2), (3) and (7), labour demand satisfies [4]:

$$\widehat{\ell}_t^d = \delta\left(\Delta\widehat{p}_t - E_{t-1}\Delta\widehat{p}_t\right) + \gamma\widehat{u}_{t-1} - \delta\epsilon_t^s, \tag{9}$$

[2] In the rest of the paper, we shall use the notation $E_{t+k}x_{t+i}$ for the expectations' framed for the period $t+i$, on the basis of information available at time $t+k$, k being positive or negative.

[3] Alogoskoufis and Manning (1988), p.464-465, have suggested to modify the insiders objective function by including deviation in real wages and unemployment from their respective targets

[4] Where $\widehat{u}_t = \bar{\ell}_t - \widehat{\ell}_t$.

and hence, the associated unemployment rate is: [5]

$$\widehat{u}_t = \gamma \widehat{u}_{t-1} + \delta \left(E_{t-1}\pi_t - \pi_t \right) - \delta \epsilon_t^s. \tag{10}$$

Equation (10) shows that the unemployment rate gets a long lasting memory and a state dependency on the path followed (if $\gamma = 1$). Positive domestic supply shocks lead to a decrease in unemployment. Remark that the "surprise terms" represented by $(E_{t-1}\pi_t - \pi_t)$ plays also a complex role in labour market dynamics. As we mentioned above, this paper is concerned with the behaviour of the labour market in response to monetary and real shocks in an open-economy model. We may now identify the driving forces behind the "surprise term".

2.2 The aggregate demand relation

In this Section we specify the aggregate demand. The price level p_t is defined as a relation between nominal exchange rate e_t and foreign price level p_t^f:

$$\widehat{p}_t = \widehat{p}_t^f + \widehat{e}_t. \tag{11}$$

Our specification assumes that the system is bombed with permanent shocks in a random walk manner: $\widehat{p}_t^f = \widehat{p}_{t-1}^f + \pi^f + \epsilon_t^p$, where ϵ_t^p captures domestic demand shocks. To complete the model, we introduce equation (12) which represents the conditions for equilibrium in the money market:

$$\widehat{m}_t - \widehat{p}_t = \bar{y}_t - \eta \widehat{i}_t + v_t \quad \eta > 0, \tag{12}$$

$\widehat{m}_t$, $\widehat{i}_t$ and v_t are respectively, money supply, and monetary shock. Equation (12) gives the money demand as a decreasing function in nominal interest rate and an increasing function in potential output. $\bar{y}_t$ is the potential output defined as:

$$\overline{y}_t = \alpha \overline{\ell} + \widehat{a}_t. \tag{13}$$

We assume that money demand shocks follow a first order auto regressive process:

$$v_t = v_{t-1} + \epsilon_t^m. \tag{14}$$

Money demand is subject to an exogenous disturbance ϵ_t^m. For simplicity, we assume that the process generating ϵ_t^m is a white noise. Uncovered interest rate parity links

[5] Since $\widehat{p}_t - E_{t-1}\widehat{p}_t = \Delta \widehat{p}_t - (E_{t-1}\widehat{p}_t - \widehat{p}_{t-1}) = \pi_t - E_{t-1}\pi_t$, the formulation are equivalent. π_t is the domestic inflation rate.

home nominal interest rates to exchange rate expectations', $\widehat{e}_t$ and foreign nominal rates, $\widehat{i}^f_t$. Given perfect capital mobility, nominal rate on bonds are set at the beginning of each period as:

$$\widehat{i}_t = E_t \widehat{e}_{t+1} - \widehat{e}_t + \widehat{i}^f_t. \tag{15}$$

In a small open-economy perspective, $\widehat{i}^f_t$ is the foreign interest rate which also evolves also as a random walk: $\widehat{i}^f_t = \widehat{i}^f_{t-1} + \epsilon^i_t$. World interest rate shock is captured by ϵ^i_t. These equations (2)-(15) can be solved for nominal wage, employment, price level and unemployment rate.

2.3 The law of motion of unemployment

To determine how labour market behaves in response to structural shocks, we have to compute the rational expectations' solution to the previous model given the exchange rate regime.

2.3.1 Unemployment dynamics under flexible exchange rate

This Section provides the approach used to solve for linear rational expectations' models[6]. Substituting (11), (13) and (15) into (12), we get:

$$\widehat{e}_t = \frac{1}{1+\eta}\left[\widehat{m}_t - \widehat{p}^f_t - \alpha\bar{\ell} - \widehat{a}_t + \eta\widehat{r}^f_t + v_t + \eta E_t \widehat{e}_{t+1}\right] \Leftrightarrow \left(J - \frac{1+\eta}{\eta}\right)\widehat{e}_{t+1} = \frac{1}{\eta}\widehat{x}_t, \tag{16}$$

with $\widehat{x}_t = \widehat{m}_t - \widehat{p}^f_t - \alpha\bar{\ell} - \widehat{a}_t + \eta\widehat{r}^f_t + v_t$ and J is the forward operator: $J\widehat{e}_t = E_t\widehat{e}_{t+1}$. Using (16) recursively to eliminate the expectation operator on nominal exchange rate, we obtain the no-bubbles solution:

$$\widehat{e}_t = \frac{1}{1+\eta}\sum_{i=0}^{\infty}\left(\frac{1}{1+\eta}\right)^i \widehat{x}_{t+1}. \tag{17}$$

The nominal exchange rate depends on the current paths of money supply, foreign price, technical progress and foreign interest rate[7] (see for instance Walsh (2003)). Using (2), (14) and the law of iterative expectations', we find a solution for (17):

$$\widehat{e}_t = \widehat{x}_t + \frac{\eta}{1+\eta}\left(\mu - g - \pi^f\right), \tag{18}$$

[6]Since our framework is both forward and backward-looking, a specific procedure is required to obtain a solution. General discussions about this approach can be found in Ulig (1999) and Sargent (1987).

[7]See relation 17.

where μ and π^f, represent the money growth and the inflation rate[8]. In order to get $E_{t-1}\Delta\widehat{e}_t$, we apply the expectation operator to equation (18) and we obtain:

$$E_t\Delta\widehat{e}_{t+1} = \mu - g - \pi^f. \tag{19}$$

In the same way, starting from (11) and (18) and apply the expectation operator, we get:

$$E_t\pi_{t+1} = \mu - g. \tag{20}$$

A useful results is obtained: authorities stabilize inflation in this model if money supply growth equals to productivity growth. In this case, it can be shown that foreign shocks, interest rates shocks, supply shocks and demand shocks would affect nominal exchange rate expectations', which implies that:

$$\widehat{e}_t - E_{t-1}\widehat{e}_t = \eta\epsilon_t^i + \epsilon_t^m - \epsilon_t^f - \epsilon_s^s. \tag{21}$$

Substituting the solution for $\widehat{e}_t$ given by (18) into (11), we obtain the inflation rate in terms of economic conditions and shocks:

$$\pi_t = \mu - g + \eta\epsilon_t^i - \epsilon^s + \epsilon_t^m. \tag{22}$$

The key question in this work is how do structural shocks affect the unemployment dynamics in a small-open-economy? This answer is obtained by solving (18), (19) and (10). The reduced-form for the unemployment rate dynamics is:

$$\widehat{u}_t = \gamma\widehat{u}_{t-1} - \delta\left(\eta\epsilon_t^i + \epsilon_t^m\right). \tag{23}$$

The autoregressive term γu_{t-1} shows how the persistence of the unemployment rate arises from the insider power in wage setting. If $\gamma < 1$, adverse disturbances like foreign shocks, or monetary shocks, have long lasting effects but not permanent ones, which is a persistent effect. Positive domestic supply shocks lead to a decrease in unemployment in flexible exchange rate countries. This occurs because flexible exchange rates system provide a degree of freedom to support the adjustment of prices in buffering labour against adverse structural shocks.

2.3.2 Unemployment dynamics under fixed exchange rate

Under fixed exchange rates system we have $\widehat{e}_t = \bar{\widehat{e}}$. If the system is stable and time consistent credible, then $\widehat{i}_t = \widehat{i}_t^f$ so that, from equation[9] (11) the uncovered interest parity implies that the domestic inflation rate is given by $\pi_t = \pi^f$. Here, unemployment

[8] $\mu = \widehat{m}_t - \widehat{m}_{t-1}$ and $\pi^f = \widehat{p}_t^f - \widehat{p}_{t-1}^f$.
[9] With $\Delta\widehat{p}_t^f = \pi^f + \epsilon_t^p$.

dynamics is easier to compute. Using the previous conditions and equation (10), the unemployment dynamics can be re-expressed as:

$$\widehat{u}_t = \gamma \widehat{u}_{t-1} - \delta \left(\epsilon_t^p + \epsilon_t^s \right). \tag{24}$$

Contrary to flexible exchange rate, productivity and aggregate demand shocks cause an immediate decrease in unemployment.

3 The Extended model: predictions of a New Keynesian macroeconomic model

We extend the discussion by taking into account the New Keynesian Macro-Model. Our theoretical framework is motivated by the fact that small open-economies, such as Caribbean economies, have important effect on international business cycles the latter affecting domestic labour markets. For instance, unexpected strong real growth in the US economy might increase all exports, output and labour in the Caribbean economies. The model presented here incorporates several foreign structural shocks. We examine the behavior of the labour market in response to foreign shocks.

In line with Obsfield and Rogoff (1996), we characterize a set of macroeconomic relations through a system of three equations: the aggregate supply, the IS and the forward looking monetary policy relations.

3.1 The supply relation

We adopt the aggregate supply developed by Fuhrer and Moore (1995). This equation is derived from a model of overlapping wage contracts real wages:

$$\pi_t^f = \psi_{AS} + \lambda E_t \pi_{t+1}^f + (1-\lambda)\, \pi_{t-1}^f + \theta \left(\frac{\widehat{y}_t^f + \widehat{y}_{t-1}^f}{2} \right) + \epsilon_t^{AS}, \tag{25}$$

where ψ_{AS} is a constant. π_t^f and y_t^f are foreign inflation rate and foreign output (for instance the US output). ϵ_t^{AS} captures the Aggregate Supply shock, assumed to be independently and identically distributed with variance σ_{AS}^2. E_t is the Rational expectations' operator conditional on the information available at time t. In the remainder of this Section, upperscript f captures foreign variables (the US economy).

3.2 The IS relation

The IS equation is derived from the representative individual utility maximization. We included an external level of habit in the utility function, which is:

$$U_t\left(C_t^f\right) = \frac{\left(\frac{C_t^f}{\left(C_{t-1}^f\right)^h}\right)^{1-\sigma} - 1}{1-\sigma}, \tag{26}$$

where h measures how strong the habit level is and σ is the inverse of the elasticity of substitution. The utility function depends on the consumption ratio in the current period, C_t^f over previous period consumption, C_{t-1}^f. The external habit is not considered as an argument to maximize household's utility function. The budget constraint is :

$$C_t^f + B_t^f \leq \frac{P_{t-1}^f}{P_t^f} R_t^f + W_t^f. \tag{27}$$

where P_t^f is the foreign price level. The previous equation implies that consumption, C_t^f cannot exceed the household endowment coming from labor income, W_t^f, and the real value of the asset holdings at the beginning of the period $\frac{P_{t-1}^f}{P_t^f} R_t^f$. The representative household solves the infinite period dynamic problem by maximizing his expected discounted utility function subject to the budget constraint (27). The Euler condition is :

$$1 = E_t\left(\varphi \frac{U'(C_{t+1}^f)}{U'(C_t^f)} \frac{P_t^f}{P_{t+1}^f} R_t^f\right) \tag{28}$$

where φ is the discounted factor. By an appropriate approximation, the Euler condition can be rewritten as:

$$\widehat{c}_t^f = \psi_{IS} + \vartheta E_t \widehat{c}_{t+1}^f + (1-\vartheta)\,\widehat{c}_{t-1}^f - \rho\left(\widehat{i}_t^f - E_t \widehat{\pi}_{t+1}^f\right). \tag{29}$$

Equation (29) is the monetary transmission mechanism in the IS curve. Since there is no investment and government expenditures, we have the following long run equilibrium condition: $\widehat{c}_t = \widehat{y}_t$. Equation (29) becomes:

$$\widehat{y}_t^f = \psi_{IS} + \vartheta E_t \widehat{y}_{t+1}^f + (1-\vartheta)\,\widehat{y}_{t-1}^f - \rho\left(\widehat{i}_t^f - E_t \widehat{\pi}_{t+1}^f\right) + \epsilon_t^{IS}, \tag{30}$$

where ψ_{IS} is the constant and ϵ_t^{IS} is the foreign aggregate demand shock, independently and identically distributed with variance σ_{IS}^2.

3.3 The monetary rule

The monetary rule is set according to the reaction function proposed by Gali, and Gertler (2000). This function has two parts. The first one reflects the tendency of the central bank to smooth interest rates:

$$\widehat{i}_t^f = \varsigma \widehat{i}_{t-1}^f + (1-\varsigma)\,\widehat{i^*}_t^f + \epsilon_t^{MP}. \tag{31}$$

The second one, $\widehat{i^*}_t^f$, represents the Taylor Rule:

$$\widehat{i^*}_t^f = \widehat{\bar{i^*}}^f + \omega\left(E_t\pi_{t+1}^f - \widehat{\bar{\pi}}^f\right) + \kappa\widehat{y}_t^f, \tag{32}$$

where $\widehat{\bar{\pi}}^f$ is the long run equilibrium level of inflation and $\widehat{\bar{i^*}}^f$ is the target nominal interest rate. From (31) and (32) we can derive (33):

$$\widehat{i}_t^f = \psi_{LM} + \varsigma\widehat{i}_{t-1}^f + (1-\varsigma)\left(\omega E_t\pi_{t+1}^f + \kappa\widehat{y}_t^f\right) + \epsilon_t^{MP}, \tag{33}$$

where $\psi_{MP} = (\widehat{\bar{i^*}}^f - \omega\widehat{\bar{\pi}^*}^f)$. The Monetary Policy structural shock is ϵ_t^{MP} . As previously, it is assumed to be independently and identically distributed with variance σ_{MP}^2.

The structural model of labour market contains 6 linear rational expectations' equations: technology level (2), wage setting (7), exchange rate dynamics (for flexible exchange regime) (16), foreign inflation rate dynamics (25) and foreign IS curve (30), foreign monetary policy (30). Using the Ulig (1997) general method, we compute analytical and numerical solutions to the optimization problem by taking into account the exchange rate regime[10].

4 Empirical results

This Section is devoted to the computation of the responses of some key variables of labour market to structural disturbances. We solve the equilibrium model by taking into account the rational expectations' hypothesis and perform the parameterization for both basis and extended models. We then simulate the model for Barbados (flexible exchange rate regime) and OECS countries (fixed exchange rate regime).

4.1 Calibration

By following the business cycle literature, we set the elasticity the production function with respect to the employment as $\frac{1}{3}$. The Degree of persistence is allowed to vary

[10]see Cooley (1995) for detailed discussions on several techniques.

from completely persistent to completely *hysteretic* such as $\gamma \in [0, 1]$. Labour market parameters of both basic model and extended models are reported in the table 1 and 2 (see Appendix A.2).

To calibrate the sources of the stochastic volatility, we assume that US interest rate is the driving force describing the world (nominal) interest rate. For the monetary policy rule and other parameters, we follow the benchmark model adopted by Allegret and Sand-Zantman (2006) and Cho and Moreno (2006) (for the US economy).

4.2 Some preliminary Results

Several results emerge. First, under a flexible exchange rate regime, unemployment, unemployment and wage have smaller fluctuations when countries are hit by structural shocks whereas the price level, the nominal and the real exchange rates have larger fluctuations (as shown in Appendix B). Second, under a fixed exchange rate regime, labour market tends to fluctuate more whereas the price level, the nominal wage and the real exchange rates have smaller fluctuations. These observations are consistent with many other studies (more particularly Mussa (1986)).

5 Conclusion

We theoretically and numerically examine the link between structural shocks and labour market variables. To do so, we solve dynamic stochastic small open-economy. The model combines nominal wage rigidity under different exchange rate regimes. The numerical solutions are compared with the actual empirical regularities.

The main sources of labour market fluctuations in the flexible exchange rate countries are foreign and the domestic demand shocks. In the fixed exchange rate countries, labour market fluctuations are mainly due to supply shocks. These results are fairly similar to those supply responses observed by industrialized countries.

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A Appendix

A.1 Approximation

Let us recall the first order of profit maximization:

$$A_t L_t^{\alpha-1} = \frac{W_t}{\alpha P_t}.$$

Let us use a linear approximation of the previous expression in a neighbourghood of L_0, A_0, P_0 and W_0:

$$L_0^{\alpha-1}\left[\frac{A_t - A_0}{A_0}\right] A_0 + (\alpha-1)A_0 L_0^{\alpha-2}\left[\frac{L_t - L_0}{L_0}\right] L_0 = \frac{1}{P_0\alpha}\left[\frac{W_t - W_0}{W_0}\right] W_0 - \frac{W_0}{\alpha P_0^2}\left[\frac{P_t - P_0}{P_0}\right] P_0. \quad (34)$$

Let us denote by small letters the following quantities:

$$\widehat{a}_t = \frac{A_t - A_0}{A_0}, \quad \widehat{\ell}_t^d = \frac{L_t - L_0}{L_0}, \quad \widehat{w}_t = \frac{W_t - W_0}{W_0}, \quad \widehat{p}_t = \frac{P_t - P_0}{P_0}.$$

Rewrite (34) with these notations, develop the left hand side and use the first order condition into the right hand side to get :

$$A_0 L_0^{\alpha-1}\widehat{a}_t + (\alpha-1)A_0 L_0^{\alpha-1}\widehat{\ell}_t^d = A_0 L_0^{\alpha-1}\widehat{w}_t - A_0 L_0^{\alpha-1}\widehat{p}_t.$$

Simplify by $A_0 L_0^{\alpha-1}$:

$$(\alpha-1)\widehat{\ell}_t^d = \widehat{w}_t - \widehat{p}_t - \widehat{a}_t \iff \widehat{\ell}_t^d = -\left[\frac{\widehat{w}_t - \widehat{p}_t - \widehat{a}_t}{1-\alpha}\right] \iff L_t = L_0\left[1 - \left[\frac{\frac{W_t}{W_0} - \frac{P_t}{P_0} - \frac{A_t}{A_0}}{1-\alpha}\right]\right].$$

A.2 Behavioural Parameters

Table 1: Parameter values of the model basic

α	γ	η	$\bar{\ell}$
0.33	0.90	0.25	1

Table 2: Parameter values of the extended model

λ	θ	ϑ	ς	ω	κ	ρ	σ_{AS}	σ_{IS}	σ_{MP}
0.5586	0.0011	0.4859	0.0045	1.6409	0.6038	0.0045	0.4585	0.0.374	0.7327

Note: Cho and Moreno (2006).

B Appendix

B.1 Impulse responses for OECS economies : the basic model

Figure 1: Impulse responses to ϵ_t^s

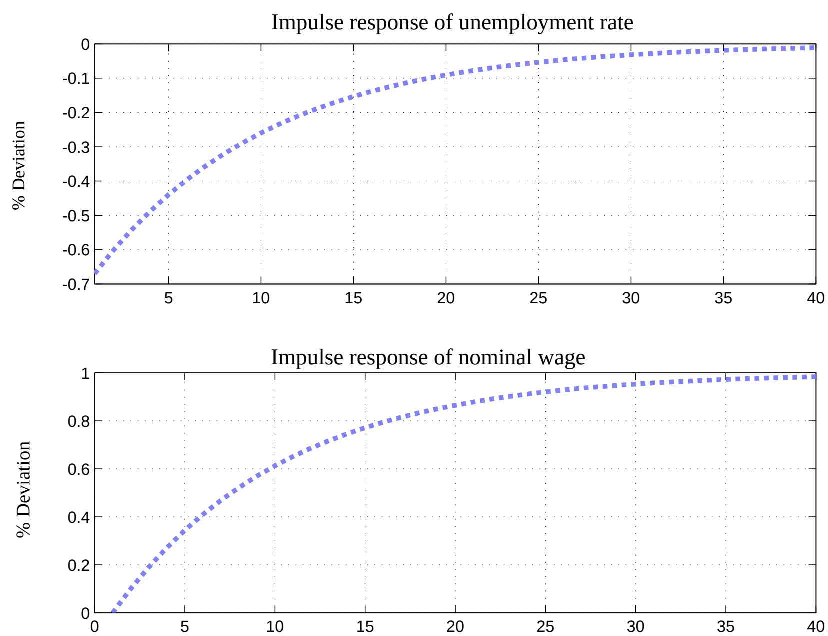
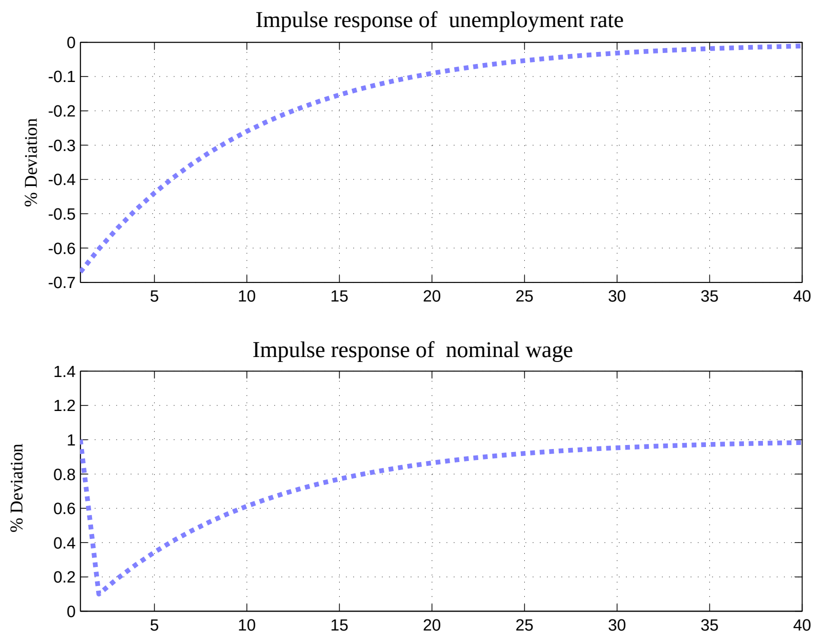


Figure 2: Impulse responses to ϵ_t^p



B.2 Impulse responses for Barbados economy : the basic model

Figure 3: Impulse responses to ϵ_t^i

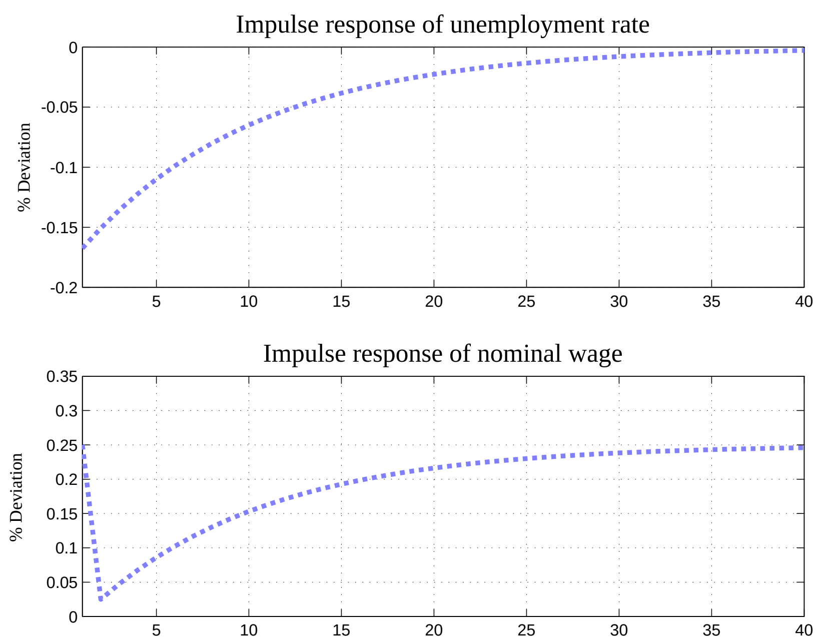
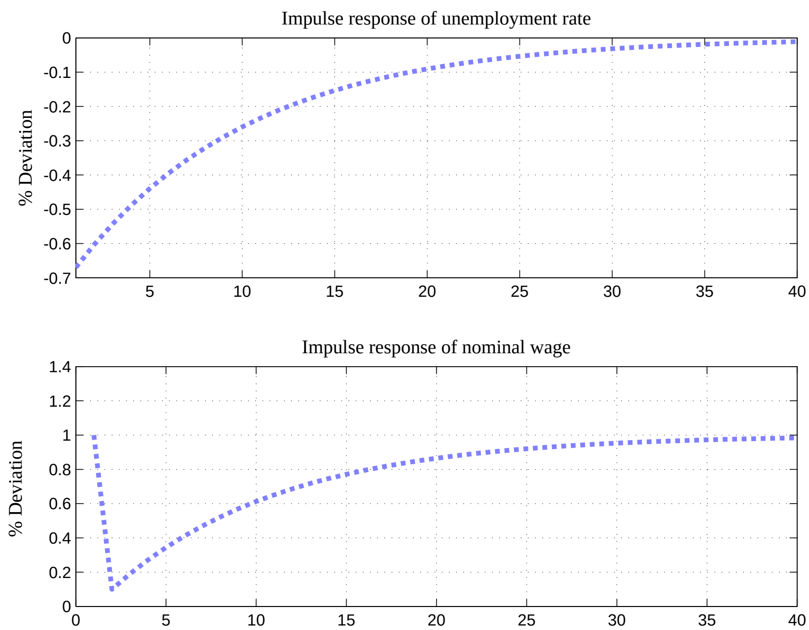


Figure 4: Impulse responses to ϵ_t^m



B.3 Impulse responses for OECS economies : the extended model

Figure 5: Impulse responses to ϵ_t^{AS}

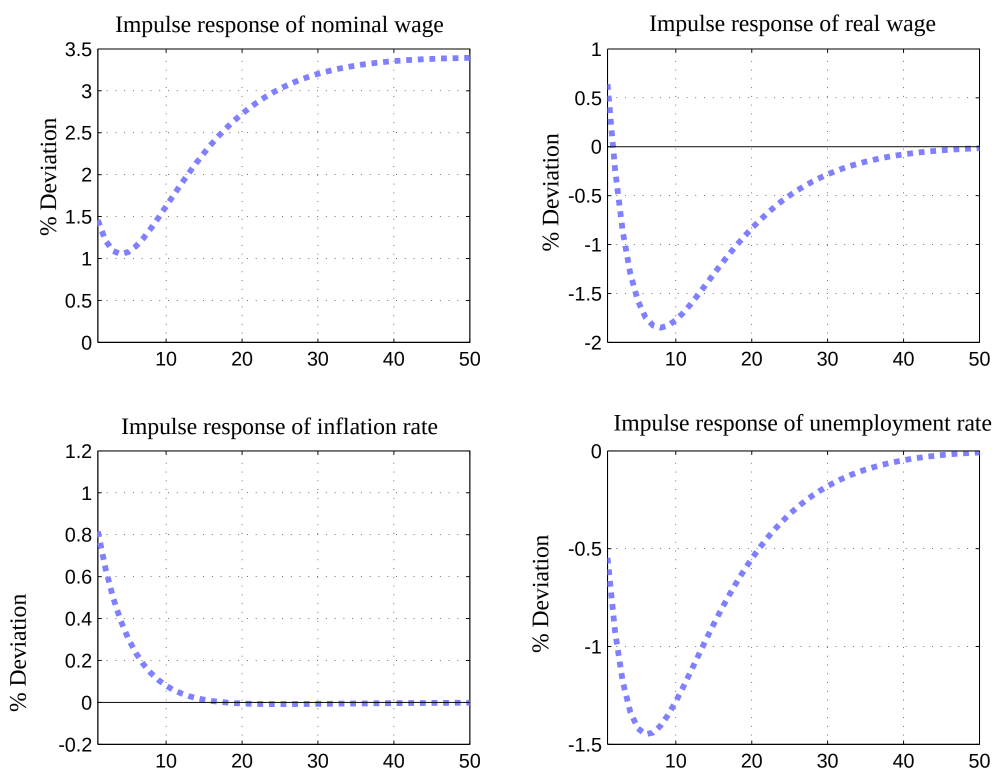


Figure 6: Impulse responses to ϵ_t^{IS}

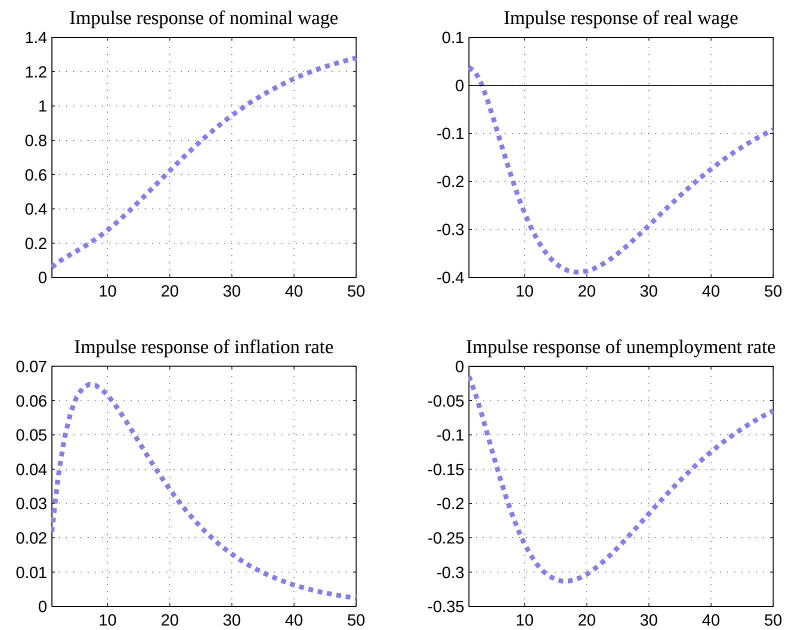
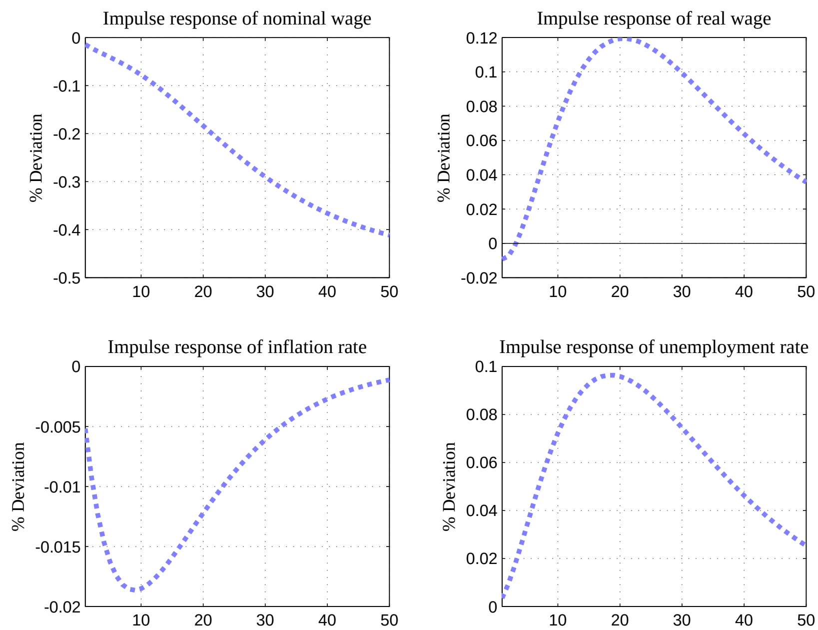


Figure 7: Impulse responses to ϵ_t^{MP}



B.4 Impulse responses for Barbados economy : the extended model

Figure 8: Impulse responses to ϵ_t^{AS}

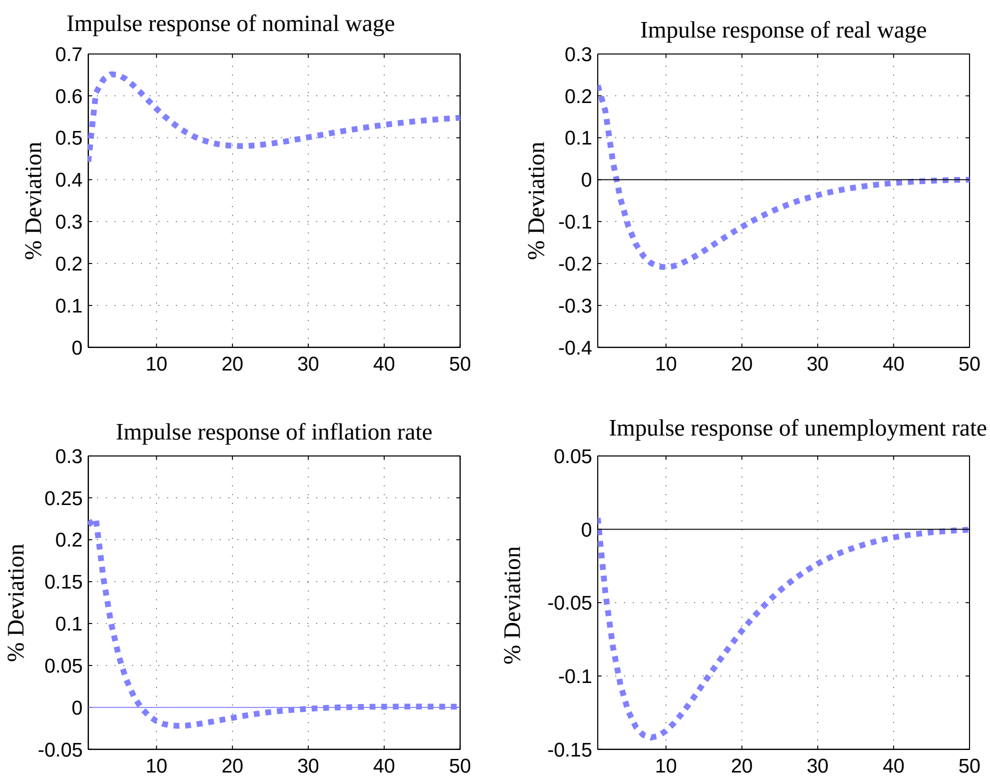


Figure 9: Impulse responses to ϵ_t^{IS}

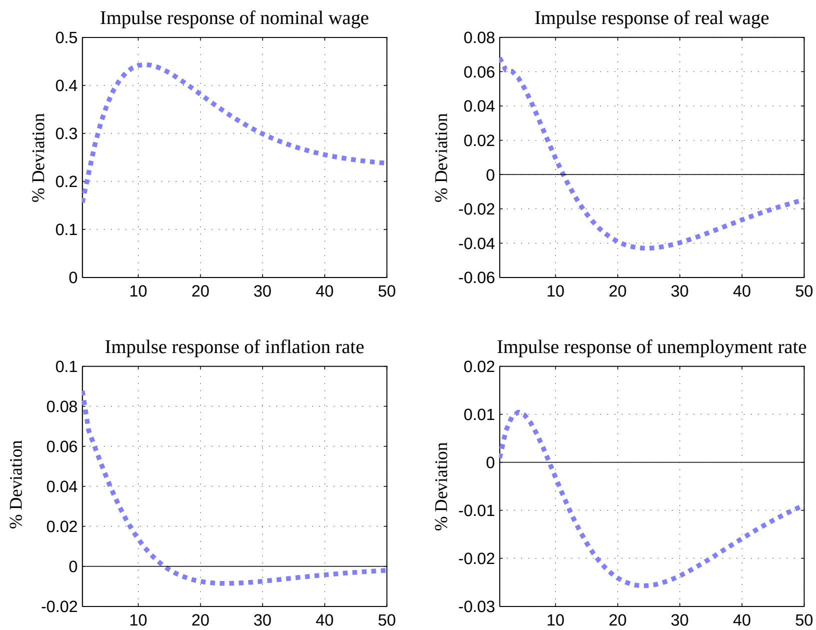


Figure 10: Impulse responses to ϵ_t^{MP}