

A Long Run Analysis of the Price Dynamics in Guadeloupe : Theoretical and Empirical Consideration

Patrice Borda

*Université des Antilles et de la Guyane
Lead et Cémafi*

Alain Maurin

*Université des Antilles et de la Guyane
et Lead*

Jean Gabriel Montauban

*Université des Antilles et de la Guyane
et Lead*

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Abstract

French overseas departments are related to national economy in different way. For example, most of observations suggest that regional fluctuations are linked more closely to french business cycle than economic fluctuations in USA. This paper seeks to determine the role of french inflation in explaining the regional price dynamic. We focus on Guadeloupe economy. The first part of this paper considers the theoretical foundations of the regional price dynamic. A number of useful findings are obtained : in the long run, regional price growths at the same rate that of french ; regional economy reacts negatively to national inflationary shock. The second part of the paper discusses evidence on regional price dynamic, with an emphasis on carefully connecting theoretical models with data analyses. The work that has been done can serve as a starting point for further research.

1. Introduction

While the study of interactions between state economies and national economies are relatively new (see Krugman (1995)), the study of interactions between colony economies and national economies are as old as the international trade theory¹. These new consideration emerge from the fact that french overseas departments will face numerous economies and political challenges in the near future (for instance, the monetary union or the statutory evolution wished by the majority of the citizen,...). Several studies have documented the correlation between local economies and national economies. For instance, Golberg an Tracy (1999) analysed the consequences of real exchange rate movement for the employment, hours and hourly earnings of workers in the US manufacturing industries across individual states. They found that exchange rate have statistically significant implications in local economies. Using a VAR model Levre and Poloz (1996) found that regional economic performances have to do with movements in Canada's term of trade.

This paper examines the economic fluctuation of two economies : the local economy (Guadeloupe) and the national economy (France). It is well known that french overseas departments are related to the french economy in different way. For example, most of observations suggest that regional fluctuations are linked more closely to french business cycle than economic fluctuations in USA. Indeed, the data show that when price level in France is high or low, price level in Guadeloupe tend to be also high or low (see figures 1). This observation could be compared as the state-national business cycles.

Figure 1
Consumer price index

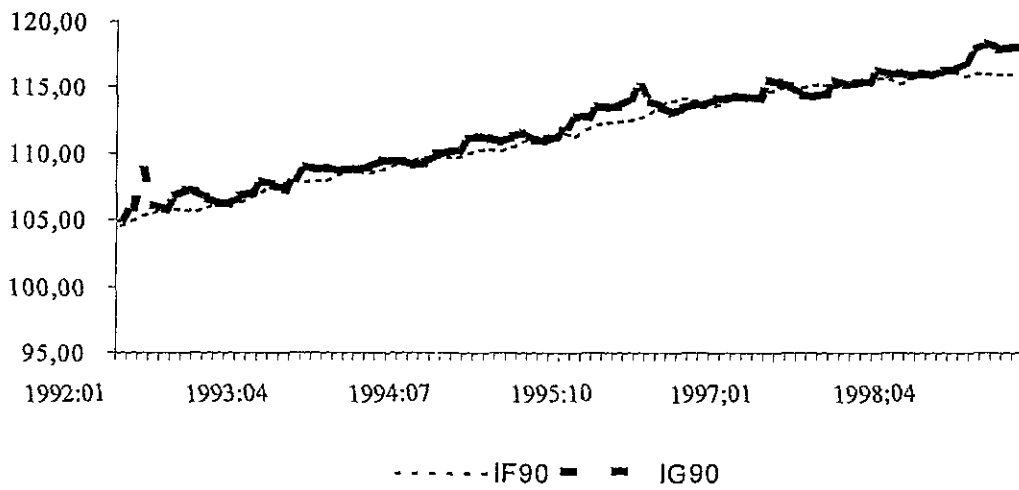
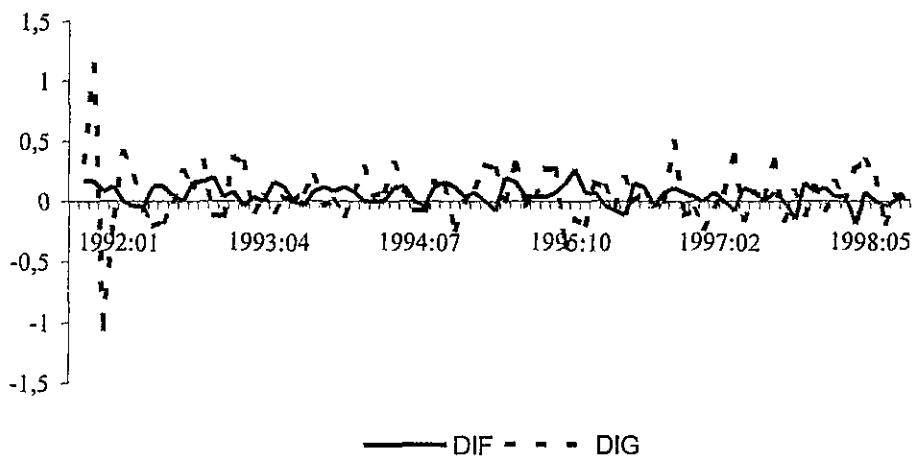


Figure 2
Interregional business cycles



¹ Smith A. (1776), *An inquiry into the Nature of the wealth of nations*, New York, Random House.

In addition, we see that national business cycles extend to Guadeloupe with some lags (see figure 2). There are two basic explanations for why these to economies move together. First, business cycles simply reflect the fact that local economy is affected by that same source of innovations (demand shocks, monetary shocks,...) and they probably respond to these shocks in the same way, in other words the responses may be symmetric. The second explanation is that monetary shocks are transmitted from France to Guadeloupe via imports². This paper seeks to determine the role of french inflation in explaining the regional dynamic prices. We focus on Guadeloupe economy. The first part of this paper considers the theoretical foundations of the regional dynamic price. The second part of the paper discusses evidence on regional dynamic price, with an emphasis on carefully connecting theoretical models with data ; we present a modified VAR model for local economy.

2. Inflationary dynamics

2.1 A theoretical model

In our discussion it is useful to begin with the price relation³ which we write in the following manner :

$$\Delta p^g = \alpha \Delta p^m + (1 - \alpha) \Delta p \quad (1)$$

where Δp_g , Δp_m and Δp are respectively, the variation of domestic price, the variation of French price and the variation of commodity price. Here, the idea is that the variation of domestic price is adjusted to french price

² So we have imported inflation.

³ Denote logarithms of variables by corresponding lower case letters.

and to domestic inflation. The equation (2) is the wage setting relation which can be derived from a variety of set-ups, but is commonly thought of as reflecting the outcome of bargaining framework :

$$\Delta w = \beta \Delta p^e + (1 - \beta) \Delta p_{-1}^e - \gamma u \quad (2)$$

where Δw is the nominal wage growth and u_t is the level of unemployment rate. This relation is similar to a standard Phillips curve ; prices positively affect wage growth. Notice that wage growth is influenced by previous inflation. There is thus a nominal inertia. The wage growth is decreasing in unemployment rate, which reflects the unemployment trade-off. The price commodity tends to rise with the level of expected price and commodity price at the previous period :

$$\Delta p = \lambda (p^e - p_{-1}) \quad (3)$$

In this relation p is the expected price. Prices are set as a mark-up over the marginal cost :

$$p = \mu + w + \bullet - y \quad (4)$$

$$p^e = \mu^e + w + \bullet - y \quad (5)$$

where y , \bullet and w are respectively, the output, the employment level and the nominal wage. In this relation μ is the mark-up rate. Note that under perfect competition, μ is equal to zero. A natural interpretation is that it comes from imperfect competition in the goods market, leading firms to set price level above marginal cost. The key question in this work is what variables affect the price dynamic in Guadeloupe. This

question can be examined by solving the previous framework. Let's remind that France is the major partner of Guadeloupe. Inflation is therefore imported. Equation (3), (4) and (5) have been used to deduce relation (6) :

$$\Delta p = \lambda((\Delta w - \Delta q) + (\mu^e - \mu)) \quad (6)$$

with $q = y - \bullet$

Substituting (2) into (6) and using relation (1), we get :

$$\begin{aligned} \Delta p^s = & \frac{\alpha}{1 - \lambda\beta(1 - \alpha)} \Delta p^m + \frac{\lambda(1 - \alpha)(1 - \beta)}{1 - \lambda\beta(1 - \alpha)} \Delta p_{-1}^s + \frac{\lambda\gamma}{1 - \lambda\beta(1 - \alpha)} u - \frac{\lambda(1 - \alpha)}{1 - \lambda\beta(1 - \alpha)} \Delta q \\ & + \frac{1 - \alpha}{1 - \lambda\beta(1 - \alpha)} (\mu^e - \mu) \end{aligned} \quad (7)$$

Equation (7) includes as explanatory variables the lagged value of the inflation, the imported inflation (french inflation), unemployment, the productivity growth, and the *mark-up* gap. This result suggests that to lower inflation, it is advisable to reduce the imports, by developing for instance, a local industry of replacements in the imports and, to improve the capacity of self-financing of companies. Note that a degradation of the financial situation announces the future increase in prices.

We can show that in the long run the inflation rate of the guadeloupean economy is indexed to that of France. We therefore first-*differenced* the relation (3) :

$$\Delta p = \lambda \Delta w + (1 - \lambda) \Delta p_{-1} \quad (8)$$

In a steady state we have⁴ :

$$\Delta p^g = \Delta p_{-1}^g$$

and

$$\Delta p = \Delta p_{-1}$$

By using (1), (2) and (7), it is then easy to show that :

$$\Delta p^g = \Delta p^m$$

Hence, the domestic price grows at the same rate that of french.

2.2 Adjustment cost in term of unemployment

We try in this section to assess the potential cost, in terms of unemployment, of disinflationary policies in Guadeloupe, which corresponds to a measure of real wages rigidity. For that, we use the same framework as in the previous section and we now introduce the unemployment growth in to the relation⁵ (2) :

$$\Delta w = \beta \Delta p^g + (1 - \beta) \Delta p_{-1}^g - \gamma \Delta u \quad (9)$$

⁴ The unemployment rate, and productivity are nearly constant.

⁵ The others relations remains unchanged.

The key assumption behind this relation is that wage setting is dominated by insiders, i.e. by those currently or recently employed. If $\Delta q = 0$, to compensate ($\Delta w = 0$) for a demand shock, we must have :

$$\Delta u = \frac{\alpha}{\gamma} \Delta p^m$$

The adjustment cost in term of unemployment following a price shock is given by the sacrifice ratio. The sacrifice ratio is the percentage point changes in unemployment required to produce a 1% permanent reduction in inflation, following a national demand shock. The regional economy reacts negatively to inflationary shock ; the reason is that high inflation pressure leads to an increase in wage. This effect can not occur if the increase of real real wage is compensated by a slow down of the productivity growth. Note that, any factor that reduces α reduces the unemployment rate in french overseas department.

The second way to present the adjustment cost is to consider that change in unemployment affect the productivity growth. In other words, $\Delta q \neq 0$. The productivity growth can be expressed as :

$$\Delta q = \Delta y - \Delta \bullet \quad (10)$$

where Δy is the GDP growth. The loss in output is associated with an increase in unemployment rate (i.e. Okun law) :

$$\Delta y = -\eta \Delta u \quad \eta > 0 \quad (11)$$

In the same way, the evolution of employment is given by :

$$\Delta \bullet = -\Delta u \quad (12)$$

Combining (10), (11) and (12) yields the productivity growth :

$$\Delta q = (1 - \eta)\Delta u \quad (13)$$

Eliminating the productivity in (8) and using the relationship between (1) and (9), we find the relationship between Δu and Δp^m :

$$\Delta u = \frac{\alpha}{\gamma + (1 - \alpha)(1 - \eta)} \Delta p^m \quad (14)$$

3. Empirical results

In this section, we present the specification of the model estimated in this paper. We begin with a discussion of the variables included in the model followed by a discussion of the structure of the VAR model.

3.1 Methodological considerations

Our model contains 2 variables : the consumer price index for France and the consumer price index for Guadeloupe. These variables should capture the economic relationship that determines the linkage between local economy (Guadeloupe) and national economy (France). The link measure used in this paper, is calculated using the impulses function , which is used with an empirical technique called vector autoregression (VAR). We have considered a model of the form :

$$\Delta p_t^f = \gamma + \sum_{i=1}^4 \delta_{t-i} \Delta f_{t-i}^g + \varepsilon_t^f$$
$$\Delta p_t^g = \lambda + \sum_{i=1}^4 \eta_{t-i} \Delta p_{t-i}^g + \sum_{i=1}^4 \beta_{t-i} \Delta p_{t-i}^f + \varepsilon_t^g$$

The regional economy restriction implies that estimates are based on the Seemingly-Unrelated-Regressions technique.

3.2 Some preliminary results

We begin with a discussion of the relative importance of regional vis-à-vis national inflation shocks. In the long run, positive national shocks (in price) lead to a permanent increase in consumer price index in Guadeloupe (figure 3). In contrast, a regional price shock has a temporary effect on regional consumer price index.

Figure 3

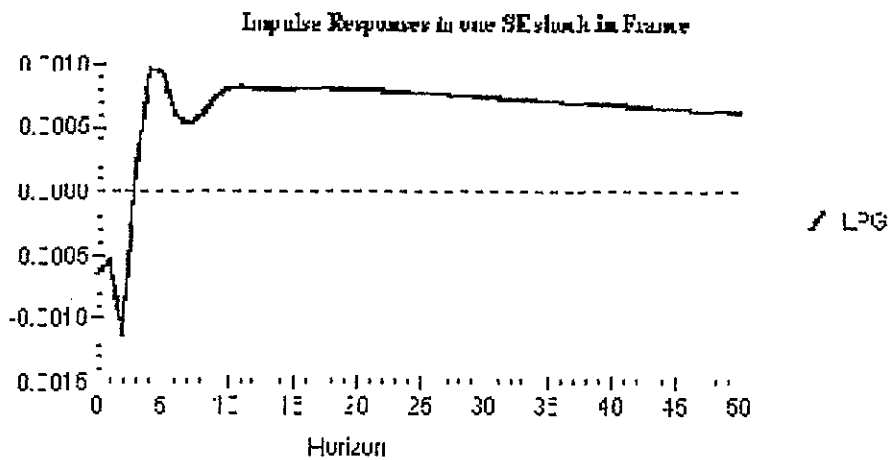
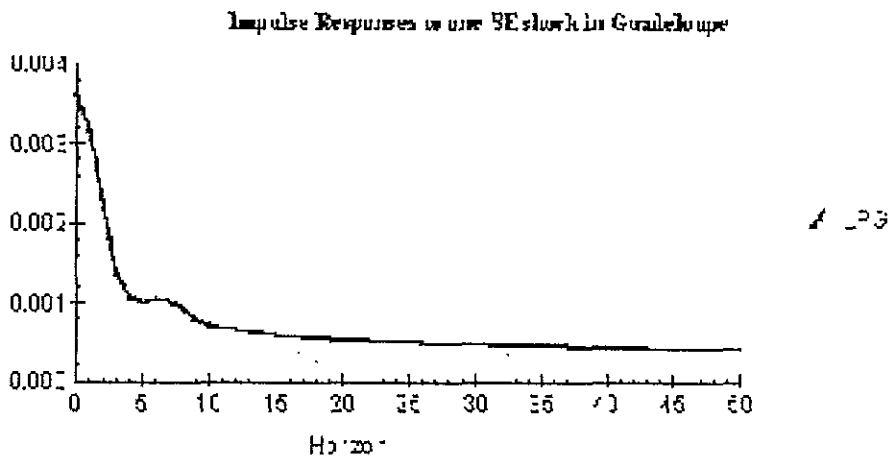


Figure 4



CONCLUSION

The aim of this paper has been determine the role of French inflation in explaining the regional price dynamic. We focus on Guadeloupe economy. In the first part of this paper we have considered the theoretical foundations of the regional price dynamic. A number of useful findings are obtained : in the long run, regional price, grows at the same rate that of French ; regional economy reacts negatively to national inflationary shock. A 1% inflation shock in French

lead to a proportional increase in unemployment and consumer price in Guadeloupe.

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