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Portugal and the competitive disinflation: let the data speak

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Abstract

This paper provides an empirical evaluation of the three main arguments proposed by Blanchard (2007) in a recent article on the evolution of the Portuguese economy during the last decade, with special regard to the dynamics of international trade and unemployment. Our time-series evidence supports two out of the three arguments.

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1. Introduction and data

This paper is about the evolution of the Portuguese economy over the last decade, with special regard to the dynamics of international trade and unemployment. We analyze quarterly time-series data from 1995:1 to 2006:2, collected from three main sources: *Banco de Portugal*, *Instituto Nacional de Estatística* (INE) and Eurostat. Figure 1 plots the entire data-set¹ explored in the paper. A complete list of variables (with related labels) is as follows:

- growth rate of real GDP (GR_GDP),
- growth rate of real private consumption expenditure (GR_PRIVATE_CONSUMPTION),
- growth rate of real public consumption expenditure (GR_PUBLIC_CONSUMPTION),
- growth rate of real investment expenditure² (GR_INVESTMENT),
- current-account deficit (CURRENT_ACCOUNT_DEFICIT),
- growth rate of labour productivity (GR_LAB_PRODUCTIVITY),
- growth rate of nominal wages (GR_NOM_WAGES),
- growth rate of real GDP in the United States (GR_GDP_US),
- growth rate of real GDP in the European Union³ (GR_GDP_EU),
- unemployment rate (UNEMPLOYMENT_RATE),
- inflation rate (INFLATION_RATE).

Let us begin by stressing that the pattern of the Portuguese current account over the last few years is an interesting case-study. Figure 1 shows that the current-account deficit rapidly increased since 1995:4, peaking in both 2000:1 and 2005:1 (see CURRENT_ACCOUNT_DEFICIT). However, while the first peak happened at the end of a period of moderate growth, the second peak took place in a period of anaemic growth (see GR_GDP). Therefore, while the first peak can be partly attributed to an acceleration of imports due to a moderate economic expansion, the second peak should primarily be interpreted as a consequence of a progressive loss of competitiveness that Portugal experienced within the Euro area (note that the Euro area represents roughly 70% of the whole Portuguese trade). As a matter of example, from 1996:2 to 2006:2, the unit cost of labour in the Portuguese private sector grew on average at a rate of 3.1% per quarter, while the corresponding indicator in the rest of the Euro area (12 members) grew on average at a rate of 0.7% per quarter. The next section presents a simple theoretical framework for analyzing the evolution of the Portuguese competitiveness within the Euro area.

2. Price competition within the Euro area

Let us assume that Y is real output, L is labour input, K is non-labour input, w is the price of the labour input (the nominal wage), r is the price of the non-labour input, p is the price of the real output.

Further, let us assume that $a = \frac{Y}{L}$ is the real average product(ivity) of labour. If total costs C are given by salaries plus non-labour costs, i.e. $C = wL + rK$, then the average output cost is given by

$\frac{C}{Y} = \frac{w}{a}(1 + \eta)$ where $\eta = \frac{rK}{wL}$ is the share of non-labour costs over labour costs.

In this paper, we assume that prices are set using a standard mark-up pricing rule $p = \frac{w}{a}(1 + \mu)$ where μ is the level of the mark-up. Note that a sufficiently high mark-up (higher than η)

¹ Technical details on several series in the data-set are provided by Castro and Esteves (2004).

² Available data do not differentiate between private and public investment.

³ We refer to the composition of the European Union before January 1st, 2007 (i.e. 25 members).

guarantees a profit on each unit of real output (because $\mu > \eta$ implies $p > \frac{C}{Y}$). So, the mark-up level can be divided in two components: a cost-recovering component η and a profit margin λ , such that $\mu = \eta + \lambda$. Finally, note that, for the average firm, we can assume that $\eta < 1$ and that λ is a small positive number. So, for the average firm, μ is unlikely to be higher than one.

Within the Euro area, the nominal exchange rate cannot be used as a policy instrument. Therefore, in order to become more competitive (from a macro-level perspective), a country needs to lower its inflation rate relative to the inflation rate of its competitors. Under mark-up pricing, it is easy to show that the inflation rate of a country can be expressed as a function of three macroeconomic variables: the nominal wage growth, the labour productivity growth, and the variation of the mark-up.

If we take logarithms to both sides of a standard mark-up pricing rule $p_t = \frac{w_t}{a_t}(1 + \mu_t)$, we get

$\ln p_t = \ln w_t - \ln a_t + \ln(1 + \mu_t)$. Then, since μ_t is generally lower than one, we can argue that $\ln(1 + \mu_t) \approx \mu_t$ and therefore that $\ln p_t \approx \ln w_t - \ln a_t + \mu_t$. Hence, by subtracting $\ln p_{t-1}$ to both sides of the latter expression, we obtain $\ln p_t - \ln p_{t-1} \approx \ln w_t - \ln a_t + \mu_t - (\ln w_{t-1} - \ln a_{t-1} + \mu_{t-1})$. Finally, after defining the inflation rate as $\pi_t = \ln p_t - \ln p_{t-1}$, the nominal wage growth as $\omega_t = \ln w_t - \ln w_{t-1}$, the labour productivity growth as $\alpha_t = \ln a_t - \ln a_{t-1}$, and the variation of the mark-up as $\Delta\mu_t = \mu_t - \mu_{t-1}$, we come up with the following expression:

$$\pi_t \approx \omega_t - \alpha_t + \Delta\mu_t \quad (1)$$

linking the inflation rate to the nominal wage growth, to the labour productivity growth, and to the mark-up variation (depending on both the variation of the cost-recovering component η and the variation of the profit margin λ).

Note that, following Blanchard and Muet (1993), the Portuguese competitiveness can be defined as the difference $\pi_t^* - \pi_t$, where π_t^* is the inflation rate of a representative Portugal's competitor within the Euro area. Therefore, according to expression (1), in order to become more competitive, Portugal needs either a reduction in the nominal wage growth or an increase in the labour productivity growth or a decrease in the level of the mark-up (assuming that the inflation rate of the representative Portugal's competitor π_t^* does not change). As we will see in the next section, a recent paper by Blanchard (2007) considers two of these three hypotheses, namely reducing nominal wage growth and increasing labour productivity growth.

3. Competitive disinflation and policy options

This section briefly summarizes the analysis of 'the difficult case of Portugal' proposed by Blanchard (2007) in the *Portuguese Economic Journal*. First, we present the competitive-disinflation argument. Second, we discuss which options are open to policy-makers in order to minimize both the length of a competitive-disinflation period and its unemployment cost.

Competitive disinflation

According to Blanchard (2007), the recent evolution of the Portuguese current account is likely to determine the entry of the country into a period of competitive disinflation, i.e. a market process in which an increasing unemployment rate pushes the growth rate of nominal wages down until the country's competitiveness is restored.

Both the length and the unemployment cost of a competitive disinflation depend on the degree of downward-rigidity of nominal wages in Portugal. The higher is the degree of downward-rigidity, the

higher is the level of unemployment needed to re-establish competitiveness, the longer is a period of competitive disinflation. Previous studies on related topics are due to Blanchard and Muet (1993) as well as Blanchard and Giavazzi (2002), among others.

A simple model of competitive adjustment through unemployment increase just needs two theoretical constructions: expression (1), derived in the previous section, and the standard Phillips curve. As well known, the latter inversely relates the growth rate of nominal wages ω_t to the level of the unemployment rate u_t , i.e.:

$$\omega_t \approx \beta_0 - \beta_1 u_t \quad (2)$$

where β_0 and β_1 are positive parameters. Particularly, β_1 can be thought of as reflecting the degree of downward nominal-wage flexibility: the lower is this parameter (i.e. the lower is the degree of downward nominal-wage flexibility), the higher is the unemployment increase needed to generate a given reduction in the nominal wage growth.

The mechanism of the competitive disinflation is intuitive. Based on (2), an increase in the unemployment rate u_t decreases the growth rate of nominal wages ω_t . Based on (1), a decrease in ω_t pushes the inflation rate π_t down and increases the competitiveness index $\pi_t^* - \pi_t$, thus improving the current account.

Descriptive statistics seem to support the argument that, in Portugal, either a period of competitive disinflation will start soon or it has already begun. Indeed, Figure 1 shows that the increase in the Portuguese unemployment rate (see UNEMPLOYMENT_RATE), occurred since 2001:2, is associated⁴ with a decrease in the growth rate of nominal wages (see GR_NOM_WAGES). Recent data, showing an improvement of the Portuguese current account, do not reject this view (see CURRENT_ACCOUNT_DEFICIT). However, a more detailed empirical evaluation of the whole competitive-disinflation argument will be presented in section 4.

Policy options

Based on the above general picture, what can Portuguese policy-makers do, today, in order to minimize the length of the competitive disinflation and its unemployment cost? In the view of Blanchard, two policy options are currently open. The first has to do with labour-market reforms inducing a permanent decrease in the growth rate of Portuguese nominal wages ω_t . The second has to do with the implementation of structural reforms aiming at a permanent increase in the growth rate of labour productivity α_t .

These two different strategies can be interpreted as complementary to each other. The wage-based strategy is primarily intended to be a short-run policy option, while the productivity-based strategy represents a medium-run (or long-run) option. Both the two strategies are aimed at accelerating the competitive adjustment *without increasing* the unemployment rate. Both the two options incur some risk of default:

- The first option, based on labour-market reforms increasing the competitive pressure of the ‘outsiders’ on the ‘insiders’ (for instance, by downsizing the employment-protection legislation), may be unsuccessful in reducing the length and the unemployment cost of the competitive disinflation because a decrease in nominal wage growth can reduce labour productivity growth (standard efficiency-wage considerations can motivate this result). Moreover, firms (particularly those operating in competitive international markets with relatively small profit margins) may respond to a reduction in nominal wage growth with an increase in profit margins, thus slowing the international adjustment of relative prices. Finally,

⁴ The correlation coefficient between unemployment rate and nominal wage growth from 2001:1 to 2006:2 is -0.42 .

the growth rate of internal demand may fall too much⁵, thus improving the current account (through lower imports' growth) at the cost of increasing the unemployment level.

- The second option, based on structural reforms⁶ increasing the stock of human and physical capital, may take a considerable amount of time before generating some substantial improvements in labour productivity growth, thus being meanwhile ineffective for the purpose of reducing the length and the unemployment cost of a competitive disinflation. In addition, labour-productivity increases may call for nominal wage increases, thus slowing the adjustment process.

Our paper tries to empirically evaluate a number of issues arisen by Blanchard (2007). It mainly deals with the following two topics. First, we evaluate whether a market process of competitive disinflation works and whether it needs to be accompanied by a policy intervention. That is, we measure the economic consequences of a permanent increase in the Portuguese unemployment rate. Second, we try to evaluate to what extent the two policy options proposed by Blanchard for Portugal actually work. Accordingly, we measure the economic effects of both a permanent reduction in the growth rate of nominal wages and a permanent increase in the growth rate of labour productivity.

4. Empirical evidence

Since the paper is primarily aimed at letting the data speak, it is based on a simple SVAR model of the following type:

$$y_t = c + C_0 y_t + C_1 y_{t-1} + \dots + \xi_t \quad (3)$$

where c is a vector of constant terms, C is a squared matrix, ξ is a vector of structural shocks and y is a vector containing all the eleven variables listed in the first section.

Several lag-length criteria suggest the estimation of the following second-order reduced-form VAR:

$$y_t = b + B_1 y_{t-1} + B_2 y_{t-2} + \zeta_t \quad (4)$$

where $b = \frac{c}{I - C_0}$, $B_1 = \frac{C_1}{I - C_0}$, $B_2 = \frac{C_2}{I - C_0}$ and $\zeta_t = \frac{I}{I - C_0} \xi_t$ is the equation linking the vector of the reduced-form residuals ζ to the vector of the structural shocks ξ . The latter equation is identified using the method developed by Pesaran and Shin (1998), which is characterized by the desirable feature that the shape of the structural impulse-response functions is independent of the variables' ordering in the vector y ⁷.

⁵ The growth rates of consumption and investments are likely to fall if a permanent reduction in the growth rate of nominal wages takes place. On the consumption-side, disposable-income growth is likely to fall, while, on the investment-side, the expected real burden of debt is likely to increase (due to the expectation of a lower wage-led inflation).

⁶ Some concrete examples of structural reforms are discussed by Teixeira and Fortuna (2004) as well as Tavares (2004). The most obvious example has to do with the reform of the Portuguese educational system towards the goal of expanding the average level of schooling within the country.

⁷ Although the standard ADF unit-root test is not passed by some variables in our data-set, we believe that all variables can be treated as generated by stationary stochastic processes as the standard ADF test is characterized by low power in relatively small samples, such as our sample. This view is partly supported by the results of the KPSS test. In addition, the roots of the estimated reduced-form model (4) lie inside the unit circle, meaning that the VAR satisfies the required stability condition.

As previously stressed, the paper focuses on the effects of permanent structural shocks. Particularly, we consider the effects of the following macroeconomic changes: 1) a permanent increase in the unemployment rate, 2) a permanent increase in the growth rate of labour productivity, 3) a permanent decrease in the growth rate of nominal wages. Our main empirical results are reported in Figure 2, Figure 3 and Figure 4.

Does a market process of competitive disinflation work? Is a policy support needed?

By looking at Figure 2, we can observe that a permanent increase in the unemployment rate reduces the growth rate of nominal wages, the inflation rate and the current-account deficit, despite a decrease in the growth rate of labour productivity.

Figure 2 further suggests that the current-account improvement can be partly explained by the decrease in the growth rate of GDP⁸ that our empirical model predicts. The latter seems driven by a decrease in the growth rate of internal demand. Particularly, the model predicts a decrease in the growth rate of both private and public consumption which is partly explained by the referred decrease in the growth rate of nominal wages.

Based on the above empirical evidence, we can conclude that a market process of competitive disinflation actually works because a permanent increase in the unemployment rate reduces the current-account deficit by reducing nominal wage growth. However, it needs to be supported by a policy intervention because of its adverse effects on labour productivity growth and because it has, by definition, some unemployment cost.

Does a productivity-oriented policy work? Does a wage-oriented policy work?

Following Blanchard, a given policy intervention should be considered as *successful* if it induces a decrease in the current-account deficit *without implying* an increase in the unemployment rate. The shorter is the time needed for obtaining this outcome, the better is the policy. As we will see, our estimation results suggest that a productivity-based strategy works, while a wage-based strategy does not.

Figure 3 highlights that a permanent increase in the growth rate of labour productivity reduces both the unemployment rate and the current-account deficit. Notably, the productivity shock implies an increase in the growth rate of nominal wages that positively affect both internal demand⁹ and GDP. However, the productivity-based strategy cannot be considered as a fully-successful strategy because a permanent increase in the growth rate on labour productivity does not ultimately reduce the inflation rate (despite the model predicts an inflation decrease in the first six quarters following the productivity shock). The latter effect can be partly interpreted as a consequence of the increase in the nominal wage growth that the productivity shock seems to induce, with negative implications for the competitive adjustment.

Finally, let us focus on Figure 4. It suggests that a permanent decrease in the growth rate of nominal wages reduces the current-account deficit, despite a decrease in the growth rate of labour productivity; however, its negative effects on internal demand (and hence on GDP) are likely to explain the increase in the unemployment rate that the empirical model predicts. Therefore, as a policy option, the wage-based strategy turns out to be unsuccessful (because it increases the unemployment rate).

In short, our evaluation of Blanchard's policy options for Portugal is as follows. On the one hand, a productivity-based strategy is likely to produce positive effects on the current account without increasing the unemployment rate. On the other hand, a wage-based strategy is likely to increase the

⁸ A decrease in the growth rate of GDP is likely to imply a decrease in the growth rate of imports.

⁹ Note that the growth rates of both consumption and investments increase. While the consumption pattern is easily interpretable, the increase in the growth rate of investment expenditure can be partly explained by the standard accelerator's argument (higher GDP growth leads to higher investment growth which, in turn, leads to higher GDP growth, and so on).

unemployment cost of a competitive-disinflation period because of its adverse effects on internal demand.

5. Conclusions

To briefly summarize, our SVAR analysis shows that a market process of competitive disinflation works although a policy intervention is needed because of the adverse effects that a competitive disinflation seems to have on labour productivity growth and because a competitive-disinflation process implies, by definition, an increase in the unemployment rate.

Concerning with the general features of a policy intervention, we find that a productivity-based strategy is a good medium-run (or long-run) option, while a wage-based strategy is unlikely to be an appropriate short-run option.

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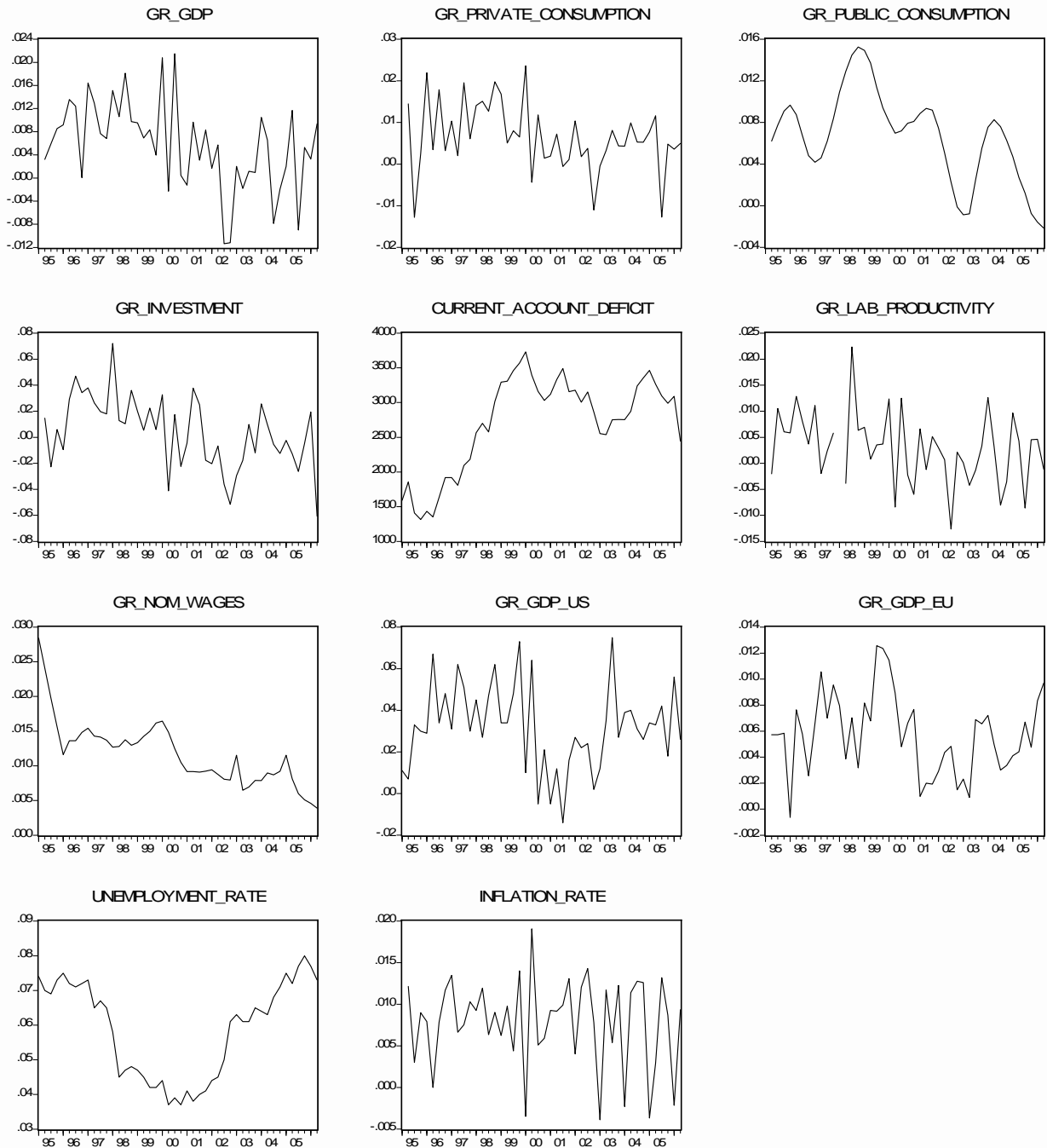
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Figure 1

Variables in the data-set



The growth rate of labour productivity is defined as the difference between the growth rate of real GDP and the growth rate of employment. Note that the labour-productivity series is broken because the INE changed the statistical way of measuring the employment level (and the labour-force level) from 1998:1 onwards, implying that the employment increase, registered from 1997:4 to 1998:1 (around 10%), does not reflect an actual employment increase.

Figure 2

Effects of a permanent increase in the unemployment rate

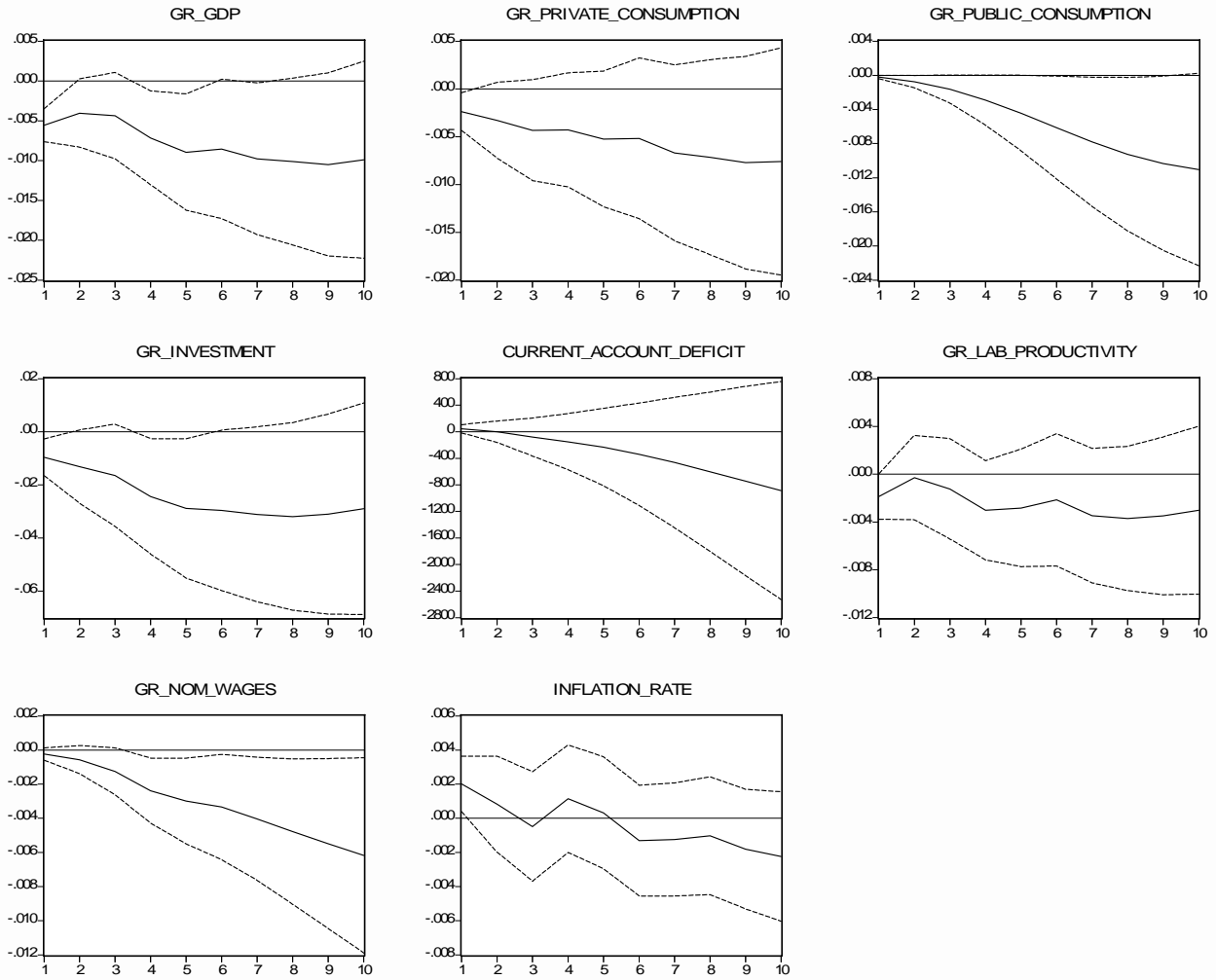


Figure 3

Effects of a permanent increase in the growth rate of labour productivity

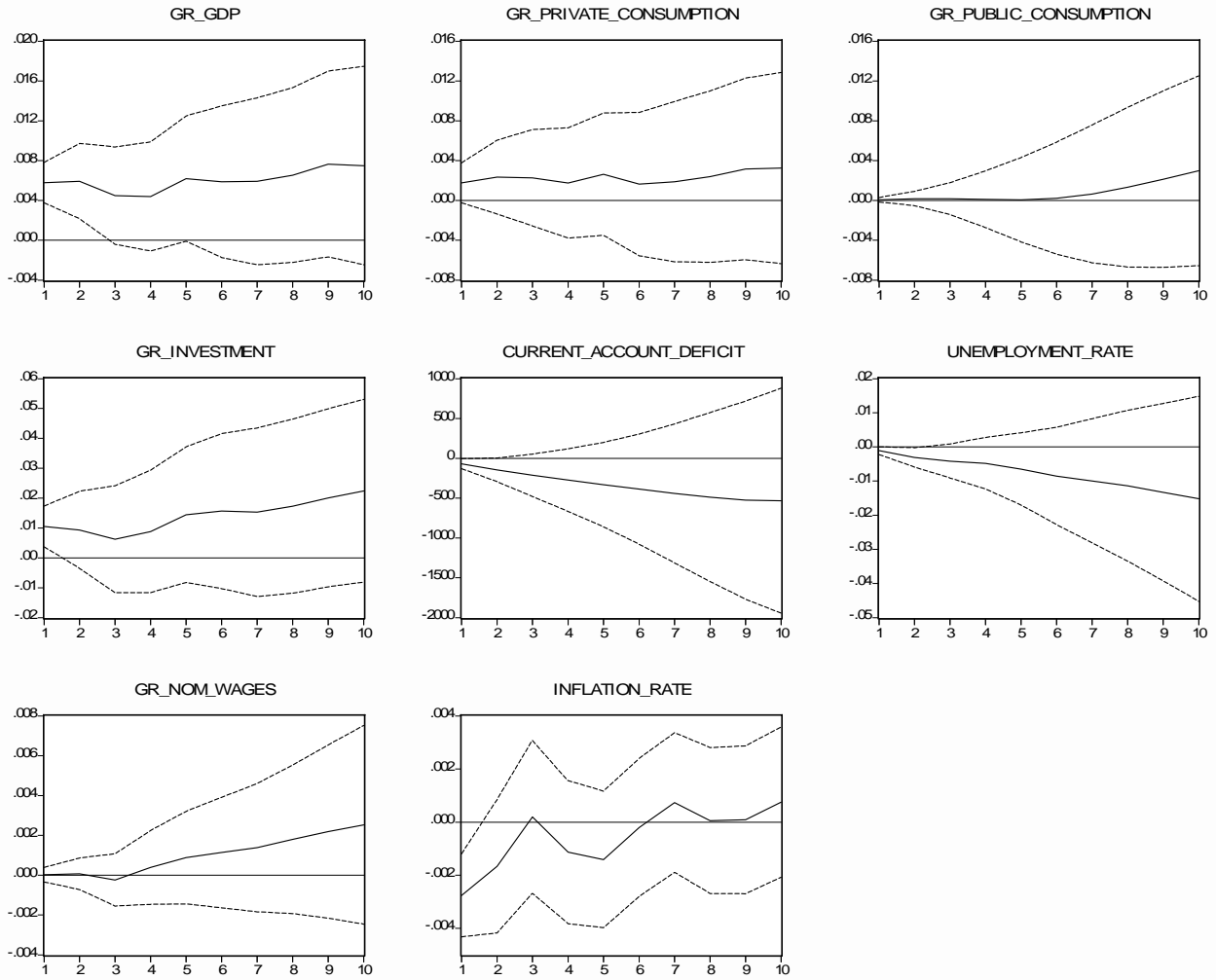


Figure 4

Effects of a permanent decrease in the growth rate of nominal wages

