

BRAZIL — Fiscal Policy and Economic Activity**Crowding-In or Crowding-Out? That Is the Question**

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- One of the recurring topics in the current macro debate is associated with the evaluation of the effects of a contractionary fiscal policy on Brazilian economic activity. On the one hand, lower government spending exerts a negative impact on domestic absorption in the short-term, which makes the resumption of growth more difficult. On the other hand, many argue that a more austere stance on fiscal policy, especially after a significant period of deterioration in public finances, could stimulate private investments and lead economic growth onto a sustainable path.
- In this report, we aim to shed light on the specific relationship between public and private investments in the Brazilian economy over the last 15 years. As pointed out in some academic papers, this relationship has been negative on the whole, which helps to explain the low investment-to-GDP ratio in Brazil when compared with the average in Latin American countries and other emerging countries.
- We present empirical exercises regarding the impact of public investment on private investment (and vice versa), isolating the impact of other relevant macro variables (e.g., GDP growth, interest rates, tax burden). We used the quarterly data series from 2001 Q1 to 2014 Q4 and, in order to analyze the evolution of the links between variables, we divided the whole sample period into two time intervals: (i) 2001 Q1 - 2007 Q4; and (ii) 2008 Q1 - 2014 Q4. The definition of the sub-periods reflected different economic policy frameworks and fiscal account performances since the early 2000's.
- We found that private investment was “crowded-in” by public investment in the sub-period 2001 Q1 - 2007 Q4, which means a complementary impact of higher government investment (e.g., infrastructure facilities) by raising the marginal productivity of private capital. In contrast, we found a “crowding-out” result for private investment in response to higher public investment in the sub-period from 2008 Q1 to 2014 Q4, which indicates the predominance of competition for financial and physical resources between the sectors. Thus, according to our estimates, the remarkably expansionary fiscal policy adopted by the government in the most recent years has reduced investment spending by private companies.
- Our empirical findings suggest that an austere fiscal policy could have a positive impact on private investment, which makes sense given that rules combining incentives for public investments with fiscal sustainability in the medium-term would be desirable conditions for the business environment.
- Thus, assuming a scenario with stability of the public debt-to-GDP ratio in the medium-term, which implies the continuity of the current contractionary fiscal policy, we could expect public investment to “crowd-in” private investment at that time. Meanwhile, we think that the reduction in public investment tends to be offset by the increase in private investments, also validating the adoption of an austere fiscal stance.
- The flip side of the coin is the scenario marked by the ongoing primary balance deficit without any fiscal adjustment, for which we should expect the public investment to “crowd-out” private investment.
- Therefore, we believe that the current fiscal adjustment agenda will play a major role in a sustainable recovery of investments in the Brazilian economy — this is because, in our opinion, the expansion of public investments under a scenario of a sharp deterioration in fiscal accounts would not drive the resumption of growth; on the contrary, it should lead to the worsening of the outlook for private investments and make the economic recovery more difficult.



Introduction

One of the recurring topics in the current macro debate pertains to the evaluation of the effects of a contractionary fiscal policy on Brazilian economic activity. On the one hand, lower government spending exerts a negative impact on domestic absorption in the short-term, which makes the resumption of growth more difficult. On the other hand, a more austere stance on fiscal policy, especially after a significant period of deterioration in public finances, could stimulate private investments (by reducing the real interest rate and risk perception, enabling greater predictability, etc.) and lead economic growth onto a sustainable path.

In this report, we aim to shed light on the specific relationship between public and private investments in the Brazilian economy over the last 15 years. Higher public investments (e.g., infrastructure spending) could boost private investments by raising the marginal productivity of private capital, which is called the “crowding-in” effect. In theory, public investments should be guided by long-term decisions geared toward social welfare and improvement in doing business rather than short-term profitability. However, higher public spending on investment could also negatively affect the private investments, by demanding more loanable funds and increasing the interest rates from the borrowing (a phenomenon called “crowding-out¹”). We must bear in mind that public investments respond to the economic policy orientation, and also to the priorities of governments, which often may not prioritize social welfare.

In fact, the broad concept of “crowding” refers to the situation in which the increased government involvement in a sector of the market economy substantially affects the remainder of the market, either on the supply or demand side. Although many studies rely on total public spending, our report focuses on the relationship between public investments and private investments.

As pointed out by some academic papers, the relationship between public and private investments in Brazil has been negative on the whole, which helps to explain the low investment-to-GDP ratio in Brazil when compared with the average in Latin American countries (22.1%) and with the top 10 emerging countries² (26.5%). This negative relationship, in turn, could explain part of the low real GDP growth in the recent period, which we try to measure in our estimates as well.

Hence, this study presents empirical exercises regarding the impact of public investment on private investment (and vice versa), isolating the impact of other relevant macro variables (e.g., GDP growth, real interest rates, and the tax burden).

Total Investments/GDP (%)

Latin America Countries		Emerging Countries	
Colombia	27.7	China	45.7
Ecuador	26.9	Indonesia	34.6
Venezuela	24.8	India	32.4
Peru	24.0	Singapore	26.3
Mexico	22.7	Thailand	24.1
Chile	22.4	Hong Kong	21.7
Uruguay	19.8	Russian Federation	20.7
Bolivia	19.2	Philippines	20.6
Paraguay	17.0	Poland	20.4
Argentina	16.9	Turkey	18.1
Average	22.1	Average	26.5
Brazil	17.7		

Sources: IBGE and World Bank.

¹ The case of a negative impact of public investment on private investment is named “crowding-out” in economic theory, while a positive impact of public investment on private investment is named “crowding-in”.

² Top 10 emerging countries are: China, Hong Kong, Indonesia, India, Philippines, Poland, Russian Federation, Singapore, Thailand, and Turkey, according to the World Bank.



Econometric Modeling

Our approach was to estimate a Vector Error Correction (VEC)³ model that relates all the following variables: (i) private investments (in real terms, based on the implicit deflator of Gross Fixed Capital Formation - GFCF); (ii) public investments (in real terms, also based on the implicit deflator of GFCF); (iii) Total GDP (in real terms, based on its implicit deflator); (iv) real interest rates (1-year Pre-CDI swap minus IPCA expectation 12-month ahead); (v) tax burden (total tax collected by federal and regional governments as a percentage of GDP); and (vi) the relative price index for capital goods (price index for “machinery and equipment” category of General Price Index). With regard to public investments⁴, we used the data series calculated by *Rodrigo Octávio Orair*⁵ and published in the report “*Investimento público no Brasil: trajetória recente e relações com o regime fiscal*”, which follows the GFCF methodology applied by IBGE (Brazilian Institute of Geography and Statistics).

We used the quarterly data series over the period from 2001 Q1 to 2014 Q4. In order to analyze the evolution of the relationships between variables, we divided the whole sample period into two time intervals and developed an econometric model for each sub-period: (i) 2001 Q1-2007 Q4; and (ii) 2008 Q1-2014 Q4.

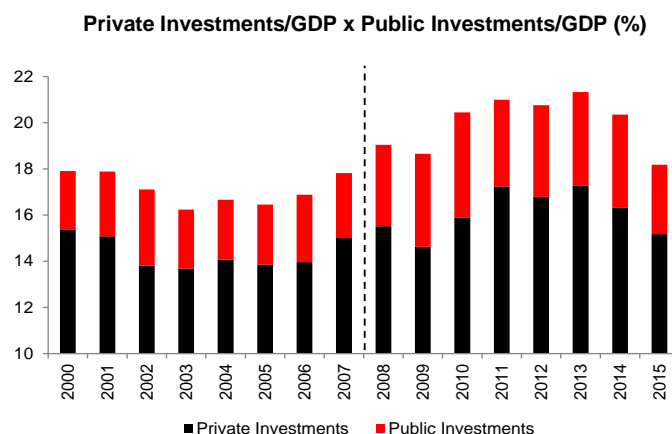
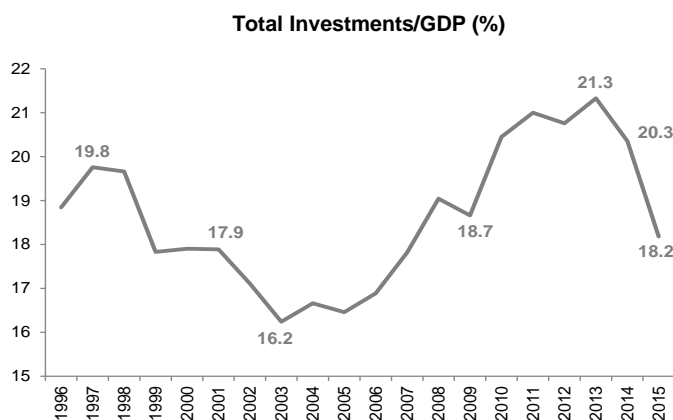
In short, our models explaining the performance of the *investments* can be written in general as the following:

$$\log I_{pub_t} = \beta_0 + \beta_1 \log I_{priv_t} + \beta_2 \log G_t + \beta_3 TB_t + \beta_4 r_t + \beta_5 P_t^K + \varepsilon_t \quad (1)$$

$$\log I_{priv_t} = \beta_0 + \beta_1 \log I_{pub_t} + \beta_2 \log G_t + \beta_3 TB_t + \beta_4 r_t + \beta_5 P_t^K + \varepsilon_t \quad (2)$$

The equation (1) and (2) states that the public investments (*I_{pub}*) or private investments (*I_{priv}*) can be explained by a constant plus private investments (*I_{priv}*) or public investments (*I_{pub}*), tax burden (*TB*), Total GDP (*G*), real interest rate (*r*), and relative price index for capital goods (*P^K*).

It is worth noting that in Brazil the total investment-to-GDP ratio oscillated from 17.9% to 20.3% over the period from 2001 to 2014, where private investment oscillated from 15.1% to 16.3% and public investment fluctuated from 2.8% to 4.0%. Nevertheless, through this period we can see two very distinct moments, at least: (1) from 2001 to 2007, the public investment-to-GDP ratio remained relatively stable at low levels, as a result of the primary fiscal target adoption and private investment in some infrastructure sectors, in the wake of the privatization/concession agenda of the end of the 90’s decade; (2) from 2008 to 2014, the public investment-to-GDP ratio sharply increased, mainly due to the change in the federal government economic policy orientation, intending to focus on investments in the infrastructure sectors (aside from the expansion of social transfers), but basically loosening fiscal spending.



Sources for both charts: SIAFI, Finance Ministry, IPEA, and Santander estimates.

³ The definition of VEC model as appropriate for our objectives was preceded by stationarity (unit root) and cointegration tests. For the former, after adopting the Augmented Dickey-Fuller and Phillips-Perron methodologies, we found that the time series were non stationary at that level. Thereafter, we used the Johansen framework for testing the cointegration among variables and found significant long-run relationships. Furthermore, all models presented no serial correlation (Autocorrelation LM test) and residuals as multivariate normal (Lutkepohl test), validating the econometric specification.

⁴ Public investments exclude capitalization of state-owned companies, acquisitions of non-construction real estate, capital transfers to subnational entities, and subsidies such as interest rate equalizations in social programs (e.g., “Minha Casa Minha Vida”). It is also worth emphasizing that the historical data series of public investments (on a monthly or quarterly basis) are relatively unknown and little used.

⁵ Research analyst of IPEA (Instituto de Pesquisa Econômica Aplicada).



Results and Conclusion

In short, all explanatory variables used in our econometric models showed consistency in terms of economic meaning. Looking specifically at the accumulated response of private and public investments to shocks in others variables⁶, we found negative impacts from real interest rates, relative price index for capital goods, and the tax burden (for the latter, we found negative influence on private GFCF and positive influence on public GFCF); in contrast, shocks in GDP exerted positive contribution on both investments.

Table 1: Expected parameter signs – equations for public and private investments

Parameter	Expected sign	Reason
β_1	Positive or Negative	Higher public (or private) investments increase or decrease private (or public) investments
β_2	Positive	Higher GDP increases investments
β_3	Positive or Negative	Higher tax burden reduces private investments, but increases public investments
β_4	Negative	Higher real interest rate contracts investments
β_5	Negative	Higher cost of capital goods contracts investments

Source: Santander.

In-line with some academic papers, we found that public investments “crowded-out” private investments in the recent period. In fact, the estimation output for the whole sample period — from 2000 to 2015 — showed a negative impact from public GFCF to private, but a positive impact in the opposite direction. However, as previously mentioned, looking at the sample sub-periods seems to bring more relevant information to our analysis, as the relationships between public and private investments should have changed considerably since the early 2000s, reflecting different economic policy frameworks and fiscal account performances.

First, we found that private investment was “crowded-in” by public investment in the sub-period 2001 Q1-2007 Q4, which means a complementary impact of higher government investment (e.g., infrastructure facilities) by raising the marginal productivity of private capital. For that sub-period, all the coefficient signals are in-line with the macroeconomic theory, as the real interest rate and tax burden negatively influences private investments, while GDP growth positively influences this variable⁷ (please see the charts in the *Appendix*).

In contrast, we found a “crowding-out” result for private investment in response to a shock in public investment in the sub-period from 2008 Q1 to 2014 Q4, which indicates the predominance of competition for financial and physical resources between the public and private sectors, instead of the increase in the profitability of private production in the wake of higher public capital accumulation. The tax burden and real interest rate coefficients remain negative, while the GDP growth parameter is positive, all of them also in-line with macroeconomic theory. Thus, according to our estimates, the remarkably expansionary fiscal policy adopted by the government in the most recent years has reduced the investment spending by private companies, mainly because the public demand for more loanable funds has driven an increase in interest rates from the borrowing, in our view.

Our empirical findings suggest that the austere fiscal policy could have a positive impact on private investment, which makes sense given that rules combining incentives for public investments with fiscal sustainability in the medium-term would be desirable conditions for the business environment.

Hence, assuming a scenario with stability of the public debt-to-GDP ratio in the medium-term, which implies the continuity of the current contractionary fiscal policy, we could expect public investment to “crowd-in” private investment at that time (it would consist of a regime switching). In this scenario, considering as assumptions the variable coefficients found in the sub-period from 2001 Q1 to 2007 Q4, we calculate that a 1% change in public investment would add 0.22% to private investment, while the response of GDP to a 1% change in public investment would correspond to an increase of 0.34%. Meanwhile, we think that the reduction in public investment tends to be offset by the increase in private investments, also validating the adoption of an austere fiscal stance.

The flip side of the coin is the scenario marked by the ongoing primary balance deficit without any fiscal adjustment, for which we should expect the public investment to “crowd-out” private investment. In this case, taking as assumptions the variable relationships found in the sub-period from 2008 Q1 to 2014 Q4, we estimate that a 1% change in public investment would reduce private investment by 0.47%, while the response of GDP to a 1% change in public investment would be a decrease of 0.04%.

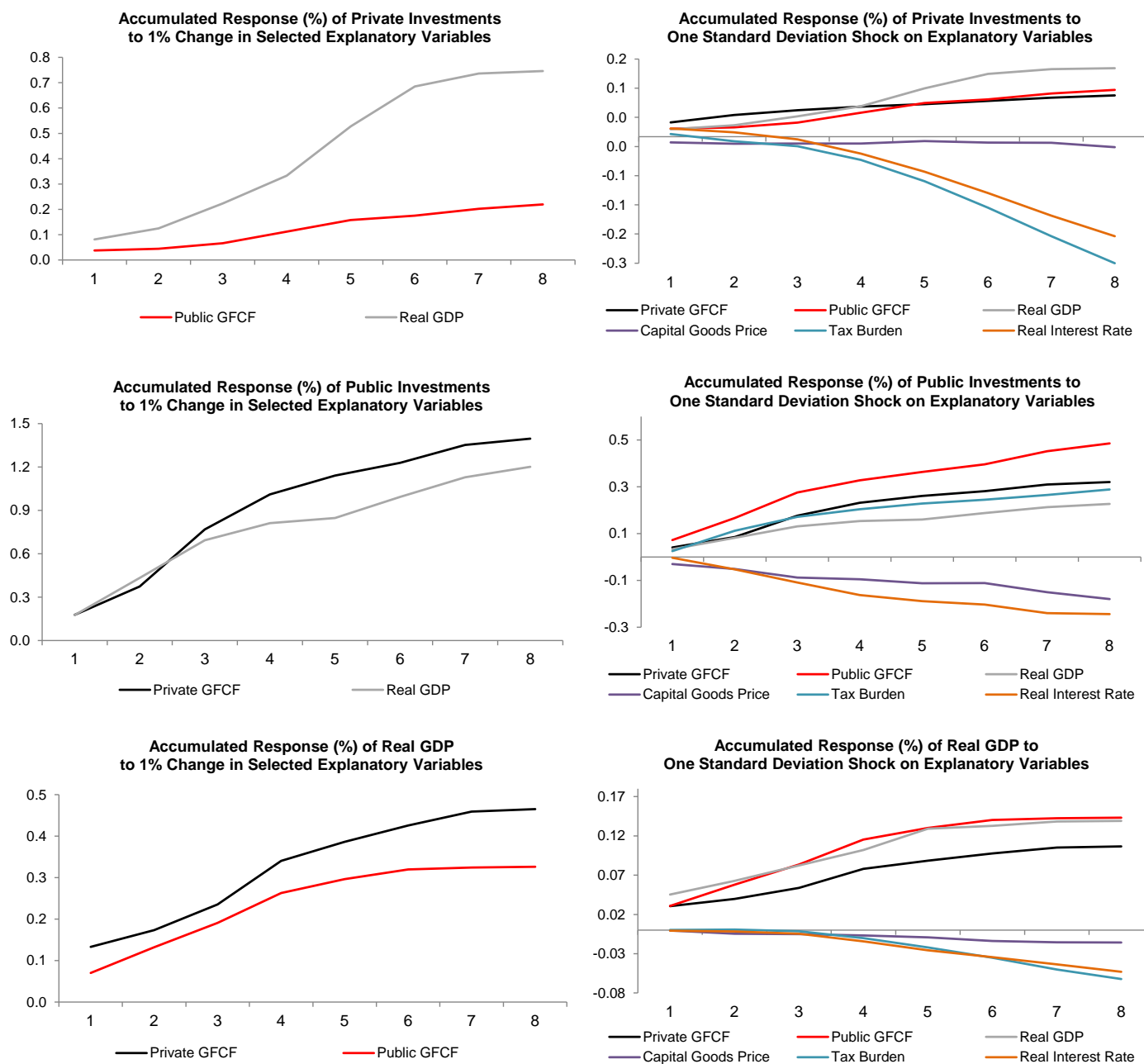
⁶ The impulse-response functions of VEC models depict the reaction over time of a given variable (in our case, we focus on private and public investments) in response to an impulse in another variable (GDP, private investment, public investment, tax burden, real interest rate or capital goods price).



Therefore, we believe that the current fiscal adjustment agenda will play a major role in a sustainable recovery of investments in the Brazilian economy. That is because, in our opinion, the expansion of public investments under a scenario of sharp deterioration in fiscal accounts would not drive the resumption of growth; on the contrary, it should lead to a worsening of the outlook for private investment, thus making the economic recovery more difficult.

Appendix

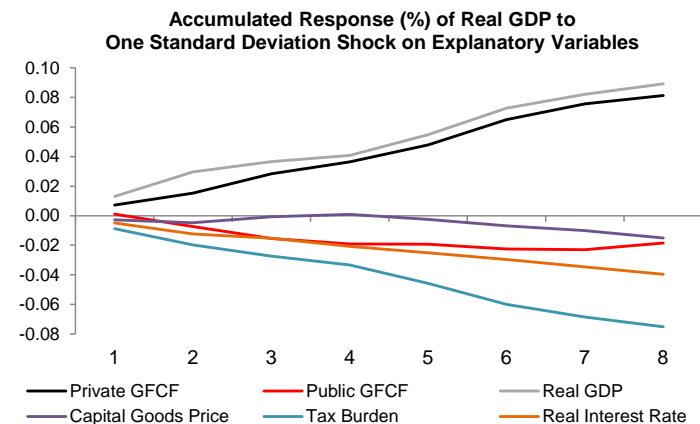
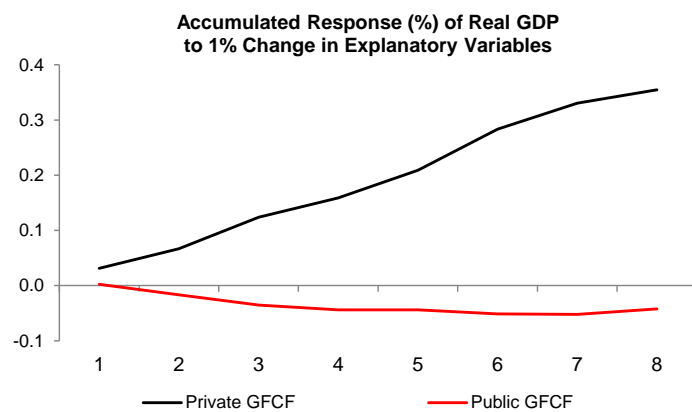
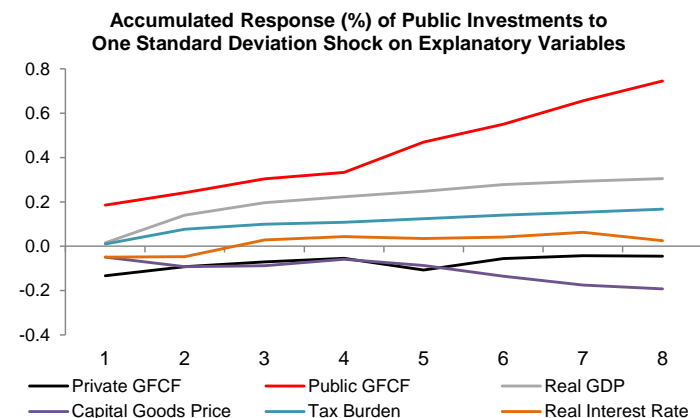
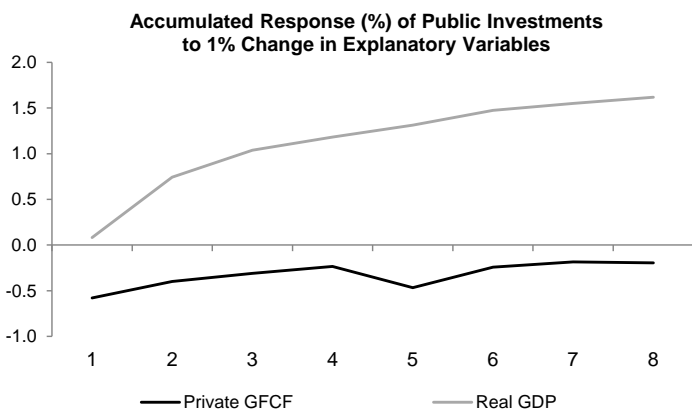
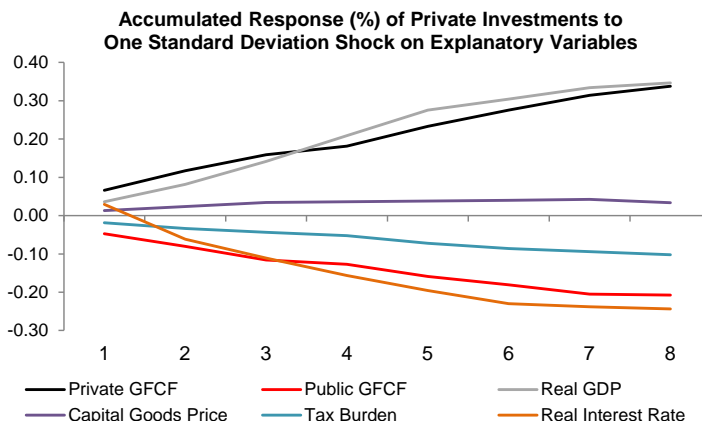
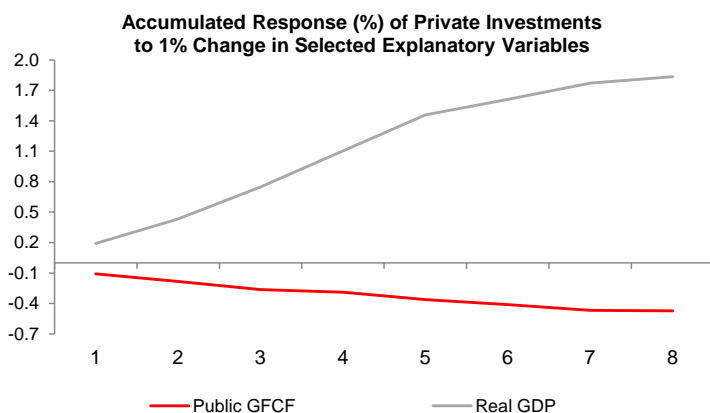
1) 1st Sub-Period – 2001 Q1-2007 Q4



Source for all charts: Santander estimates.



2) 2nd Sub-Period – 2008 Q1-2014 Q4



Source for all charts: Santander estimates.



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