

## 10. Conclusion

In this work, we used the standard neoclassical growth model to isolate the public investment shock induced by the Growth Acceleration Program (GAP) – *Programa de Aceleração do Crescimento* – in Brazil. The model includes implementation delays in infrastructure spending (the time-to-build process) and endogenous tax rates, which adjust according to the level of public debt. In a standard calibration for the Brazilian economy, the results suggest that the GAP provoked a fall in output around 0.2% and 0.4% in three years, assuming that public investment takes this same time to build up in infrastructure. The recessive impact varies according to the source of funding (capital, labor or consumption taxes) as well as the fiscal adjustment flexibility.

In a tight adjustment scenario, in which the government the debt path is contained in five years, the recessive impact is amplified with taxation on hours worked. Even in more flexible fiscal adjustments, as of fifteen years, the output may decrease 0.3% for a time-to-build process of four years. Nevertheless, although aggressive fiscal adjustments strengthen the recessive impact of the shock, a greater flexibility in managing the public debt path also induces a lower output growth in the medium to long run, since the distortions provoked by the higher taxation are prolonged over time.

It is worth mentioning that the results were obtained assuming a conservative value for the elasticity of output to public capital (calibrated to 0.10). Considering a higher value for this parameter (of 0.35), the short run recessive effect is amplified, reaching a decrease in output of 1% in three years.

As explained in the previous chapters, the economic mechanism behind the results is due to the time-to-build process, which reflects a technological constraint associated to infrastructure projects. In fact, the households anticipate the future increase in public capital stock due to the current public investment shock. As a consequence, the households optimally choose to immediately reduce the amount of hours worked and to postpone investment decisions, until the time-to-build process is concluded. The first impact is due to a positive wealth effect on labor supply, whereas the second one reflects an intertemporal substitution effect

on investment decisions. As analyzed in the first chapters, the second element in the model is quantitatively more important for the short run decrease in output.

Finally, the welfare gains associated to the GAP are very modest, even if we assume that public and private consumption are perfect substitutes. In all cases, for different financing schemes, fiscal adjustment scenarios and time-to-build processes, the measured compensating variation is lower than 0.5%. Moreover, the welfare gain declines as the lags in public spending rises, and the relative decrease does not depend significantly on the adopted financing scheme. In comparison to a time-to-build process of one quarter, the welfare gains may be lowered in up to 30% for a spending delay of four years.

Therefore, as a temporary anti-cyclical policy, the model suggests that the efficacy of the GAP is quite doubtful. Considering the estimated lag for infrastructure projects, the expansionary effects associated to the investment program are, actually, recessive in the short run, for any source of funding chosen by the government. More importantly, higher productivity levels for the public capital amplify the fall in output in the short run. Thus, the results suggest that the sluggish pace of GAP projects may have induced slowdowns in economic activity, especially in segments very constrained by a poor level of infrastructure.

However, the model also suggests that there is space for welfare gains with the investment program. Yet, such a policy would be more effective if it were implemented to permanently increase the public investment to GDP ratio. To the extent that the Brazilian economy suffers from infrastructure constraints, especially in segments of energy and transports, a permanent rise in infrastructure can lead to substantial increases in output as well as in welfare. Moreover, the results also suggest that institutional improvements that accelerate the pace of infrastructure developments are crucial to allow greater benefits to the households.