

Alternative Macroeconomic Closures in Baseline Projections – Implications for Macro Outcomes and Sectoral Structure

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Outline

- Motivation of the Study
- Baseline Projection Framework
- Baseline Projection Results for Macro Variables
- Sectoral Results and Structural Implications

Motivation of the Study

- Macroeconomic closure in computable general equilibrium (CGE) models describes how aggregate savings and investment are equilibrated.
- The differences in outcomes under alternative macro closures are more pronounced in recursive dynamic frameworks than in static models
- Bekkers et al. (2020) explore the choices of adopting different macroeconomic closures on macro variables in baseline projections. **There is a gap in literature looking at the implications of alternative closure rules for sectoral structure.**

Baseline Projection Framework

- We use the GTAP-Recursive Dynamic (GTAP-RD) model framework (Aguiar, Corong, and Mensbrugghe, 2019)
 - Based on the static GTAP model but allows for capital accumulation overtime
 - the savings-investment equilibrium is imposed at the global rather than the regional level.
- Compare three different macro closure rules in a baseline projection over 2014–2044;
- Examine the baseline projections for Italy (a slow-growth region) as a case study

Baseline Projection Framework

- We use the GTAP-RD model, with a base year of 2014
 - The model has 13 regions, 65 production activities and 65 commodities.
- The baseline projection includes
 - projections for growth in real GDP per capita
 - Population
 - the skilled and unskilled labor supply for all regions
- The baseline projection information comes from the Shared Socio-Economic Pathways (SSP) database; we use the SSP2 projections. The baseline projection is run under three different macroeconomic closures.

Baseline Projection Framework

Name of Closure	S – Savings	I – Investment	X – M (trade balance)	Closure swap statement	RORDELTA
RORE rate of expected return	Fixed regional savings rates	investment is allocated across regions such that % changes in regional expected rates of return are equalized	Adjusts to clear regional savings— investment gap	None	1
FIXSHR fixed regional allocation shares	Fixed regional savings rates	Regional investment adjusts to maintain fixed regional shares of global savings/ investment	Adjusts to clear regional savings— investment gap	None	0
DPSAVE (each region's trade balance as a share of global income is fixed)	Regional savings rates adjust to accommodate fixed trade balance	investment is allocated across regions such that % changes in regional expected rates of return are equalized	Fixed relative to global income	Swap $del_tbalry_r = dpsave_r$ for n-1 regions	1

Baseline Projection Results for Macro Variables for Italy

Percent Changes in GDP and Investment

Figure 1: Annual Percent Change in Real GDP, Italy and World

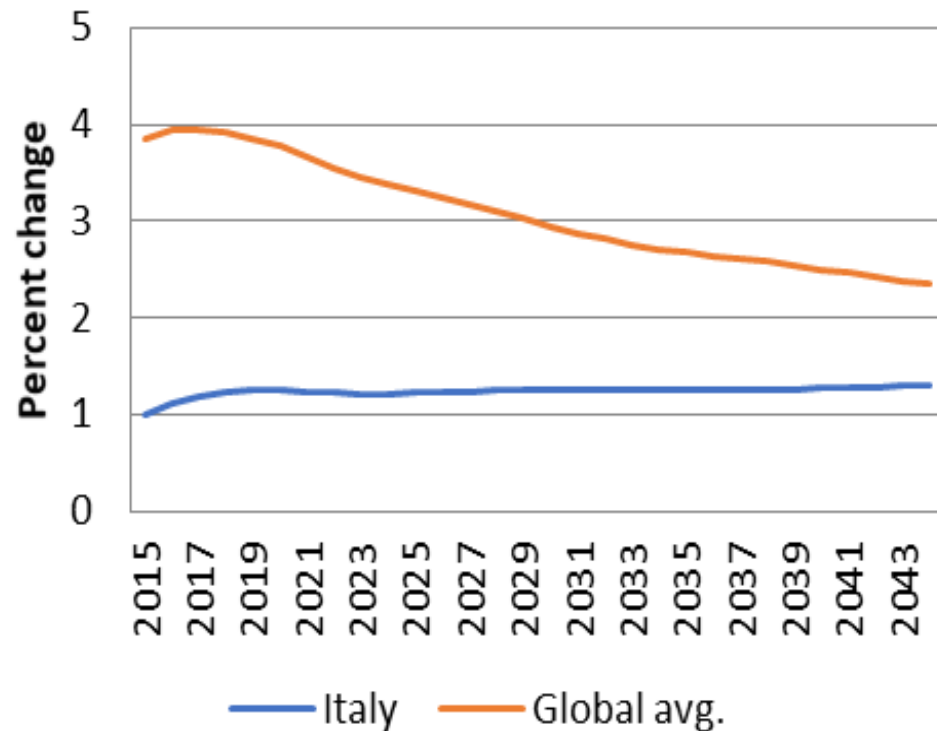
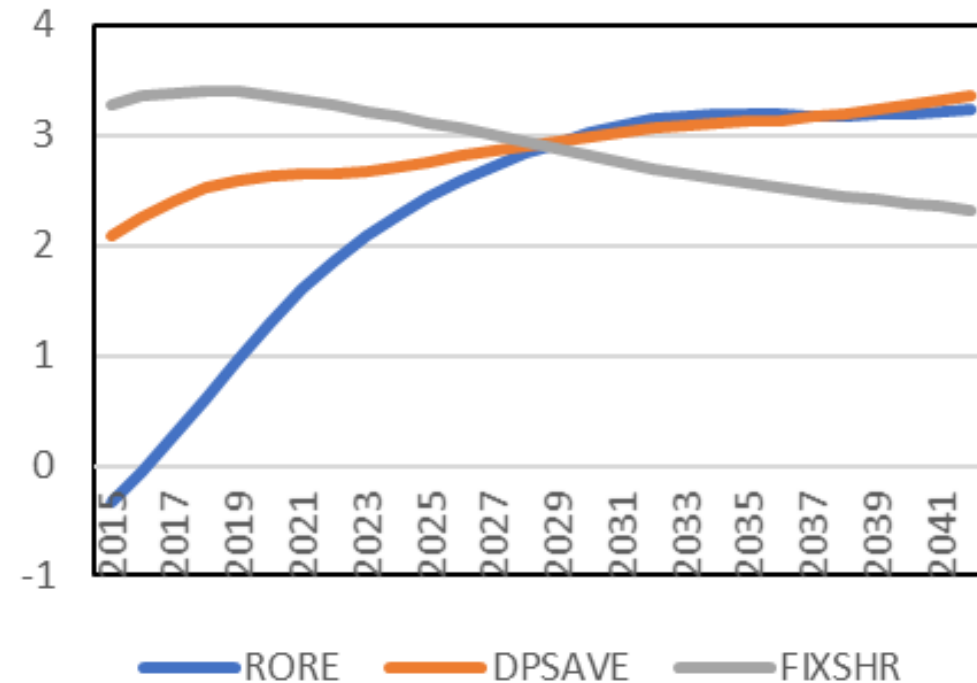
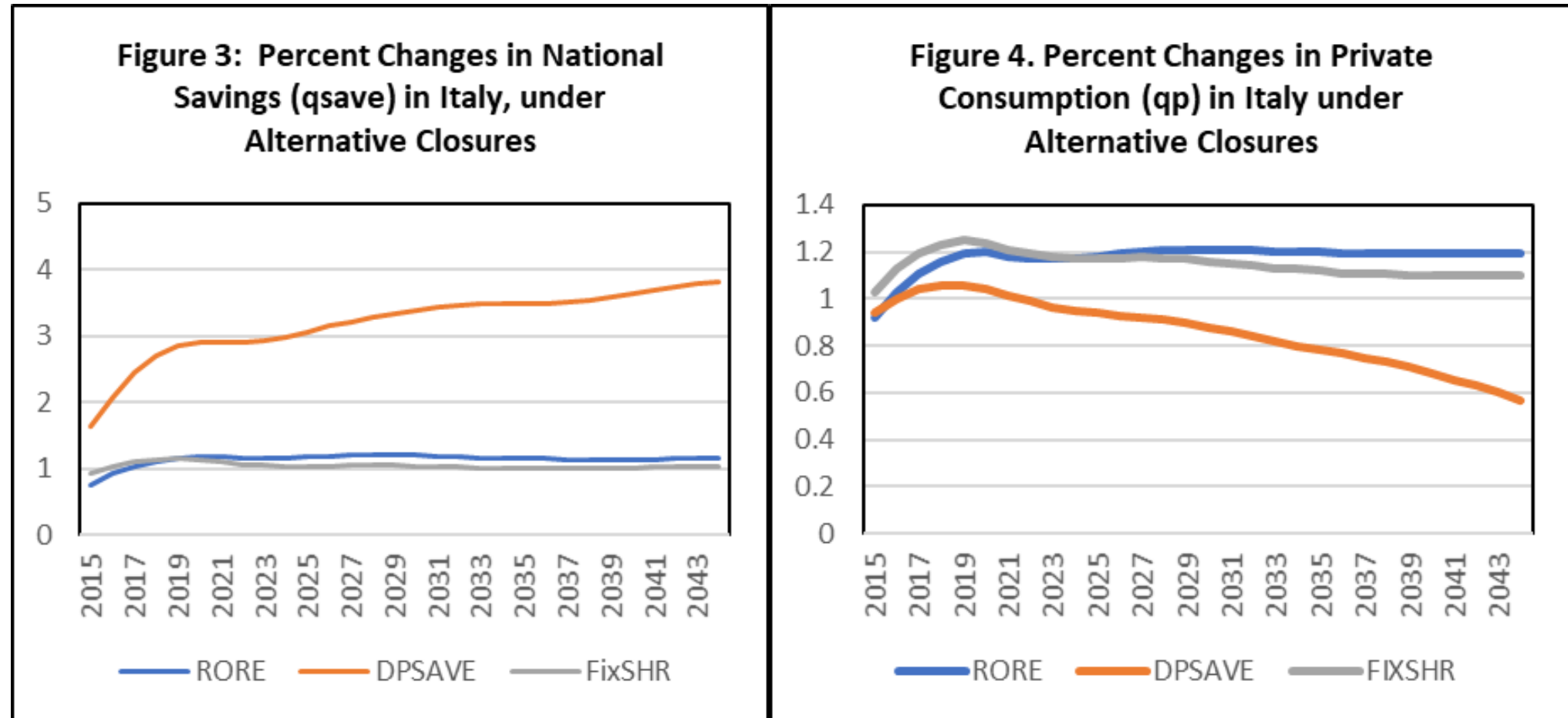


Figure 2. Percent Changes in Real Investment (qinv) for Italy under Alternative Closures



Percent Changes in Savings and Private Consumption



Italy's Trade Balance

Figure 5. Italy's Trade Balance with Alternative Closures (\$US billions)

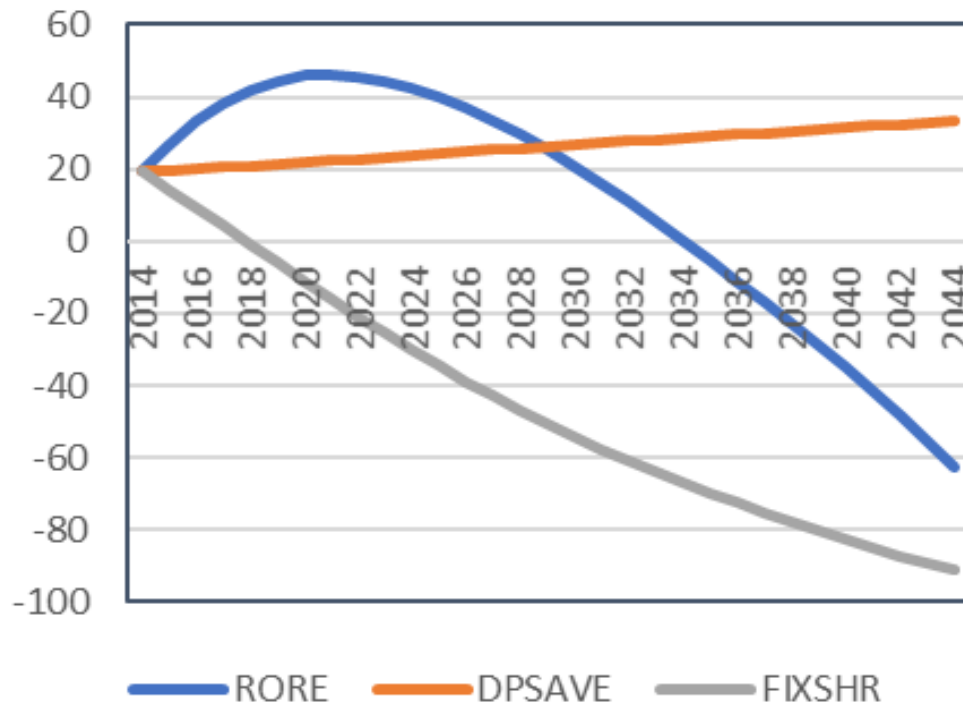
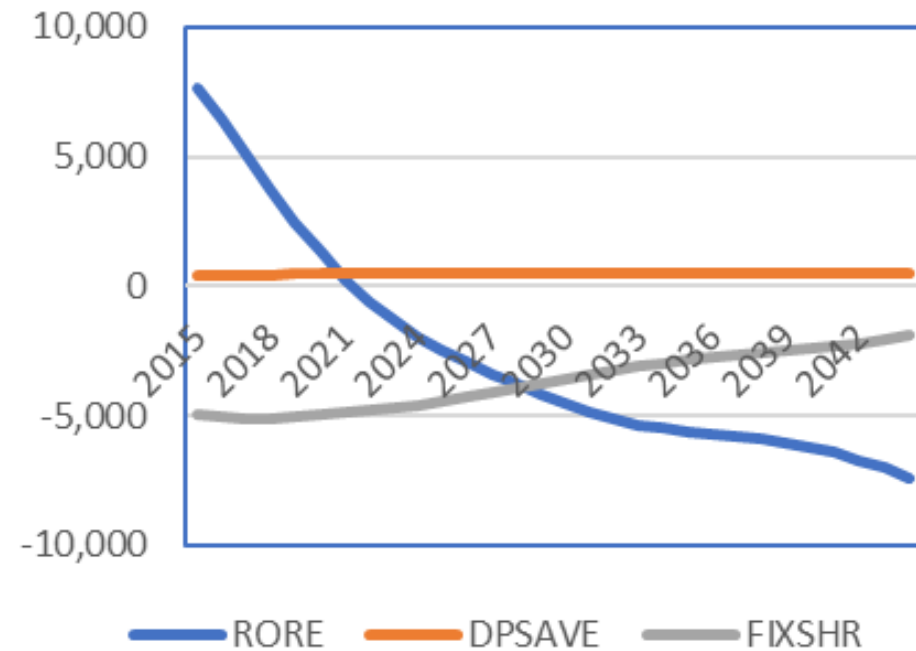
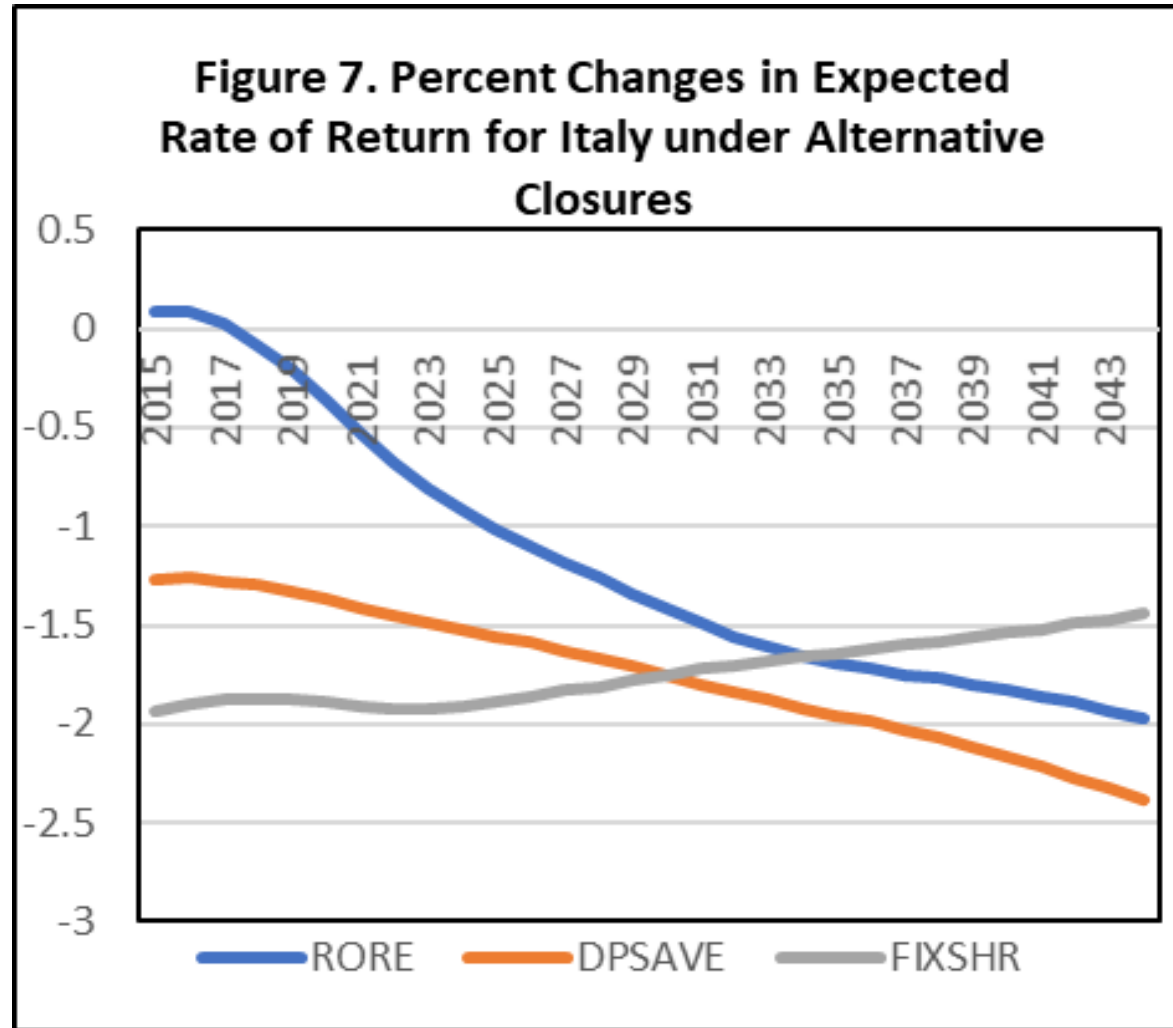


Figure 6. Annual Change in Italy's Trade Balance with Alternative Closures (\$US millions)



Percent Changes in the Expected Rate of Return (RORE)



Percent Changes in Aggregate Exports and Imports

Figure 8a. Change in Aggregate Real Exports for Italy under Alternative Closures

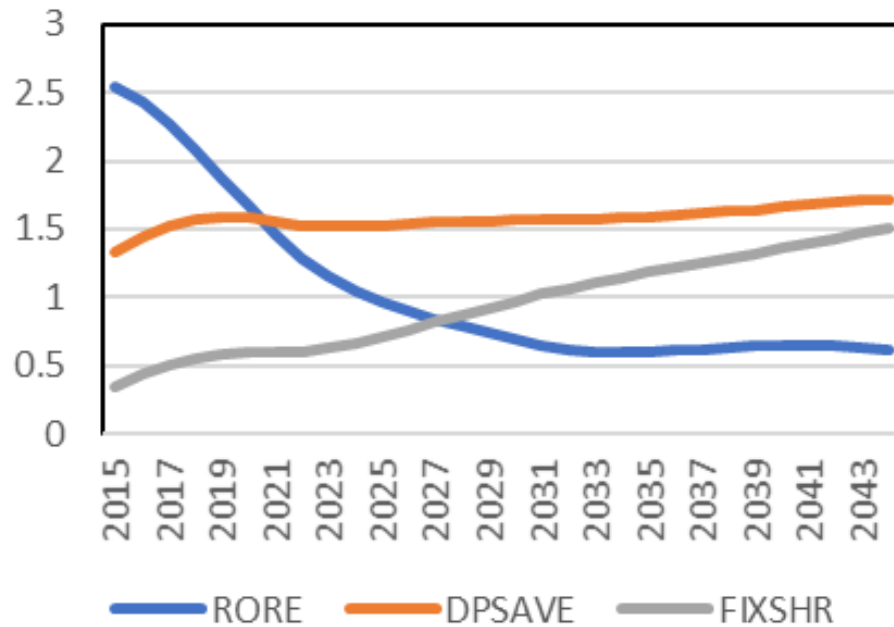
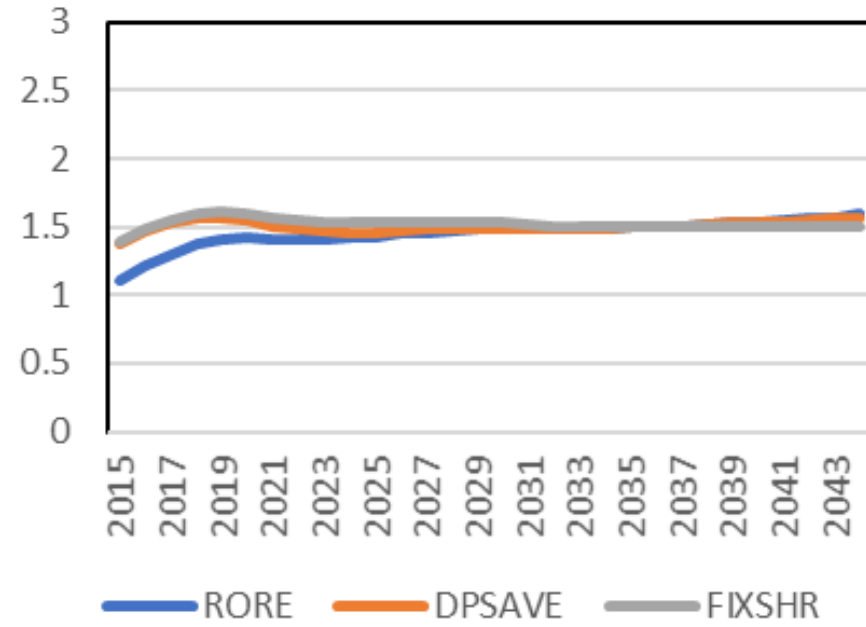
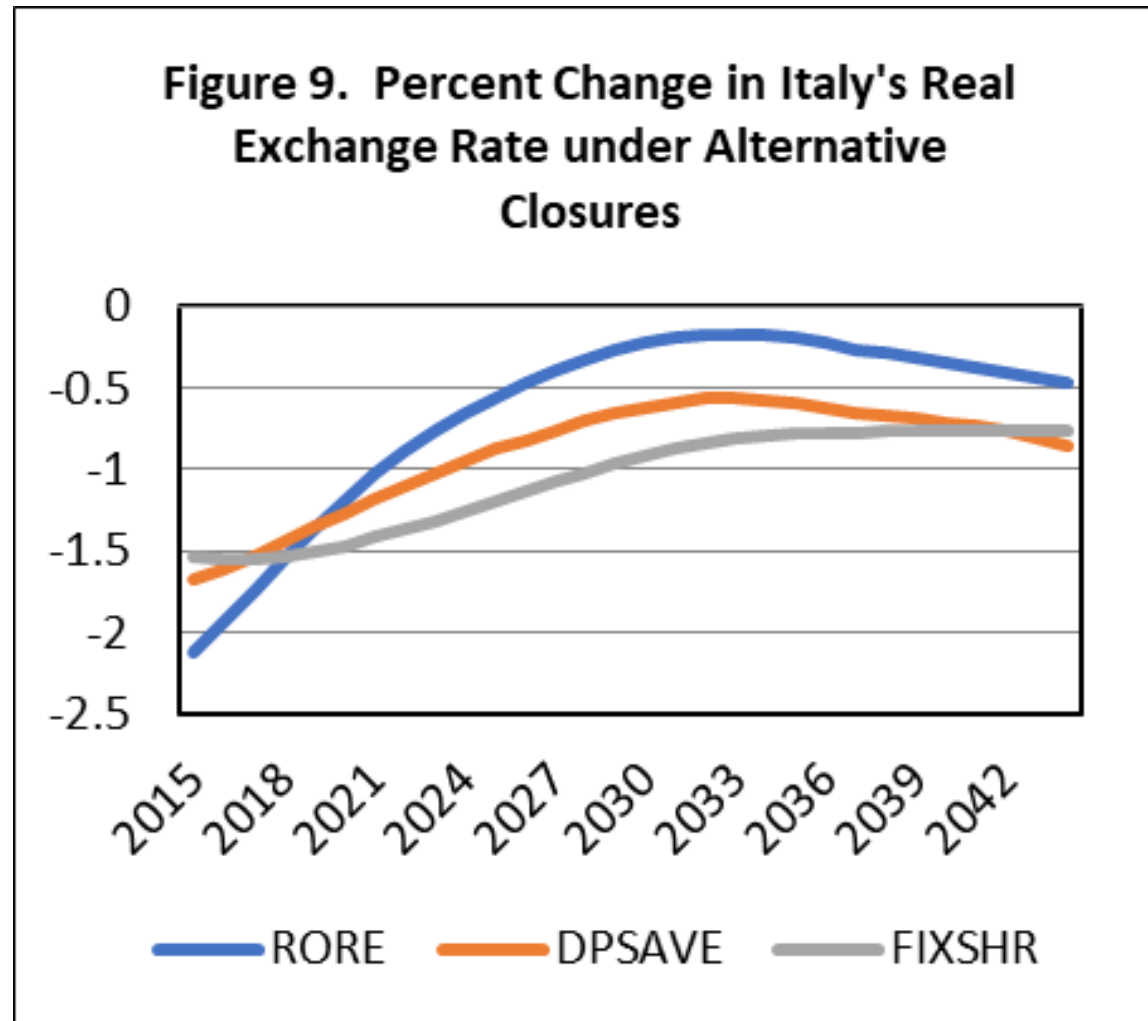


Figure 8b. Change in Aggregate Real Imports for Italy under Alternative Closures



Percent Changes in Real Exchange Rate



Sectoral Results and Structural Implications

Sectoral Characteristics and Closure Rules

- We categorize the 65 GTAP sectors based on tradability and capital intensity
- Tradability: $(\text{import share in final demand})^* (\text{export share in production})^*$
ESUBVA
 - The top 20 sectors are termed tradable sectors; the bottom 20 sectors are termed non-tradable
- Capital Intensity: the capital-labor ratio of each sector in Italy
 - The top 20 sectors are grouped as sectors with high capital intensity; the bottom 20 sectors are grouped as sectors with low capital intensity

Outputs and Tradability

Figure 10a. Percent Change in Output of Highly Tradables Sectors in Italy under Alternative Closures

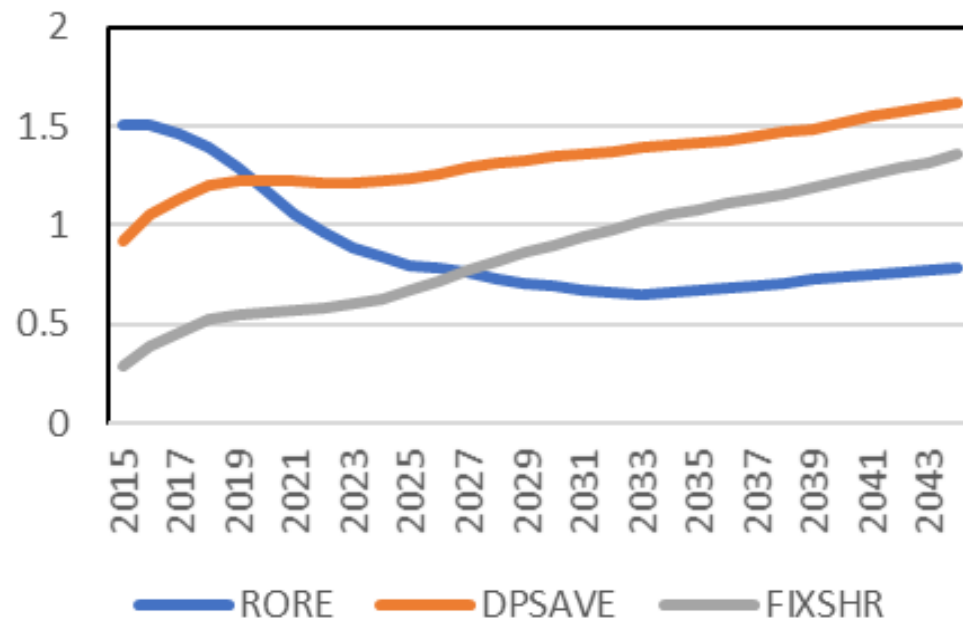
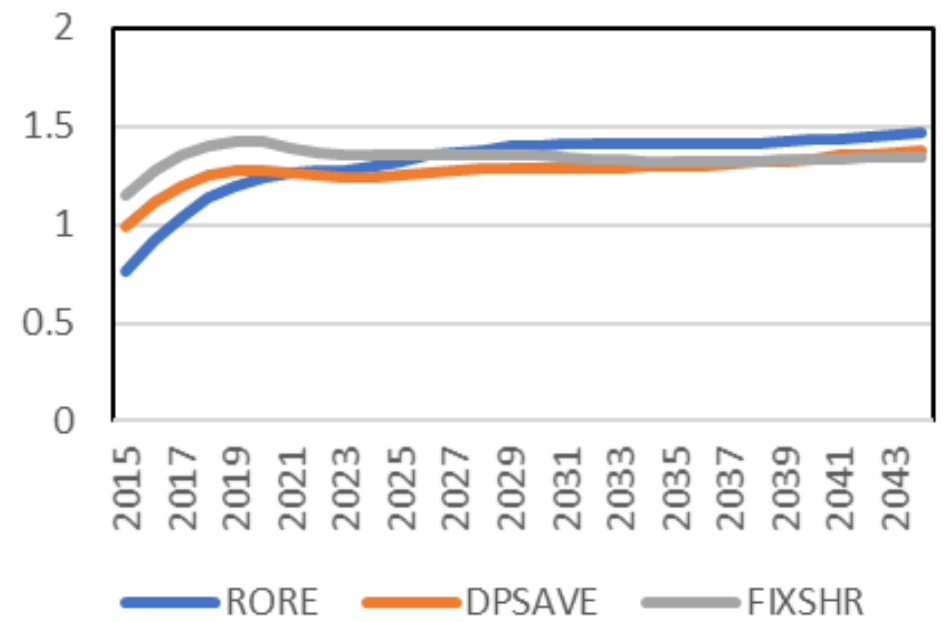


Figure 10b. Percent Change in Output of Nontradables in Italy under Alternative Closures



Outputs and Capital Intensity

Figure 11a. Percent Change in Output of High Capital Intensity Sectors in Italy under Alternative Closures

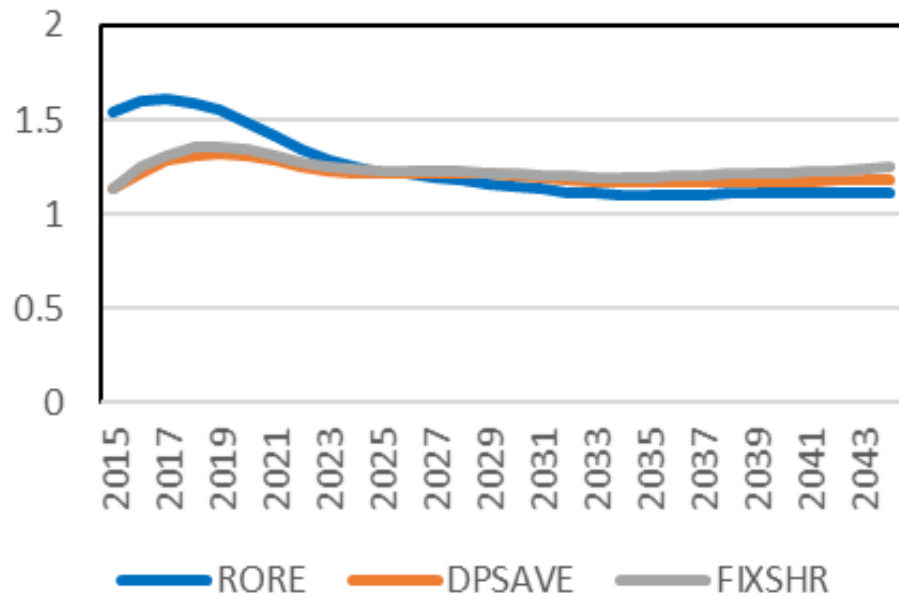
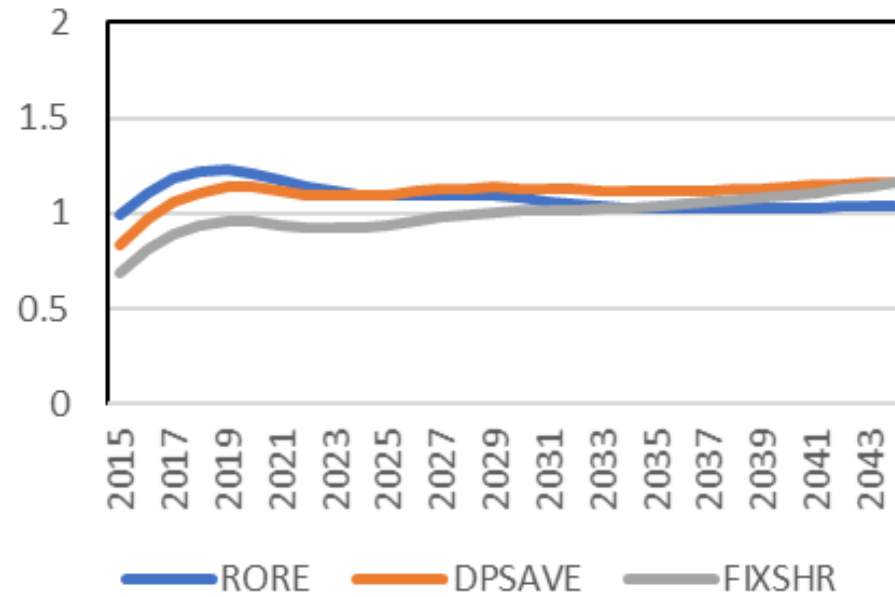
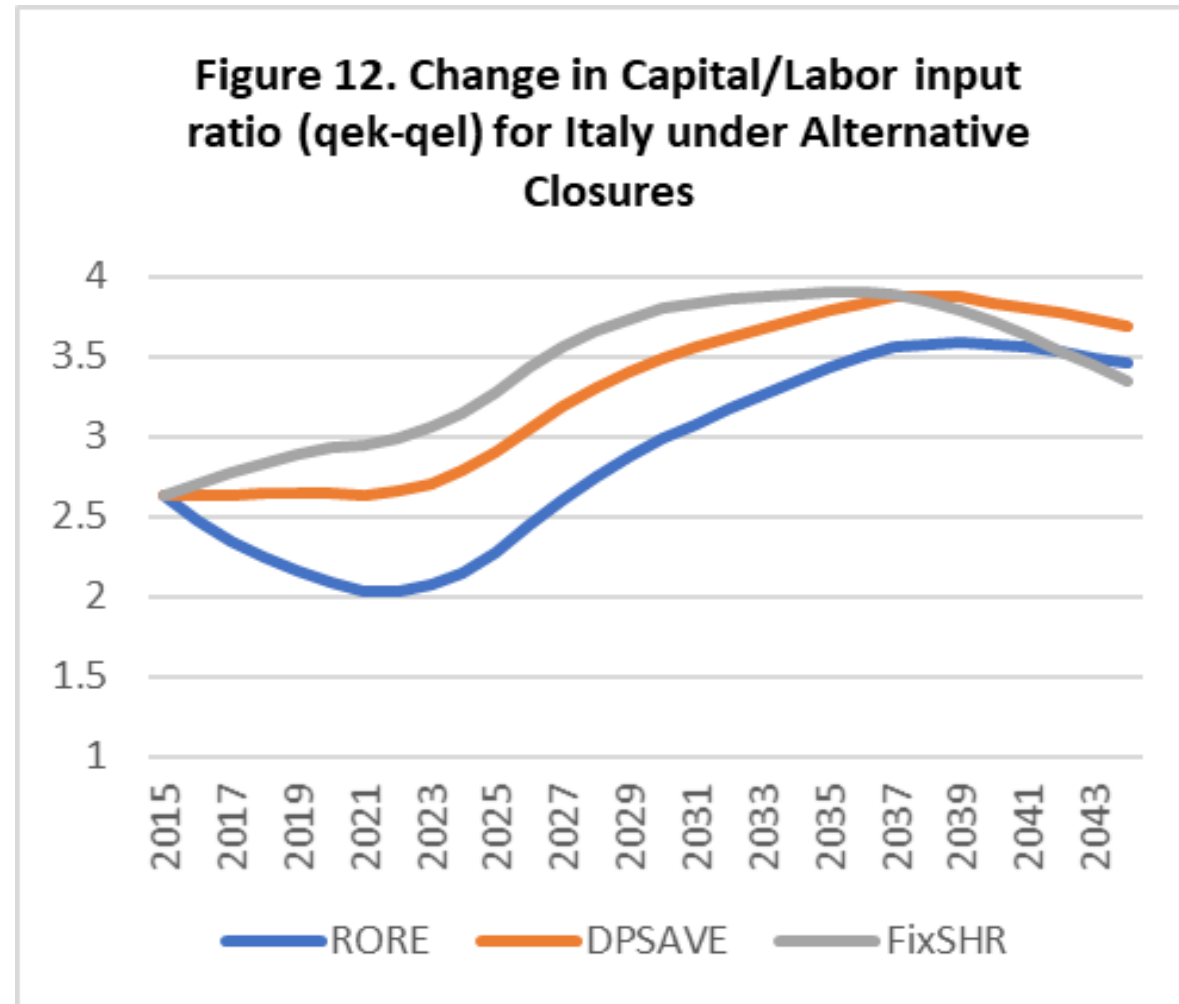


Figure 11b. Percent Change in Output of Low Capital Intensity Sectors in Italy under Alternative Closures



Change in Capital-Labor Ratio for Italy



Conclusion

One of the main triggers for the differences in baseline outcomes is that Italy is a slow-growing economy relative to the rest of the world. Differences in regional growth rates causes the macro balances and sectoral structure of a region to diverge widely

In the case of Italy:

- A capital outflow and trade surplus favor the production of tradables relative to nontradables (RORE closure); a capital inflow and trade deficit favor the production of nontradables relative to tradables (FixSHR closure); and a fixed balance of trade favors more balanced growth.
- Differences in output based on tradability is bigger compared to differences in output based on capital intensity