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BETWEEN THEORY AND REALITY: GROWTH ANALYSIS OF ITALY IN THE POST-KEYNESIAN FRAMEWORK

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Between Theory and Reality: Growth analysis of Italy in the Post-Keynesian Framework

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Abstract

This study aims to advance the analysis of Italian economic growth by examining the long-term relationship between autonomous demand and GDP through time series econometrics, while providing a comparative assessment of autonomous demand multipliers. The econometric analyzes support two key conclusions: first, that autonomous demand has been the long-term growth engine in Italy; and second, that the economic slowdown following Italy's accession to the EU may have been driven by the low multiplier values associated with exports.

Keywords: Supermultiplier Model, Italian Economic Growth, Vector Error Correction Model (VECM), Local Projections, Multipliers.

JEL Codes: C32, E12, E62

1 Beyond the Miracle: Tracing the Roots of Italian Stagnation

This article is part of a broader qualitative and quantitative analysis of Italian economic growth and its determinants. The main motivation for the study is Italy's distinct growth trajectory: while it was considered an economic "miracle" during the 1950s and 1960s, it has experienced a slowdown and significant stagnation over the past twenty-five years. Explanations for this phenomenon vary widely, depending on the theoretical perspective adopted. While the mainstream approach has focused on the stagnation of labor productivity, the post-Keynesian perspective has consistently pointed to sluggish demand as the fundamental cause of Italy's economic stagnation.

This study is based mainly on the results of Arena (2025) in the post-Keynesian literature. The article presents a historical and qualitative analysis of Italian growth. This analysis aims not only to contribute to the literature on Italy's economic performance, but also to advance post-Keynesian analysis within the field of Comparative Political Economy (Baccaro and Pontusson (2016), Stockhammer (2022)). It provides what we argue is a thorough case study of Italian growth, enabling comparative assessment with studies on other countries within the same literature.

The analysis in Arena (2025) essentially performs a historical decomposition of Italian growth from 1960 to 2022 using the Supermultiplier model. This approach is used to examine the key contributions from the demand side to growth and analyze them within

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a historical framework. Theoretical decomposition reveals the following results: From the postwar period until 1992, public spending made the largest contribution to growth, although there remains the possibility that other components of demand may also have played a decisive role. From 1993 onward, with the establishment of the European Union, exports not only became the primary contributor to growth, but, in fact, emerged as the dominant factor driving economic expansion, in the face of the slowdown experienced by the other demand components.

Building on this, the article extends the analysis of Italian economic growth by examining both the long-run relationship between autonomous demand and GDP, and the computation of autonomous demand multipliers, prior to investigating the fundamental growth drivers.

The first point of the analysis aims to replicate the work of Girardi and Pariboni (2016) for the United States and expand on that of Barbieri Góes et al. (2024) for European countries, analyzing, through time series methods, the impact of autonomous demand on GDP in Italy from 1960 to 2022. The analysis uses data from AMECO and OECD, which provide the necessary specifications for autonomous demand. The long-term relationship between autonomous demand and production is analyzed with the aim of identifying a potential causal relationship. Specifically, a vector error correction model (VECM) is used to estimate impulse responses to demonstrate that a positive shock in the autonomous demand components generates positive effects on output.

In the second point, the same data are used to study the multipliers of the individual components of autonomous demand and to assess the extent to which they contribute to the effects of a positive shock on GDP (Góes and Deleidi (2022)). This section specifically presents: (1) the analysis of the autonomous demand multiplier, including various robustness checks; (2) the examination of multipliers for individual components of autonomous demand (public expenditure, residential investment, and exports); and (3) a separate historical phase analysis of these multipliers.

The most significant finding emerges particularly from this last analysis: during the period when Italy - due to institutional constraints - primarily relied on exports as its main growth contributor, export multipliers registered the lowest values among all demand components. This phenomenon crucially contributed to the country's economic stagnation.

The article is organized as follows. Section 2 reviews the relevant literature, with a brief discussion of the Supermultiplier model and a non-exhaustive review of the literature on multipliers. Section 3 describes the construction of the autonomous demand time series and provides a descriptive analysis. Section 4 presents the VECM analysis and associated impulse response functions (IRFs). Section 5 examines the multipliers of autonomous demand and its components. Finally, Section 6 concludes with key findings and implications.

2 Theoretical Foundations: The Supermultiplier Model and Multiplier Analysis

2.1 The Supermultiplier model

The theoretical framework used in this article is the Supermultiplier model, a demand-driven growth model formalized by Serrano (1995), enriched by formal treatment and the demonstration of stability of Freitas and Serrano (2015). The model states that the growth of a country is driven by its autonomous components of the demand; a particular role is essentially played by public spending, autonomous consumption and exports, or rather that component of demand which does not depend directly or mechanically on the determination of output and does not create productive capacity.

The greatest potential of the Supermultiplier model lies in its ability to reconcile three fundamental principles: demand-driven growth, exogenous distribution, and the tendency towards normal use of production capacity. The key equations of the model are listed below, they refer to an open economy with the public sector.

In the following equations, Y is the aggregate product and M are the imports. C_H is the consumption of households, I_{PE} are the investments of companies, I_H are the residential investments[1]. G_c and G_I are, respectively, government consumption and government investments, and X are exports. μ represents the complement to the share of imports in demand. The sixth equation is the equilibrium condition between supply and demand; α is particularly important as a representation of the Supermultiplier.

$$Y + M = C_H + I_{PE} + I_H + G_C + G_I + X \tag{1}$$

$$M = (1 - \mu)(C_H + I_{PE} + I_H + G_C + G_I + X) \tag{2}$$

$$C_H = cY \tag{3}$$

$$I_{PE} = hY \tag{4}$$

$$Z = I_H + G_C + G_I + X \tag{5}$$

$$Y^* = \frac{\mu}{1 - \mu(c + h)} Z = \alpha Z \tag{6}$$

$$\alpha = \frac{\mu}{1 - \mu(c + h)} \tag{7}$$

The first equation defines the equilibrium in the goods market, requiring domestic output to match demand for domestically produced goods and services; in the second, it is assumed that imports are a direct function of income. The third equation represents income-induced consumption, and the fourth is the accelerator theory for investments: that is, investments by private companies have the function of adapting their production capacity to market demands and therefore are a direct function, through the flexible parameter of the propensity to invest h, of production. Equation (5) recalls the composition of the autonomous demand, the sixth the equilibrium condition of the model, and the seventh, as already mentioned, the Supermultiplier.

It is important to note that Equation (6) does not necessarily imply that plants are always operating at their normal degree of capacity utilization. However, a tendency towards the latter is assumed to be at work. Firms therefore adjust their investments, by changing the investment share, when they observe long-term discrepancies between the actual utilization rate and the desired rate according to Equation (8):

$$\dot{h} = h_t \gamma (u_t - 1) \tag{8}$$

[1] In the national accounts, this component is classified under investments. However, in the reference literature, it is instead treated as the consumption of a durable good and included in autonomous consumption. Autonomous consumption usually, consists of residential investments and credit-financed consumption. The latter is not considered in the model, because the data are not available

where γ represents firms' responsiveness parameter, and the normal utilization rate u_n is standardized to 1.
Let us now examine the dynamic system and the equations that represent long-run equilibrium.

$$\dot{u} = u_t(g_t^Y - g_t^K) \tag{9}$$

Equation (8) represents the dynamics of capacity utilization. From Equations (6) and (4), the output growth rate, Equation (10), and the capital accumulation rate, Equation (11), are derived.

$$g_t^Y = g_t^Z + \dot{h}\left(\frac{\mu}{1-\mu(c+h)}\right) \tag{10}$$

$$g_t^K = \frac{h_t u_t}{v-\delta} \tag{11}$$

By substituting Equations (10) and (11) into Equation (9), and setting $\dot{h} = \dot{u} = 0$, one obtain demand-led equilibrium growth driven by autonomous demand.

$$g_t^Y = g_t^K = g_t^Z \tag{12}$$

$$u_t = u_n = 1 \tag{13}$$

$$h^{eq} = v(g_t^Z + \delta) \tag{14}$$

If the autonomous demand growth rate is sufficiently stable and firms adapt their productive capacity toward normal utilization (without implying this is consistently the actual utilization rate), then output growth is demand-determined.

The model thus constitutes a demand-led growth framework that: successfully extends Keynes's principle of effective demand to the long run; reconciles the tendency towards normal utilization with exogenous distribution; avoids Harrodian instability.

2.2 Deriving multipliers

Macroeconometric literature generally employs VAR models or local projection methods to assess the effects of policy-driven changes on these variables.

More specifically, the literature has predominantly focused on estimating fiscal and monetary multipliers and their effects on GDP or other macroeconomic indicators, while paying less attention to: (1) the long-run relationship between demand and GDP, which constitutes the primary focus of the first part of this paper; (2) the estimation of aggregate autonomous demand multipliers; and (3) comparative analyses of multipliers for individual demand components.

Section 4 specifically references the VECM (Vector Error Correction Model) analysis used by Girardi and Pariboni (2016) and Barbieri Góes et al. (2024) to establish long-run causality from autonomous demand to GDP, following the Supermultiplier model framework.

When applying VECM, it is essential to take into account Engle and Granger (1987), Johansen (1988) and Johansen (1991) for the analysis of cointegration and Lütkepohl (2005) and Kilian and Lütkepohl (2017) for the structure of VECM.

When it comes to estimating multipliers, the primary methods of reference are VAR (Vector Autoregression) models and local projections, along with the associated shock identification techniques.

Structural Vector Autoregression (SVAR) models are a cornerstone of empirical macroeconomics, enabling researchers to analyze the dynamic effects of economic shocks. The focus here is on fiscal multipliers. However, their validity hinges critically on the chosen identification strategy, that is the method used to disentangle causal relationships among variables. The most prominent identification techniques are listed below.

First, the recursive approach, based on a Cholesky decomposition, imposes a causal ordering on variables, assuming that some respond to shocks only with a lag. This method is straightforward but controversial, as the results depend heavily on the ordered chosen (Ciaffi et al. (2024)). Second, Blanchard and Perotti (2002) fiscal SVAR, which uses institutional information on tax and spending policies to identify exogenous fiscal shocks. Their approach combines timing restrictions (e.g., assuming fiscal variables do not respond to GDP within a quarter) with elasticity calibrations (Perotti (2005), Giordano et al. (2007)). Third, sign restrictions. It offers greater flexibility by imposing theoretically motivated constraints on the direction (but not the magnitude) of impulse responses. Although this method avoids arbitrary ordering assumptions, it is criticized for generating multiple plausible shock structures, requiring additional criteria to narrow the results (Mountford and Uhlig (2009)). Narrative identification, as the fourth method, uses historical accounts to isolate exogenous shocks, while proxy SVARs employ external instruments as shock proxies. This approach improves credibility, but depends on the quality and exogeneity of the instruments (on this Romer and Romer (2010), Ramey (2011), Alesina et al. (2015) Ramey and Zubairy (2018)).

The need to relax the restrictive assumptions imposed by SVAR models and their identification strategies has led many economists to adopt an alternative method to estimate fiscal multipliers and generate impulse response functions (Auerbach and Gorodnichenko (2012), Auerbach and Gorodnichenko (2017), Ramey and Zubairy (2018), Ciaffi et al. (2024)). Local Projections (LP), introduced by Jordà (2005), have gained widespread popularity as a more flexible approach to computing IRFs, thanks to some key advantages. First, unlike SVARs, LP does not require stringent assumptions about shock propagation or long-run restrictions. Second, LP accommodates better nonlinearities and state-dependent effects than VAR. Third, SVARs are sensitive to lag selection and incorrect identification. LP estimates each horizon separately, reducing bias from dynamic misspecification. Fourth, LP is particularly usefull because it can incorporate proxy variables or sign restrictions while maintaining flexibility.

In conclusion, while SVARs remain valuable for certain applications, Local Projections offer a compelling alternative by trading some statistical efficiency for greater flexibility and robustness. Section 5 employs the Local Projections method to estimate and compare multipliers across different components of autonomous demand (Public spending, Residential Investments and Exports) while accounting for distinct historical regimes.

3 Setting the Scene: The Evolution of Italian GDP and Autonomous Demand

3.1 Construction of autonomous demand

In order to perform the tests, we use the annual time series taken from the AMECO database and the OECD one.

From the first source, we consider the series of: GDP, Final demand, Private final consumption expenditure, Total final consumption expenditure of general governments, Change in inventories and net acquisition of valuable, Exports and Imports. Each variable is considered at constant prices, with 2015 as the base year. The time series referring to investments are taken from the OECD database[2]. By working the variables relating to the investments, one obtains: private nonresidential investments, the variable that describes what in the theoretical literature is synthetically called investment, and which is the part of demand responsible for accumulating productive capacity made by firms; residential investments, which according to the literature is one of the autonomous components of the demand; public investments, which represent another part of the autonomous component of public spending, and therefore of autonomous demand.

3.2 The Italian Economy

Before turning to macroeconometric analysis, consider Figures 1 and 2, which display the annual time series of GDP and autonomous demand along with their annual growth rates from 1960 to 2022.

In Figure 1, the blue line represents GDP and the red line autonomous demand. Both exhibit an upward trend that begins to slow down in the late 1990s, followed by a period of economic stagnation after the 2008 crisis. Unsurprisingly, both GDP and autonomous demand exhibit downturns corresponding to the 2009-2012 crisis period and again in 2020.

Turning to the growth rates in Figure 2 (again with GDP in blue and autonomous demand in red), an additional cycle is also identified featuring a sharp negative peak in 1975, coinciding with trade union struggles, oil shocks, and the transition to flexible exchange rates.

Examine now the data and the working hypotheses. After log-transforming the series[3], it becomes evident that GDP and autonomous demand share a parallel trend - a fundamental precondition for the cointegration relationship estimated in Section 4. Figure 2 similarly reveals broadly aligned growth rates, though autonomous demand (red line) exhibits greater volatility. Supporting the relationship between growth rates, the correlation coefficient between GDP growth and autonomous demand growth is very high, approximately 0.78.

This hypothesis - specifically, the identification of a common trend and the determination of causal direction - constitutes the exact propositions tested in Section 4.

4 Establishing Causality: The Long-Run Link Between Demand and Output

4.1 Methodology

This fourth section marks the first stage of macroeconometric analysis, which examines the long-term relationship between GDP and autonomous demand. Specifically, as anticipated, we analyze whether the growth rates of GDP and autonomous demand share a common trend, as hypothesized in Serrano's model, and attempt to determine the direction of causality.

[2] For further details, see annex A.1.

[3] See Figure 35 in annex A.2.

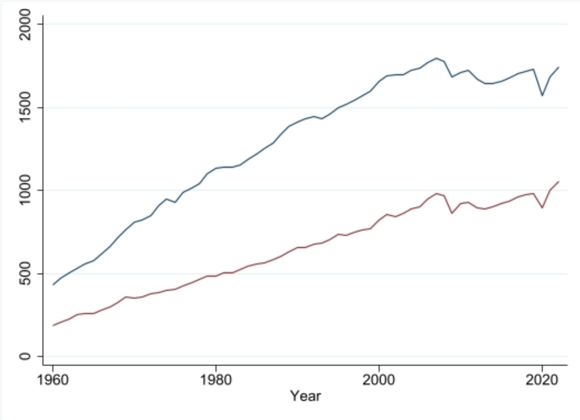

Figure 1: Time series of Gross Domestic Product in blue and for Autonomous demand in red. Data from AMECO and OECD.

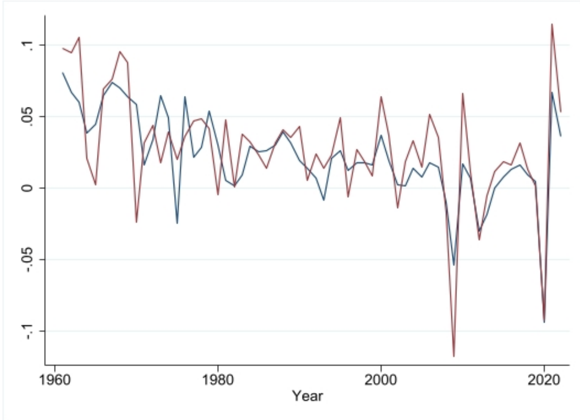

Figure 2: Rate of growth of GDP in blue and of Autonomous demand in red. Data from AMECO and OECD.

For the analysis of the Supermultiplier hypothesis, and to study the effect of the autonomous component of the demand on GDP, we apply the following steps, as in Girardi and Pariboni (2016) and in Barbieri Góes et al. (2024):

- DF test for stationarity
- Johansen test for cointegration
- VECM
- IRF

So, first the stationarity of the time series must be tested in order to investigate the presence of unit-root in the variables, with the Dickey-Fuller test. If the null hypothesis cannot be rejected, the variable is non-stationary. The goal, in order to estimate the parameters using VECM, is to obtain non-stationary series in levels, but stationary in first differences.
From the Dickey-Fuller test in Table 1, it emerges that the series are non-stationary in

Variable	**Levels – T Statistic** (SE)	**First Differences – T Statistic** (SE)
Autonomous Demand (Z)	-0.796 (0.8204)	-6.999 (0.0000)
GDP (Y)	-2.758 (0.0646)	-5.494 (0.0000)
Autonomous Demand (Z) with or without drift	-2.756 (0.2134)	
GDP (Y) with or without drift	-0.828 (0.9632)	

Table 1: Dickey-Fuller test for stationarity. The first two model specifications test for unit roots without drift, while subsequent specifications include models with drift and/or a deterministic trend. Standard Errors in parentheses.

levels and stationary in first differences as hypothesized and required by the model.

Now, the Johansen test is applied in order to verify the relation of cointegration. With this it is tested if the relationship between the two non-stationary series is spurious or cointegrated.

Specification	Rank	Trace Statistics	Selected Rank
Constant trend, lags (1)	1	0.3789	1
Constant trend, lags (2)	1	0.1912	1
None trend, lags (1)	1	1.5079	1
None trend, lags (2)	1	2.8987	1
Linear trend, lags (1)	1	6.6272	-
Linear trend, lags (2)	1	4.9420	-

Table 2: Johansen test for cointegration. The test was performed using multiple model specifications and varying lag lengths to ensure the robustness of the results.

The various specifications of the Johansen test in Table 2 confirm a cointegration relationship between autonomous demand and GDP, except for the one with a linear trend[4].

4.2 VECM

Now that the cointegration hypotheses have been verified, one can proceed to represent two cointegrated series through a bivariate VECM, to estimate the short and the long-term relations, and the direction of causality between autonomous demand (Z) and GDP (GDP).

In the model, the dependent variables are the growth rates of GDP and Z (Equations (16) and (17)), and they are functions of the same lagged variables and the cointegration Equation (15) which represents the long-term relation in the model. This represents the long-term equilibrium condition between demand and supply. The coefficients of the lagged variables represent the short-term effects on the dependent variables of interest.

$$GDP_t = c + \theta Z_t \tag{15}$$

$$\Delta GDP_t = \alpha_0 + \alpha_1(GDP_{t-1} - \theta Z_{t-1} + c) + \alpha_2 \Delta GDP_{t-1} + \alpha_3 \Delta Z_{t-1} + e_{1t} \tag{16}$$

$$\Delta Z_t = \gamma_0 + \gamma_1(GDP_{t-1} - \theta Z_{t-1} + c) + \gamma_2 \Delta Z_{t-1} + \gamma_3 \Delta GDP_{t-1} + e_{2t} \tag{17}$$

The hypotheses to be tested in order to assess the adherence of Italian data to the Supermultiplier model, and consequently to verify the direction of causality between the growth rates of demand and supply, are:

- $\theta = 1$
- $\alpha_1 < 0$
- $\gamma_1 = 0$
- $\alpha_3 > 0$

[4]The use of a linear deterministic trend in Vector Error Correction Models (VECM) is generally not recommended, as argued by Kilian and Lütkepohl (2017).

In particular, the first relationship, if significant, implies that there is cointegration between the two variables. Specifically, if θ is equal to one, it means that in the long run, GDP follows autonomous demand one-to-one and represents the long-term equilibrium condition. The second and third conditions indicate that the direction of causality runs from demand to supply. The fourth indicates the persistence of the effects of demand on supply.

The estimated Vector Error Correction Model (VECM) results are presented in Table 3, reporting the cointegrating equation (long-run relationship), the short-term dynamics and some diagnostics[5]. From the VECM, it emerges that for the equation of GDP growth

	Δ GDP	**Δ Z**		**ce1**
L.ce1	-0.0245***	-0.0232***	GDP	1
	(0.00453)	(0.00697)		
LD.GDP	-0.263	-0.172	Z	1.106***
	(0.182)	(0.281)		(0.35635)
LD.Z	0.181	0.00311	Const	-15.2419
	(0.121)	(0.187)		
Const	-0.00467	0.00493		
	(0.00500)	(0.00769)		
R-sq	0.6243	0.4558		
Observations	61	61		
Standard errors in parentheses				
***p<0.01, **p<0.05, *p<0.1				

Table 3: Vector Error-Correction Model (VECM) for the rate of growth of GDP and the rate of growth of Autonomous Demand. The specification consider the model presented in the equations with a constant. L.ce1 represents α, L is the lag operator. Standard errors are in parentheses.

rate, the R-square is higher compared to that of the autonomous demand growth rate. This reaffirms that the representation of GDP as a function of demand is better than the reverse. Therefore, considering the hypotheses described above, it is evident that all of them are satisfied, except for the third.

The first hypothesis of $\theta = 1$, which represents the long-term cointegration between demand and supply, is verified. The second and third hypotheses represent the idea that causality runs from demand to supply. In this case, $\alpha_1 = -0.0245$ means that it is less than zero and significant, as hypothesized. γ_1 is very small, but still different from zero and significant. The same result is found in Girardi and Pariboni (2016): in a period spanning crisis years, public expenditure may have had a countercyclical effect, thereby impacting this parameter.

It is clear that the hypothesis of no influence from GDP growth rates on autonomous demand growth can only remain a theoretical assumption. In reality, it is implausible that there would be no mutual influence between these variables. However, as highlighted by Girardi and Pariboni, this result must be analyzed in light of two key factors. The study includes recessionary periods where autonomous demand (particularly public spending)

[5]For the specification that considers the reverse ordering of the two variables, see the Table 15 in Annex A.3.

acted as a stabilizer, either supporting or dampening growth in response to GDP fluctuations. However, one should also consider some methodological limitations: Although VECM models capture long-term relationships, short-term causality may be obscured by exogenous shocks. If public spending reacts to economic cycles, the estimated effect of autonomous demand on GDP could reflect reverse causality or policy endogeneity.

These findings still align with Post-Keynesian critiques of unidirectional causality assumptions in mainstream growth models.
Now, compare the first model with the fourth (Table 15) reported in annex A.3, which involves the difference in the ordering of the variables, also as a robustness check. In the first model, it is implicitly assumed that GDP has a higher degree of exogeneity compared to autonomous demand, as the variables are arranged in this order. In contrast, the reversed order in the fourth model reflects the higher exogeneity of autonomous demand relative to GDP.

Note first that the short-term coefficients are robust to the two specifications, meaning that they are almost identical and equally significant, as are the R-squared values. In the equation with GDP as the dependent variable, in both cases, the R-squared is higher. To compare the long-term coefficients, we had to perform a transformation to explicitly express θ as in Equation (15), and again, the parameter is almost identical.

Therefore, this specification is used in the production of the impulse response functions, where a variable ordering is applied, specifically a Cholesky decomposition, which assumes that autonomous demand does not immediately respond to GDP shocks.

4.3 Impulse Response Functions

Examine now the orthogonalized IRFs of the estimated VECM. To obtain them, a restriction is imposed in the identification process. A variable ordering is assumed, with autonomous demand responding with a lag to GDP through Cholesky decomposition, while GDP can respond to contemporaneous changes in autonomous demand. This seems to be the most sensible identification, as autonomous demand is composed of variables that, individually, the literature recognizes as more independent of GDP.

Figure 3 represents the impact of autonomous demand on GDP, while Figure 4 shows the impact of GDP on Z. These exactly confirm the hypotheses made so far, with respect to the greater impact of autonomous demand on GDP compared to the reverse relationship[6].

[6] The results are very similar and consistent with those of the analysis by Girardi and Pariboni (2016). However, due to the limited number of observations compared to their quarterly data, it is not possible to proceed with the analysis of standard errors and confidence intervals in impulse response functions (IRF).

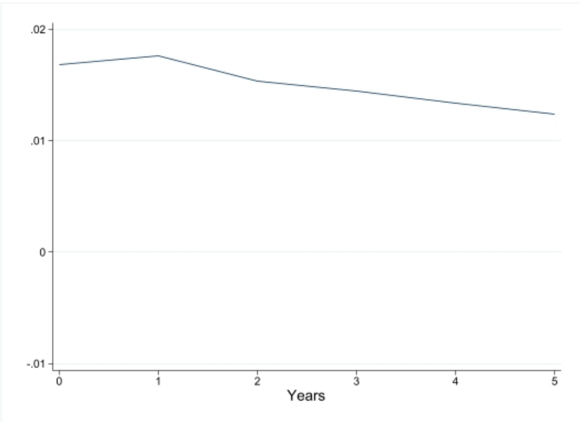

Figure 3: Orthogonalized impulse response function for the impact of the Autonomous Demand on GDP, using the Cholesky decomposition.

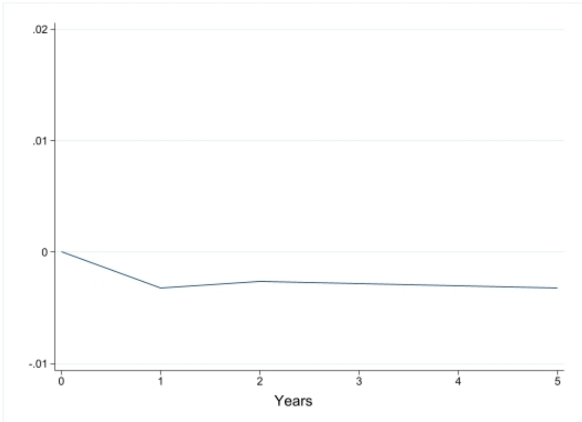

Figure 4: Orthogonalized impulse respose function for the impact of GDP on the Autonomous Demand, using the Cholesky decomposition.

5 Measuring the Impact: A Deep Dive into Autonomous Demand Multipliers

To implement the analysis of Italian growth, this chapter focuses on analyzing the actual measurement of the impact of autonomous demand and then of its individual components on GDP through the study of multipliers. The chapter provides an in-depth analysis, examining the issue in its entirety before segmenting it into historical stages. A rigorous examination of autonomous demand multipliers is essential for advancing causal inference in macroeconomics.

First, using local projections (Jordà (2005)), the autonomous demand multiplier is analyzed in general, and then its individual components.

Recent empirical work in macroeconomics has increasingly favored local projection (LP) methods over traditional vector autoregressions (VARs) for estimating impulse responses and multipliers. This shift reflects several key advantages of the LP approach, particularly when analyzing autonomous demand shocks and fiscal multipliers. First, local projections offer greater flexibility in estimating dynamic effects. Unlike VARs, which impose a rigid lag structure across all variables, LPs estimate each horizon independently through direct projections.

Second, LPs are more robust to model misspecification. VARs can produce biased estimates if the chosen lag length is incorrect or if the data-generating process deviates from the assumed linearity. In contrast, LPs are less sensitive to these issues since they do not rely on a tightly specified dynamical system.

Third, the LP framework simplifies the incorporation of identified structural shocks. While VARs require assumptions about shock propagation (e.g., Cholesky ordering or sign restrictions), LPs allow researchers to directly impose narrative, or external-instrument-based, identification at each horizon, enhancing transparency.

Finally, LPs provide more reliable estimates at longer horizons. VARs accumulate forecasting errors as the horizon extends, whereas LPs project outcomes separately for each period, reducing compounding inaccuracies. This makes them particularly useful for studying the persistent effects of fiscal policy or demand shocks. Although LPs may exhibit higher variance than VARs, their advantages in flexibility, robustness, and transparency have made them the preferred method in modern macroeconomic causal analysis. Their adoption has been particularly influential in refining estimates of fiscal multipliers and testing state-dependent effects in policy transmission.

When analyzing how changes in a component of aggregate demand affect GDP, economists employ three distinct but interrelated concepts: the elasticity, the dynamic multiplier, and the cumulative multiplier. Each of these metrics offers a different lens through which to assess the relationship between demand shocks and economic output, and understanding their differences is crucial for both theoretical and applied macroeconomic analysis.

Elasticity, the natural output when variables are transformed into logarithms in econometric models, measures the percentage change in GDP resulting from a one-percent change in a given demand component. Unlike multipliers, which quantify the absolute change in output per unit of spending, elasticity captures the proportional responsiveness of GDP to shifts in demand. Elasticity has some critical limitations: It does not provide comparable absolute effects across variables because it is unit-free; it does not account for the timing or persistence of these effects, making it a static measure of economic responsiveness.

The dynamic multiplier tracks how the impact of a demand shock on GDP evolves over time. Specifically, it measures the marginal change in output in each subsequent period following a one-unit increase in spending. For example, a dynamic multiplier of 0.5 in the first year indicates that a one-euro increase in government spending raises GDP by 50 cents in that year. The effect may then diminish in subsequent years, reflecting the gradual dissipation of the initial stimulus.

The cumulative multiplier, as defined in Ramey and Zubairy (2018), takes this analysis a step further by calculating the total impact of GDP relative to the total increase in the demand variable itself. Rather than simply summing dynamic multipliers, it divides the cumulative GDP response by the cumulative change in spending (or other demand components) over the same horizon. For example, if a €100 million increase in government spending generates a total GDP increase of €150 million over three years, the cumulative multiplier is 1.5. This approach accounts for potential persistence or reversals in the demand shock itself, such as multiyear spending programs or temporary tax cuts, offering a more precise measure of fiscal effectiveness.

Ultimately, while elasticity offers a snapshot of GDP sensitivity, dynamic and cumulative multipliers provide the motion picture, revealing how demand shocks ripple through the economy over time. The cumulative multiplier, when grounded in the Ramey and Zubairy framework, clarifies the efficiency of demand-side policies by netting out the scale of the intervention itself.

5.1 The Aggregate Effect: How Autonomous Demand Shocks Ripple Through the Economy

First, consider the effect of total autonomous demand on GDP, referring to Figure 6 and Table 4 for elasticities, multipliers, and cumulative multipliers. The equation of the reference model is the following:

$$Y_{t+h} = \alpha_h + \psi_h(L)z_{t-1} + \beta_h shock_t + \epsilon_{t+h} \tag{18}$$

where Y is the variable of interest, in this case, GDP, z is a vector of control variables, $\psi_h(L)$ is an operator in polynomial lags, and shock is the identified shock. In this initial baseline model, the shock is identified through the residuals of the autonomous demand's maximum likelihood function. This approach to identifying first stage shocks is proposed as a methodological tool by Jordà (2005) and Ramey (2016), and applied as an instrumental variable by Stock and Watson (2018). In the robustness checks in the following paragraphs, we also consider another definition of shock. Among the control variables z, the model uses the lagged values of autonomous demand, GDP, and residuals, with $\psi_h(L)$ of order 1. The coefficient β_h represents the response of Y at time $t+h$ to a shock at time t. Using the local projection method, the impulse response functions are constructed as a sequence of the estimated coefficients β from a series of individual regressions for each horizon h. For the calculation of cumulative multipliers, the three-step procedure described in Ramey and Zubairy (2018) is used. Step 1) Estimation of Equation (18) for GDP for each horizon up to h and the sum of β_h. Step 2) estimation of Equation (18) for autonomous demand for each horizon up to h and sum of those β_h. Step 3) calculation of multipliers as response to Step 1) by the answer to Step 2), multiplied by the ex post conversion factor[7].

[7] For a critique of this ex post conversion method, see Ramey and Zubairy (2018). In this case, the use of ex post conversion is still appropriate, as the ratio Y/Z is quite stable over time.

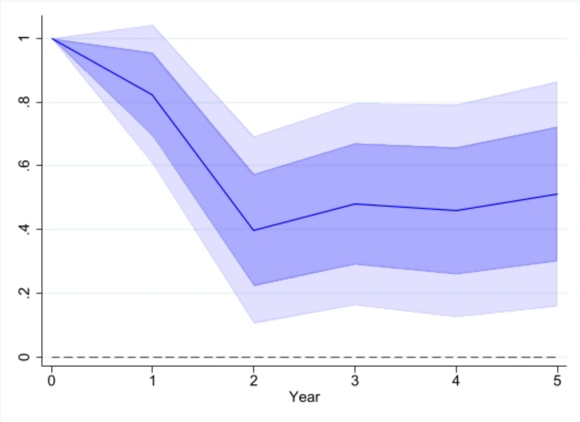

Figure 5: The impact of Autonomous Demand shocks on Autonomous Demand

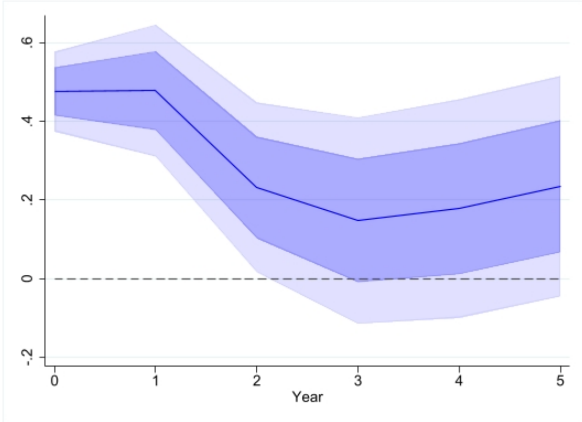

Figure 6: The impact of Autonomous Demand shocks on GDP

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.4757	0.9897	0.9897
1	0.4779	0.9943	1.0876
2	0.2316	0.4819	1.1091
3	0.1477	0.3073	1.0258
4	0.1778	0.3698	0.9939
5	0.2348	0.4884	0.9886

Table 4: Responses, Multipliers and Cumulative multipliers for shocks of the Autonomous Demand on GDP

Analyze the results. From Figure 6 it is evident that the elasticity at impact is positive and significant until the second year. In the second column of Table 4, the multipliers can be observed, and they are approximately 1 for the first two years, before dramatically decreasing in the third year. This means that for every unit of public spending, it generates an increase of one unit of GDP.

Thus, estimates indicate that an increase in autonomous demand plays a significant role in stimulating private sector activity, consistent with the theoretical predictions of the Supermultiplier model.

Even more compelling is the observation of cumulative multipliers, that is, the total effect on GDP up to period h relative to the total change in autonomous demand up to period h that consistently remain close to unity, with the largest impact occurring in the third period.

To check the robustness of the results obtained, the following sections consider different specifications, particularly an alternative definition of autonomous demand shock and the inclusion of additional lags in the model specification.

5.1.1 Changing the definition of shocks

Let's verify the robustness of the results by checking whether changing the definition of autonomous demand shock alters the results of the previous analysis. In this case, the independent shock variable is identified by the residuals of Equation (19), where clearly Z_t is the autonomous demand. The shocks are now derived from the OLS residuals of the

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.4756	0.9895	0.9895
1	0.4821	1.0030	1.0923
2	0.2694	0.5604	1.1483
3	0.1719	0.3575	1.0766
4	0.2014	0.4190	1.0529
5	0.2660	0.5534	1.0570

Table 5: Responses, Multipliers and Cumulative multipliers for OLS shocks of Autonomous Demand on GDP

autonomous demand.

$$Z_t = \gamma_t + \delta_t Z_{t-1} + \zeta_t GDP_{t-1} + \epsilon_t^Z \tag{19}$$

Refer to Figure 8 and Table 5. The different specification of the shock does not change

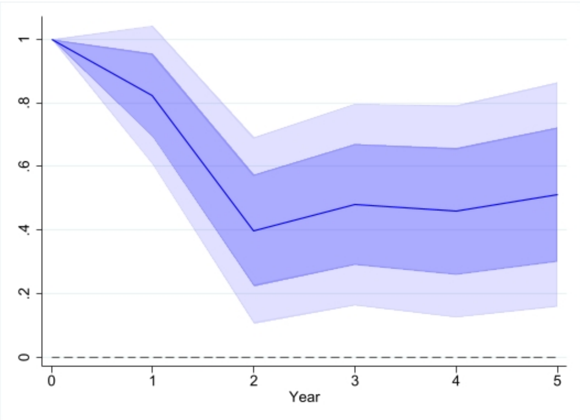

Figure 7: The effect of Autonomous Demand shocks (identified by OLS residuals) on Autonomous Demand

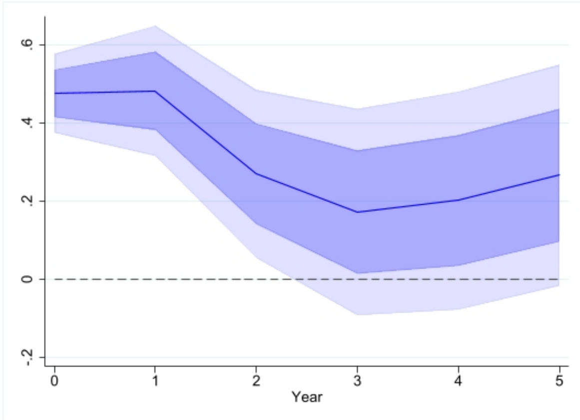

Figure 8: The effect of Autonomous Demand shocks (identified by OLS residuals) on GDP

the results obtained in the previous section. The elasticities are significant up to the second year, and again, the multipliers at impact and in the first period are around 1. The findings on cumulative multipliers remain consistent. The only minor differences are in the multipliers and the cumulative multipliers from the third horizon onward, which are slightly larger [8].

5.1.2 More lags specification

For other robustness checks, let's now consider the specification with more lags, as shown in Figure 10 and Table 6 as suggested in Jordà and Taylor (2025). Again, the results are not significantly different. The elasticities are nearly identical, while for the multipliers, it can be observed that now the highest value is at the impact, rather than in the first period after. Again, the sharpest decline in the multiplier occurs in the third period.

[8] As a further robustness check, we also tested a specification without explicitly modeled shocks, simply including the Z variable directly as the shock in the local projection. The near-identical results imply that both approaches, namely maximum likelihood estimation and residuals of OLS, have limited explanatory power for autonomous demand. These findings confirm the exogeneity of autonomous demand, as neither estimation method contributes significantly to explaining its variation.

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.5256	1.0935	1.0935
1	0.5086	1.0581	1.2398
2	0.3022	0.6287	1.3563
3	0.2877	0.5986	1.3327
4	0.3384	0.7040	1.3501
5	0.3800	0.7905	1.3854

Table 6: Responses, Multipliers and Cumulative multipliers for the Autonomous Demand shocks on GDP, specification with 3 lags

Unlike other specifications, the cumulative multipliers in this model begin at unity and demonstrate stronger growth in later periods.

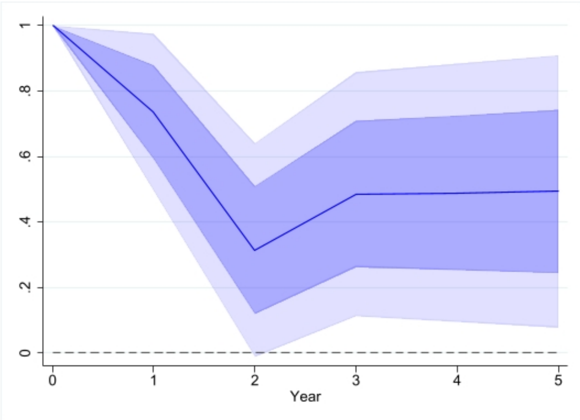

Figure 9: The impact of Autonomous Demand shocks on Autonomous demand considering 3 lags

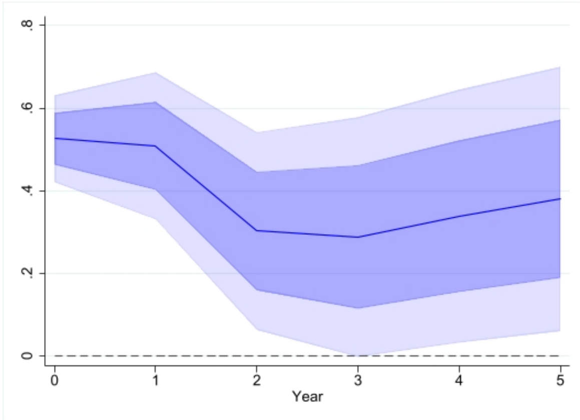

Figure 10: The impact of Autonomous Demand shocks on GDP considering 3 lags

5.1.3 Effect of GDP on Autonomous Demand

In this section, it is analyzed the impact of GDP shocks on autonomous demand, in order to verify the reverse causality. Here, assuming a Cholesky ordering, we suppose that autonomous demand responds to GDP with a one-period delay, as hypothesized in Section 4.3.

The baseline model follows a reverse specification compared to Equation (18), being instead described by Equation (20):

$$Z_{t+h} = \alpha_h^Z + \psi_h^Z(L)z_{t-1} + \beta_h^Z shock_{t-1} + \epsilon_{t+h}^Z \tag{20}$$

where Z is the variable of interest, in this case, the autonomous demand, z is a vector of control variables, $\psi_h^Z(L)$ is the operator in polynomial lags, and shock is the identified shock. The shock is simply identified as the GDP. Among the control variables z, there are lagged values of autonomous demand and GDP. Here, GDP enters the model with a two-period lag. The coefficient β_h^Z represents the response of Z at time $t+h$ to a shock at time $t-1$.

Referring to Figure 12 and Table 7, the Cholesky identification set the impact at time 0 to be null. Subsequently, the results are: no significant effects in all subsequent periods.

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0	0	0
1	-0.1891	-0.0918	-0.0487
2	-0.2525	-0.1225	-0.0884
3	0.1707	0.0828	-0.0410
4	0.0791	0.0384	-0.0237
5	0.1682	0.0816	-0.0025
6	0.0273	0.0132	0.0003

Table 7: Responses, Multipliers and Cumulative multipliers for GDP on Autonomous Demand considering a lagged response

Multipliers are negative for the first two periods and positive from period 3, albeit always small in magnitude. All cumulative multipliers show negative values of limited magnitude, except in the final period.

In light of this comparison between the two models, Figure 6 and Figure 12, it can be reiterated the conclusion drawn in Section 4.3. The evidence suggests that the direction of causality is more likely to run from autonomous demand to GDP rather than the reverse.

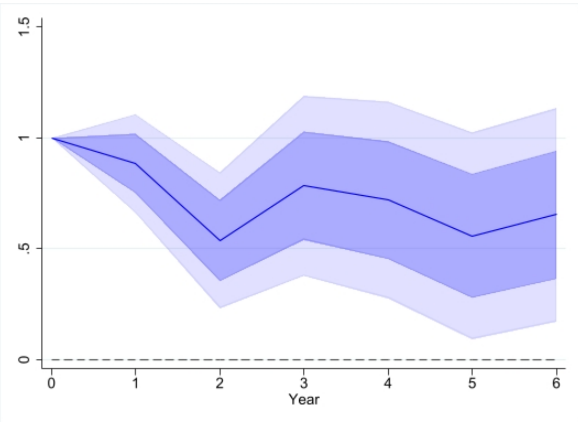

Figure 11: The impact of GDP on GDP

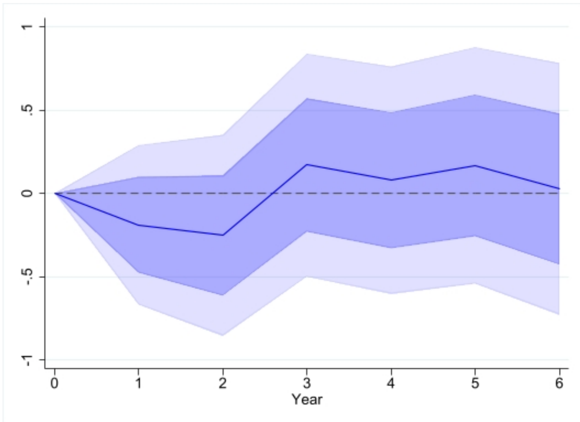

Figure 12: The impact of GDP on Autonomous Demand considering a lagged response

5.1.4 A Tale of Two Eras: How Multipliers Shifted After 1992

This subsection examines the autonomous demand multiplier by dividing the analysis into two distinct historical phases, a separation that is also applied to the individual multipliers.

The need for this historical division arises from several key factors. First, the two periods identified in the historical decomposition of Italian growth presented in Arena (2025), exhibit markedly different economic dynamics. The first phase is characterized by strong, sustained growth, while the second see a stagnant economy. Moreover, the composition of autonomous demand components contributing to growth shifted radically. In the first phase, public spending is the primary contributor of growth (though other components also played active roles), whereas in the second phase, exports emerge as the sole significant contributor. The same historical decomposition identifies 1992 as the

Horizon	Elasticities 1960-1992	Elasticities 1992-2022	Multipliers 1960-1992	Multipliers 1993-2022	Cumulative Multipliers 1960-1992	Cumulative Multipliers 1993-2022
0	0.2495	0.5923	0.5594	1.1267	0.5594	1.1267
1	0.4316	0.4608	0.9678	0.8765	0.7617	1.2185
2	0.4718	0.0694	1.0578	0.1321	0.9278	1.2258
3	0.241	0.1330	0.54194	0.2530	0.9122	1.1138
4	0.1588	0.2201	0.3561	0.4187	0.9236	1.0576
5	0.3614	0.1441	0.8102	0.2742	0.9758	1.0221

Table 8: Responses, Multipliers and Cumulative multipliers for Autonomous Demand shocks on GDP divided for the historical phases

turning point for this structural shift. Crucially, it is during Italy's institutional entry into the European Union that the country's growth paradigm fundamentally changes, justifying a comparative historical analysis of the multipliers.

This approach also aligns with multiplier studies that emphasize how multipliers are determined by cyclical economic conditions (expansion vs. recession), (Auerbach and Gorodnichenko (2012), Auerbach and Gorodnichenko (2017), Ramey and Zubairy (2018)).

Finally, this approach also helps mitigate potential criticisms of ex-post multiplier conversion (Ramey and Zubairy (2018)), which in this case remains plausible, by introducing two distinct conversion factors for two different historical periods.

Refer to Figures 14 and 16. These illustrate the stark contrast between the two phases. In the first phase, the effect of autonomous demand on GDP appears far weaker, yet relatively stable over time. In contrast, the second phase shows a significantly stronger initial impact, but by Horizon 2 (i.e., two years after the shock), the elasticity becomes statistically indistinguishable from zero.

This pattern is mirrored in the multipliers in Table 8: while the initial impulse is markedly higher in the second phase, the values in subsequent horizons are almost consistently larger in the first phase. The same cannot be said for cumulative multipliers, which remain above unity only in the second period of analysis.

These findings align with studies showing higher multipliers during economic recessions. In historical periods marked by underemployment and idle productive capacity, as observed in the current era, the marginal effect of an additional (or reduced) unit of autonomous demand exerts a more pronounced impact (or recessionary drag) on GDP compared to periods of sustained expansion.

5.2 Dissecting the Engine: Public Spending, Exports, and Residential Investment

The following subsections focus on analyzing the multipliers of individual autonomous demand components, beginning with fiscal multipliers. The methodology remains consistent throughout, employing: local projection techniques for impulse response function analysis; three-step procedure for the calculation of the multipliers.

This study offers several novel contributions to the literature on fiscal multipliers and autonomous demand components on the Italian case. First, it employs an exceptionally

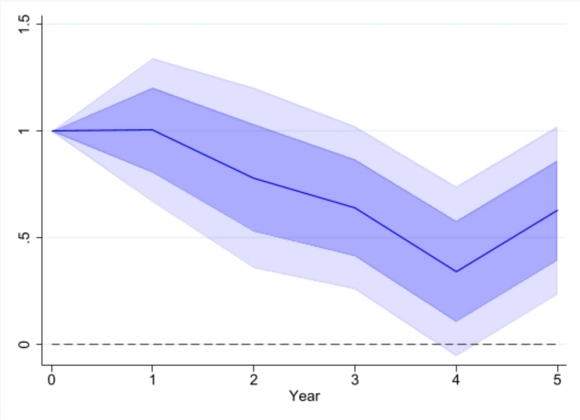

Figure 13: The impact of Autonomous Demand shocks on Autonomous Demand for the period 1960-1992

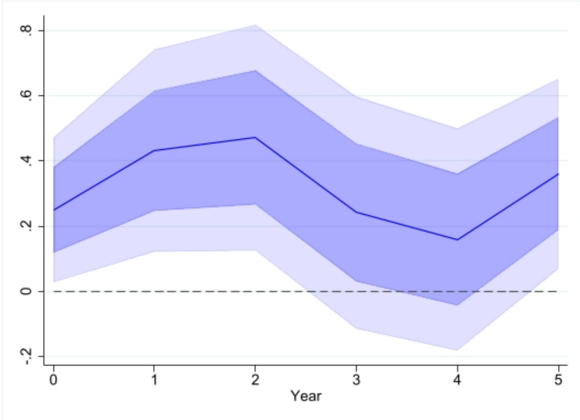

Figure 14: The impact of Autonomous Demand shocks on GDP for the period 1960-1992

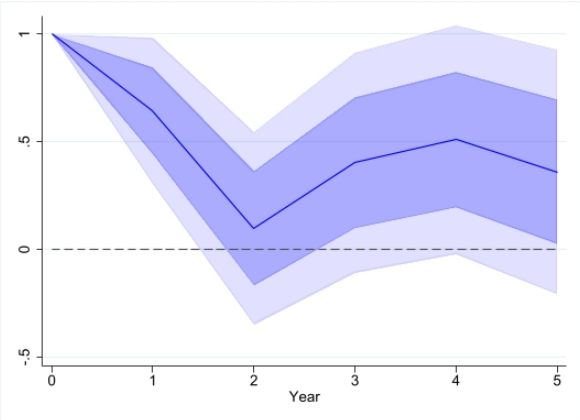

Figure 15: The impact of Autonomous Demand shocks on Autonomous Demand for the period 1993-2022

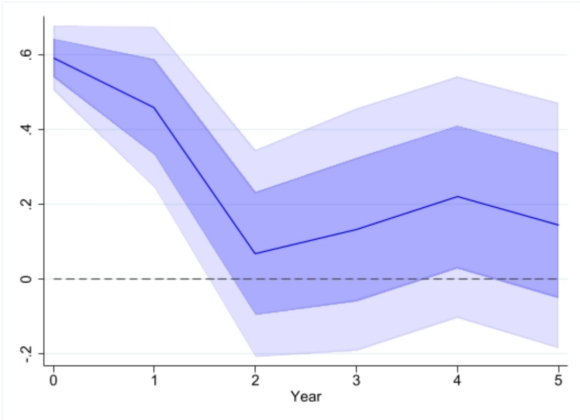

Figure 16: The impact of Autonomous Demand shocks on GDP for the period 1993-2022

long historical time series that spans multiple business cycle phases, allowing for a more comprehensive assessment of how multipliers behave under different economic conditions.

Second, the analysis adopts a phase-differentiated approach, providing targeted insights into the specific roles of public expenditure and exports as drivers of growth in the different phases highlighted in the growth decomposition.

The combination of an extended time horizon, phase-specific analysis, and component-level examination represents a significant advance in understanding the dynamics of Italian economic growth.

We are aware that standard analyses in this field typically incorporate additional controls, particularly for monetary policy and exchange rate effects, but this study adopts a distinct approach. Rather than pursuing precise point estimates of fiscal, residential investment, and export multipliers, its primary objective is to establish comparable relative measures across demand components and historical phases.

5.2.1 The Fiscal Lever

Now, let's examine the fiscal multipliers calculated using the procedure already explained. In this case as well, it does not seem unrealistic to employ ex-post conversion, given that

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.2307	1.0492	1.0401
1	0.4404	2.0025	1.4806
2	0.3805	1.7303	1.3371
3	0.2543	1.1566	1.1797
4	0.2778	1.2630	1.1242
5	-0.0971	-0.4414	0.8892

Table 9: Responses, Multipliers and Cumulative multipliers for Public Spending shocks on GDP

the conversion factor, that is the ratio GDP/G, remains fairly stable over time.

The results obtained from the impact multiplier and, particularly, the cumulative multipliers are consistent with those studies suggesting fiscal multipliers approaching one, and significantly larger effects in times of economic depression.

The impulse response function, shown in Figure 18, shows that a fiscal policy shock generates a positive and statistically significant effect at the level 68% for up to two years after the shock. These findings are further confirmed by alternative model specifications[9].

Table 9 reports both impact multipliers and cumulative multipliers. The estimates reveal a cumulative impact multiplier greater than one, an effect that persists over the next three years.

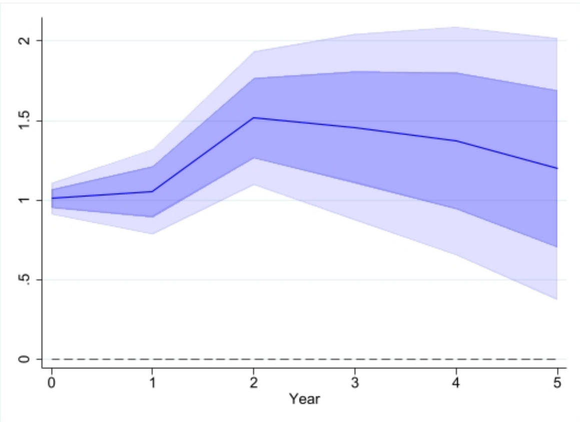

Figure 17: The impact of Public Spending shocks on Public Spending

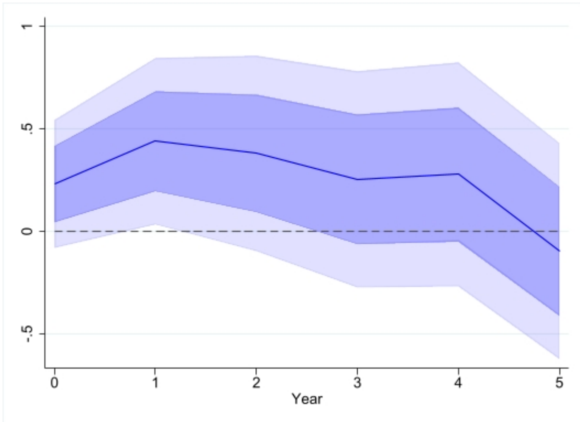

Figure 18: The impact of Public Spending shocks on GDP

Let's now turn to the analysis of fiscal multipliers, divided into the two historical phases. As discussed previously, the choice of 1992 as the breaking point stems from the analysis of the historical decomposition of Italian growth. This year is identified as the point when, due to Italy's entry into the European Union and the implementation of European rules, the contributions of autonomous demand components to growth change significantly.

Figures 20 and 22, and Table 10 present the results of this breakdown. The proposed methodology aligns with the literature on state-dependent fiscal multipliers (usually estimated via nonlinear SVAR/LP frameworks). Specifically, this analysis compares fiscal

[9]When employing the three-lag specification, we find moderately larger fiscal multipliers (excluding periods 1-2) and more persistent effects - with elasticities statistically significant (68% CL) through period 4 versus period 2 in the baseline specification. Even when omitting the lags in public spending, residential investment, and exports from the controls, the results show elasticity and multiplier estimates comparable to those of the baseline and the more comprehensive lag specification.

multipliers during an initial period of stable and sustained growth with those during a subsequent phase of economic stagnation.

The breakdown yields highly informative results, consistent with studies finding larger multipliers during recessions. In particular, the significance of impact multipliers and those in the immediate aftermath appears to hinge almost entirely on the second historical phase. In the first phase, the impact multiplier remains statistically insignificant and close to zero. Another key difference is that multipliers in the early phase exhibit fluctuating effects across periods, whereas in the second phase, after the spike in horizon 1, they decline monotonically.

However, the focus should be on cumulative multipliers. It is precisely in the second phase, extending to the present, that cumulative multipliers reach their highest values. These findings have critical policy implications. First, they suggest that in the current stagnant environment, fiscal policy could exert non-negligible effects on GDP and, consequently, employment[10]. Second, they imply that negative public spending shocks (a lesson from the GFC and sovereign debt crises) would have, and may have had, devastating cumulative effects on the Italian economy.

Let's now focus on the historical analysis of the causes underlying the different multipliers for the two historical phases. The lower fiscal multipliers in Italy during the 1960-1992 period, compared to the 1993-2022 period, can be attributed to several structural and macroeconomic factors that shaped the effectiveness of fiscal policy in these two distinct eras.

During the earlier period, Italy experienced strong economic growth, often referred to as the Italian economic miracle, which meant the economy was frequently operating near full capacity, reducing the impact of fiscal stimulus because there were fewer idle resources to mobilize.

The higher multipliers in the second period could also reflect the depressive effect of the major austerity policies that followed Italy's entry into the European Union and the Great Financial Crisis, as well as the procyclicality of public spending during this period, which further exacerbated the downturn, thereby reinforcing the negative role of multipliers during recessions.

Moreover, when Italy joined the European Monetary Union, it relinquished two critical policy tools: monetary autonomy and exchange rate flexibility. Before the euro, Italy could respond to economic shocks by devaluing the lira (boosting competitiveness) or adjusting interest rates (stimulating demand). However, under the EMU, these mechanisms disappeared, leaving fiscal policy as the only remaining (limited) lever for macroeconomic stabilization. The larger impact, and hence the value of larger multipliers, may not reflect a better policy design, but the absence of alternative policy instruments, and hence the importance they now have.

Finally, the composition of public spending in the second period could have influenced the determination of multipliers. In particular, some measures such as the minimum income guaranteed or the Superbonus, which are measures aimed directly at supporting demand, could have improved the multiplicative effect of public spending.

[10] The conjunction of these results with Ciaffi et al. (2024)'s findings regarding fiscal policy impacts on public debt further supports the argument for expansionary fiscal measures.

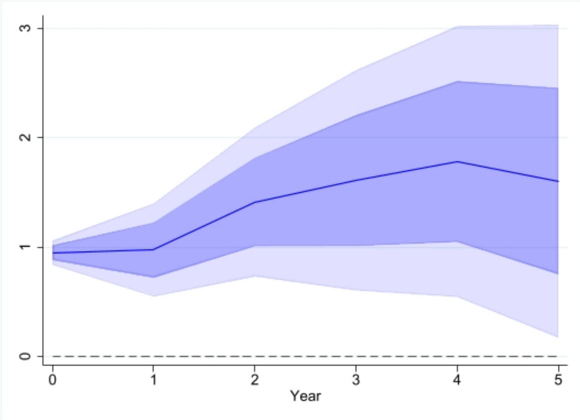

Figure 19: The impact of Public Spending shocks on Public Spending for the period 1960-1992

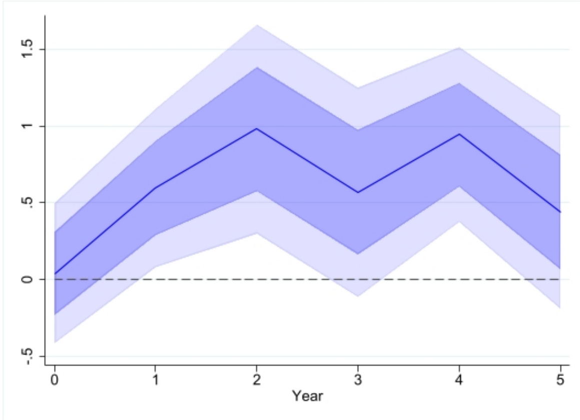

Figure 20: The impact of Public Spending shocks on GDP for the period 1960-1992

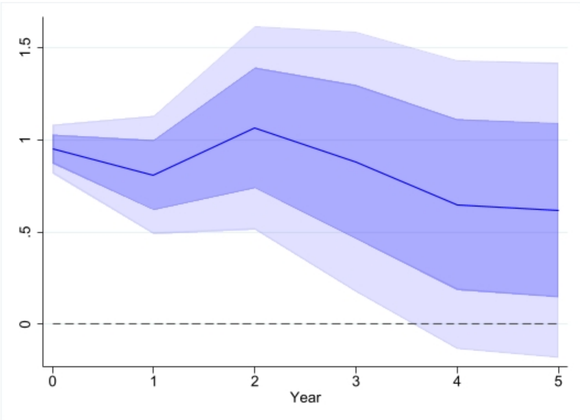

Figure 21: The impact of Public Spending shocks on Public Spending for the period 1993-2022

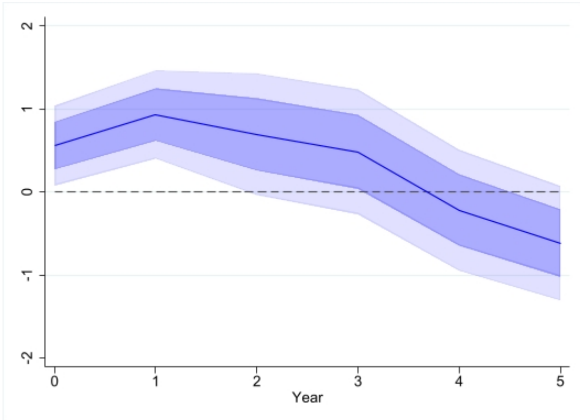

Figure 22: The impact of Public Spending shocks on GDP for the period 1993-2022

5.2.2 The Housing Catalyst

This section focuses on the analysis of residential investments. The procedure for calculating the multipliers remains the same. Refer to Figure 24 and Table 11 for details. From the IRF, it can be observed that a positive shock to residential investments has a significant and positive impact, which persists (at a 68% confidence level) until the second year following the shock.

From the table, it emerges that both the dynamic and cumulative multipliers for residential investments are very high, exceeding 3 at impact and in the first subsequent period. Interestingly, there is a sharp decrease in the fourth period, with the multiplier falling to approximately -2.6[11].

This result is not unusual for residential investments, and the accounting rationale lies in the high value of the conversion factor. However, the underlying causes can be traced to the nature of the expenditures typically generated by residential investments.

Specifically, residential investments tend to be labor intensive and require greater em-

[11] When employing the three-lag specification, we find moderately larger dynamic and cumulative multipliers. Even when omitting lags of public spending, residential investment, and exports from the controls, the results show comparable elasticity. In contrast, the multipliers in this specification from period two onward change substantially, exhibiting significantly higher values (for both dynamic and cumulative multipliers).

Horizon	Elasticities 1960-1992	Elasticities 1992-2022	Multipliers 1960-1992	Multipliers 1993-2022	Cumulative Multipliers 1960-1992	Cumulative Multipliers 1993-2022
0	0.0404	0.5593	0.1816	2.5725	0.1915	2.7080
1	0.5962	0.9345	2.6827	4.2982	1.4923	3.9051
2	0.9792	0.6949	4.4059	3.1962	2.1828	3.5644
3	0.5687	0.4832	2.5587	2.2226	1.9904	3.3169
4	0.9435	-0.2193	4.2450	-1.0088	2.0946	2.5907
5	0.4399	-0.6161	1.9790	-2.8338	1.9295	1.6986

Table 10: Responses, Multipliers and Cumulative multipliers for Public Spending shocks on GDP divided for the historical phases

ployment compared to other types of spending. Additionally, they entail expenditures across many related sectors due to a longer and more diversified supply chain. In addition, residential investment spending and the demand for housing, particularly in Italy compared to other countries, are structural and less volatile, enabling them to sustain demand more consistently over time.

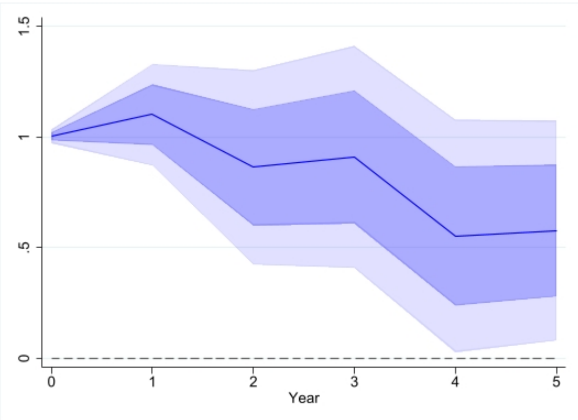

Figure 23: The impact of Residential Investments shocks on Residential Investments

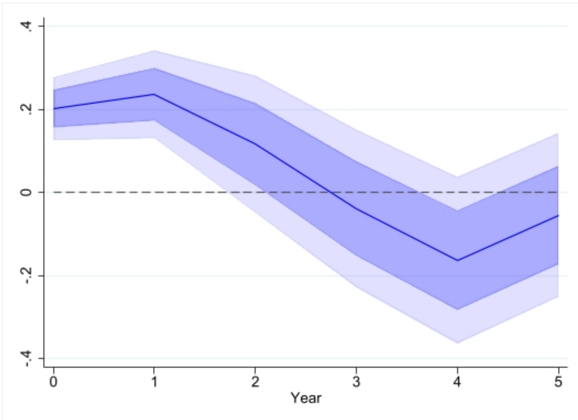

Figure 24: The impact of Residential Investments shocks on GDP

The analysis of residential investment multipliers also adopts the same two-phase historical breakdown. This differentiated approach proves particularly relevant here, as the conversion factor for residential investments differs substantially between periods (approximately 12 in the first phase versus 20 in the second phase[12]). Mirroring the fiscal multiplier results, the estimates appear largely driven by the second historical phase, where multipliers - especially cumulative multipliers - are significantly higher and more statistically significant.

The possible causes of this multiplier growth could lie in the structure of real estate and in the financial markets. The combination of a more developed financial market and higher construction productivity (technology, sustainability) after 1993 probably made residential investments more economically impactful than in the 1960-1992 era. Furthermore, the growing role of real estate services (e.g., property management, brokerage)

[12]Refer to Annex A.4.2 for the assessment of the conversion factor's role.

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.2020	3.1929	3.1801
1	0.2365	3.7377	3.2911
2	0.1161	1.8344	2.9519
3	-0.0386	-0.6106	2.1015
4	-0.1635	-2.5838	1.2565
5	-0.0544	-0.8595	0.9400

Table 11: Responses, Multipliers and Cumulative multipliers for Residential Investments shocks on GDP

Horizon	Elasticities 1960-1992	Elasticities 1992-2022	Multipliers 1960-1992	Multipliers 1993-2022	Cumulative Multipliers 1960-1992	Cumulative Multipliers 1993-2022
0	0.1071	0.2740	1.2935	5.4531	1.3638	5.3221
1	0.1288	0.3210	1.5559	6.3886	1.4838	5.5298
2	0.0510	0.2404	0.6163	4.7838	1.3885	6.1527
3	-0.0864	0.1820	-1.0433	3.6229	0.9181	4.9105
4	-0.1427	-0.0226	-1.7240	-0.4496	0.2961	3.7497
5	0.0581	-0.0140	0.7023	-0.2788	0.6560	2.9404

Table 12: Responses, Multipliers and Cumulative multipliers for Residential Investments shocks on GDP divided for the historical phases

meant that residential investments generated more diversified economic activity, boosting their multiplier effect compared to the earlier period.

These results may also carry significant policy implications for the current period of economic stagnation and for the design of industrial policy measures. The findings should be particularly considered in light of the recent cancellation of the 'Superbonus' fiscal stimulus program[13].

5.2.3 The Weakest Link

This subsection on export multipliers thus concludes the macroeconometric analysis of this article. Once again, from the IRF in Figure 30, a significant positive impact from an export shock can be observed, which remains statistically significant at the confidence level 95% for up to five years after the initial shock. The multipliers, summarized in Table 13 and considering the analysis in its entirety, are consistently close to or greater than 1. In particular, the cumulative effect of an export shock grows year after year, peaks in the fifth period after the shock, a pattern that underscores the enduring and amplifying nature of the export-driven stimulus[14].

Several important observations emerge at this stage. As previously stated in the study's objectives, a comparison of multipliers across different autonomous demand com-

[13] Refer to Annex A.4.1 for the calculation of multipliers that exclude the Superbonus years.

[14] We verify the results of the specifications with additional lags and excluding control variables (except for the lags of the shock). In both cases, we initially find slightly larger multipliers compared to the baseline in period 0, followed by broadly similar values in subsequent periods.

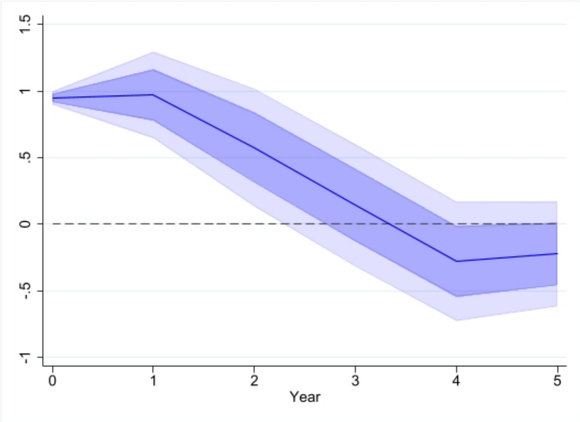

Figure 25: The impact of Residential Investments shocks on Residential Investments for the period 1960-1992

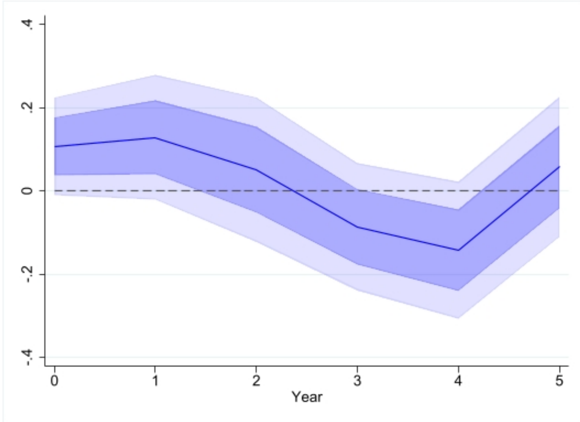

Figure 26: The impact of Residential Investments shocks on GDP for the period 1960-1992

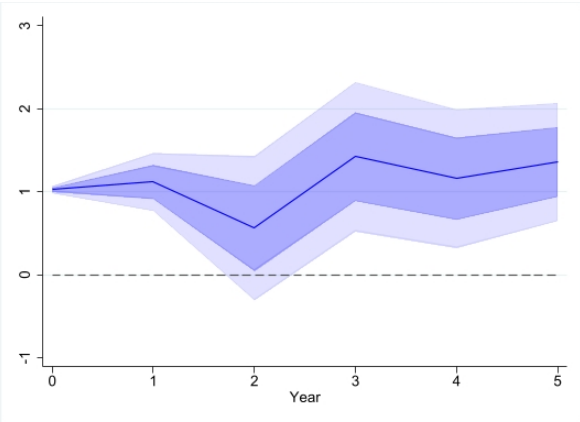

Figure 27: The impact of Residential Investments shocks on Residential Investments for the period 1993-2022

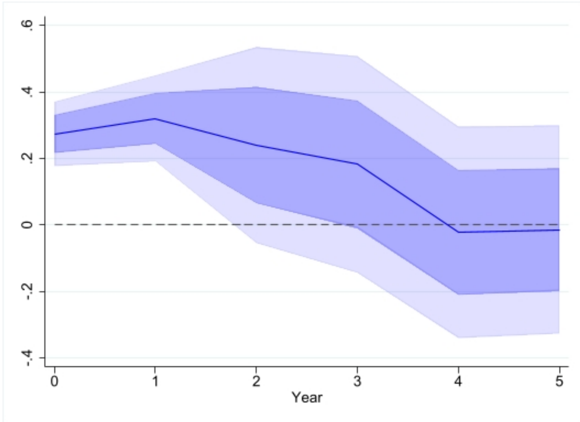

Figure 28: The impact of Residential Investments shocks on GDP for the period 1993-2022

ponents is required, with particular focus on the export versus fiscal multipliers. Residential investment multipliers are temporarily excluded from this comparison for two reasons: (1) the unique expenditure characteristics they generate, and (2) the approximations involved in analyzing the conversion factor discussed in the previous section.

The analysis reveals distinct temporal patterns between the export and fiscal multipliers. Initially, the export multiplier shows a larger impact compared to its fiscal counterpart. However, this relationship undergoes a complete reversal over time, and fiscal stimuli ultimately exhibit greater persistent effects. When examining cumulative effects over the entire 1960-2022 period, export multipliers consistently maintain higher values than fiscal multipliers.

The phase-dependent analysis of export multipliers yields results diametrically opposed to those observed for fiscal and residential investment multipliers in the preceding sections. Although the impact multiplier remains higher in the second historical phase (from 1993), both dynamic and cumulative multipliers of the following horizons demonstrate significantly higher values during the initial phase. The first phase exhibits particularly pronounced effects, while the second phase includes negative peak values. The additional output generated by an export shock is now substantially weaker than that observed thirty years ago. This attenuation suggests structural changes in the way export stimuli propagate through the modern Italian economy compared to the pre-1992 period.

Probably, in the decades following 1992, the multiplier effect of exports weakens not because Italy exports less, but because globalization reshapes the structure of trade, increasing reliance on foreign inputs and reducing the domestic economic spillovers of exports. During the early period, Italy's industrial base is more self-sufficient. The key export sectors (textiles, machinery, and automobiles) rely heavily on domestically produced components, meaning that rising exports stimulate local suppliers, employment, and investment. The result is a high multiplier effect, as export revenues circulate extensively within the Italian economy.

From the 1990s onward, however, deeper global integration alters this dynamic. As supply chains fragment, Italian firms increasingly source intermediate goods from abroad to remain competitive. A "Made in Italy" product, whether a luxury car or a fashion item, now often incorporates imported engines, electronics, or fabrics. Although this kept exports cost-competitive, it also means that a growing share of export earnings is leaking out of the economy[15]. In this sense, an increasing marginal propensity to import "crowds out" the effect of exports on GDP[16].

The analysis concludes by comparing cumulative multipliers across all three autonomous components in the post-1992 period, revealing critical policy insights. The highest multipliers belong to residential investments, whose consequences were analyzed in the preceding section. These findings should guide policymakers in designing industrial policies, particularly given the urgent need to adapt infrastructure for the mitigation of climate change, a context that further amplifies their relevance. The primacy of residential investments multipliers suggest green housing policies could serve dual climate-growth objectives.

The following in magnitude are the public expenditure multipliers, with the export multipliers ranking last. This ordering has significant implications, also in light of the historical decomposition of Italian growth presented in Arena (2025). Since 1993, institutional factors (notably EU accession) have shifted the most important contribution of autonomous demand, from public spending to exports, the component with the weakest multipliers. Crucially, during this period, when exports represented almost 80% of the demand contributions to growth, the economy recorded its lowest growth rates in the entire sample. Under the theoretical framework of the Supermultiplier model, this inverse relationship between export dependence and growth performance reveals a clear causal mechanism: reliance on demand components with low multipliers structurally constrains economic expansion.

[15]This reasoning is consistent and in line with Thirwall's model of the equilibrium balance of payments Thirlwall (2004), where the long-run growth rate is determined by the ratio of the income elasticity of exports and imports.

[16]This finding is consistent with the results on import propensity in Arena (2025), where Figure 4 clearly shows an upward trend.

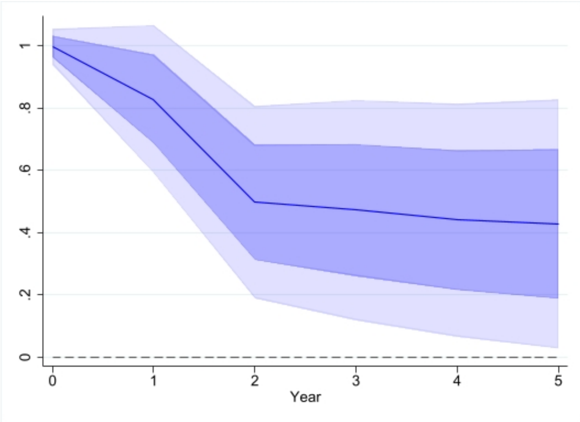

Figure 29: The impact of Exports shocks on Exports

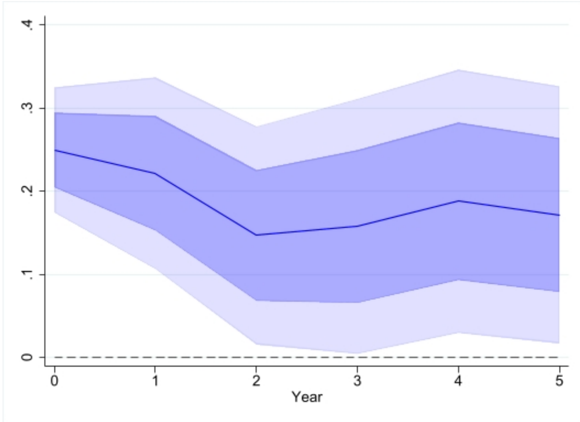

Figure 30: The impact of Exports shocks on GDP

Horizon	Elasticities	Multipliers	Cumulative Multipliers
0	0.2497	1.5713	1.5757
1	0.2217	1.3953	1.6243
2	0.1466	0.9228	1.6732
3	0.1576	0.9918	1.7452
4	0.1879	1.1824	1.8731
5	0.1714	1.0784	1.9485

Table 13: Responses, Multipliers and Cumulative multipliers for Exports shocks on GDP

Horizon	Elasticities 1960-1992	Elasticities 1992-2022	Multipliers 1960-1992	Multipliers 1993-2022	Cumulative Multipliers 1960-1992	Cumulative Multipliers 1993-2022
0	0.1173	0.3792	0.9837	1.5148	1.0546	1.4715
1	0.2176	0.2147	1.8242	0.8577	1.6400	1.4744
2	0.3251	-0.0130	2.7252	-0.0518	2.5036	1.3835
3	0.2193	-0.0037	1.8389	-0.0147	2.9361	1.3437
4	0.0936	0.0979	0.7850	0.3912	3.2223	1.4492
5	0.0626	0.0451	0.5247	0.1803	3.3665	1.4470

Table 14: Responses, Multipliers and Cumulative multipliers for Exports shocks on GDP divided for the historical phases

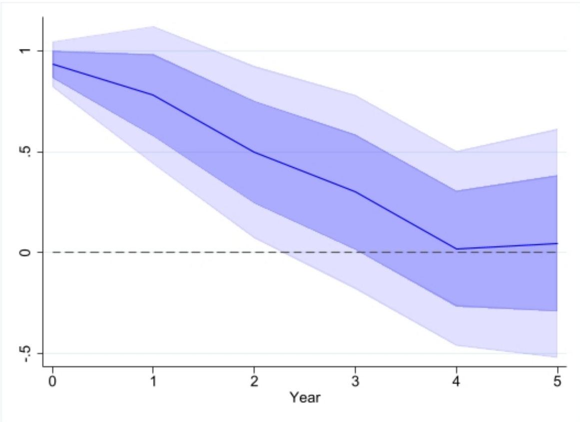

Figure 31: The impact of Exports shocks on Exports for the period 1960-1992

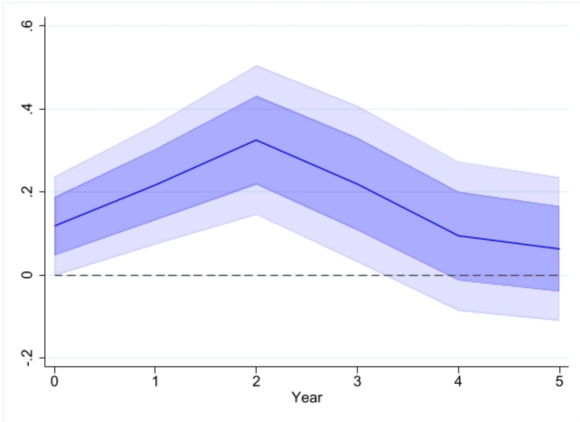

Figure 32: The impact of Exports shocks on GDP for the period 1960-1992

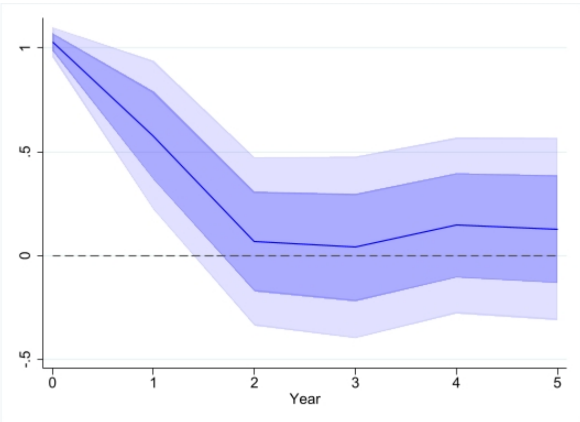

Figure 33: The impact of Exports shocks on Exports for the period 1993-2022

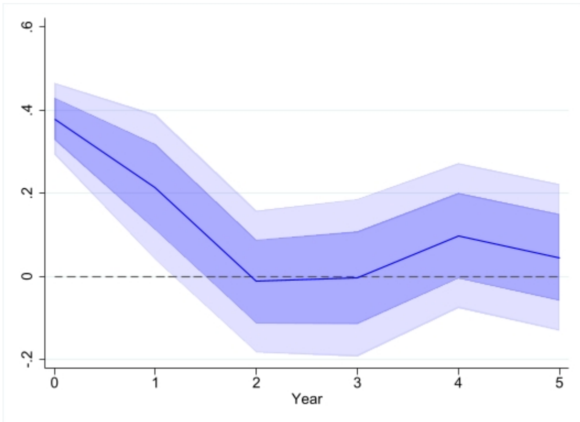

Figure 34: The impact of Exports shocks on GDP for the period 1993-2022

6 Policy Implications: Choosing the Right Tools for a Demand-Led Recovery

In seeking to contribute to the analysis of the Italian economy, this article primarily focuses on two analytical approaches: a VECM (Vector Error Correction Model) analysis to examine the long-term relationship between autonomous demand and GDP in Italy; an investigation of the multipliers of autonomous demand and its components.

The results of the first analysis support the hypotheses of the Supermultiplier model, confirming the long-term causality from autonomous demand to GDP. The VECM estimation demonstrates that growth rate dynamics most plausibly suggests causality running from autonomous demand to GDP, a finding further reinforced by impulse response functions analysis. In the study of autonomous demand multipliers, the direction of causality is again tested, which corroborates the earlier results.

Furthermore, the analysis provides an estimate of the Supermultiplier, quantifying the marginal increase in GDP for a given increase in autonomous demand. This is further differentiated through two distinct historical phases. The analysis reveals that in the current economic stagnation, characterized by underemployment and idle productive capacity, an autonomous demand shock would yield significantly greater impact compared to what would have occurred thirty years ago.

Section 5.2 extends the analysis to the multipliers of individual autonomous demand components over the full historical series, with a key innovative contribution being the examination of such an extended dataset, segmented by the two phases.

This study primarily examines the relative comparison of multipliers between the components of autonomous demand (public expenditure, residential investments, and exports) rather than their precise numerical estimation. This methodology achieves two important goals: first, it employs rigorous statistical methods that meet wide methodological consensus across theoretical traditions; second, it grounds these empirical findings in a demand-led growth framework that properly accounts for the structural features of Italy's economy. This approach provides fresh insights into the structural drivers of Italy's economic outcomes, moving beyond conventional supply-side explanations.

In conclusion, the ordering of the cumulative multiplier of the individual components of the autonomous demand in the post-92 era carries significant implications. After the shift in the autonomous demand most important contributor to GDP, from public spending to exports, Italy had to rely on the component with the weakest multipliers. Under the theoretical framework of the Supermultiplier model, this inverse relationship between export dependence and growth performance reveals a clear causal mechanism: reliance on demand components with low multipliers structurally constrains economic expansion.

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Annex

A.1 Data sources of empirical analysis

- Gross Domestic Product (Y): AMECO database; GDP, at constant prices (OVGD), (constant prices, 2015 as base year).
- Private non-residential consumption (C_H): AMECO database; Private FCE, at constant prices (OCPH), (constant prices, 2015 = 100).
- Public consumption (G_C): AMECO database; Total FCE of general government, at constant prices (OCTG), (constant prices, 2015 = 100).
- Residential investment (I_H): OECD database; gross fixed capital formation, housing (constant prices, 2015 = 100).
- Public investment (G_I): OECD database; General government fixed capital formation, (nominal value), Gross fixed capital formation deflator.
- Private non-residential investment (I_{PE}): OECD database; Private non-residential and government fixed capital formation (constant prices, 2015 = 100), General government fixed capital formation (nominal value), Gross fixed capital formation deflator.
- Inventories (E): AMECO database; Change in inventories and net acquistion of valuables, at constant prices (OIST), (constant prices, 2015 = 100).
- Exports (X): AMECO database; Exports, at constant prices (OXGS), (constant prices, 2015 = 100).
- Imports (M): Imports: AMECO database; Imports, at constant prices (OMGS), (constant prices, 2015 = 100).

A.2 Logarithmic Transformations for GDP and Autonomous Demand

Figure 35

A.3 Specification Choices in VECM Estimation

Table 15 presents a different specification of the VECM that involves a change in the order of the variables, specifying autonomous demand first and then GDP.

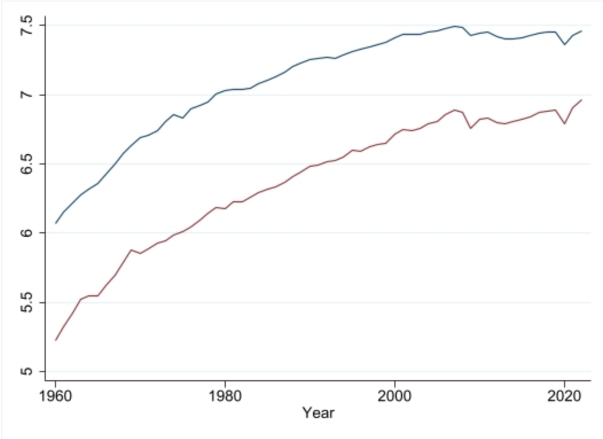

Figure 35: Logarithmic Transformations for GDP in blue and Autonomous Demand in red

	Δ GDP	**Δ Z**		**ce1**
L.ce1	-0.0270***	-0.0256***	GDP	1
	(0.0050)	(0.0077)		
LD.GDP	-0.2630	-0.1724	Z	1,1017
	(0.1823)	(0.2805)		(...)
LD.Z	0.1814	0.0031	Const	15,2430
	(0.1213)	(0.1867)		
Const	-0.0047	-0.0028		
	(0.0050)	(0.0206)		
R-sq	0.6243	0.4558		
Observations	61	61		
Standard errors in parentheses				
***p<0.01, **p<0.05, *p<0.1				

Table 15: Vector error-correction model that considers a change in the order of the variables, specifying autonomous demand first and then GDP

A.4 Robustness Checks

A.4.1 Assessing the impact of the Superbonus on residential investments

This section examines whether Italy's Superbonus (2020-2022), a tax incentive for home renovations, explains the elevated multipliers of residential investment in the second phase analysis. We exclude 2020-2022 to isolate its effects (see Figures 36, 37 and Table 16). The results show that the GDP response to residential investments, when excluding the Superbonus years, is even higher than in the analysis that includes the last three years. Therefore, it can be concluded that the Superbonus was not the cause of the high residential investment multipliers observed in the 1993-2022 period.

Horizon	Elasticities 1993-2022	Multipliers 1993-2022	Cumulative Multipliers 1993-2022
0	0.3568	7.0704	7.3264
1	0.4911	9.7309	7.3554
2	0.3447	6.8310	6.5066
3	0.1820	3.6074	5.3904
4	-0.0226	-0.4476	4.3144
5	-0.0140	-0.2776	3.5032

Table 16: Responses, Multipliers and Cumulative multipliers for Residential Investments shocks on GDP from 1993 to 2019, excluding the Superbonus years

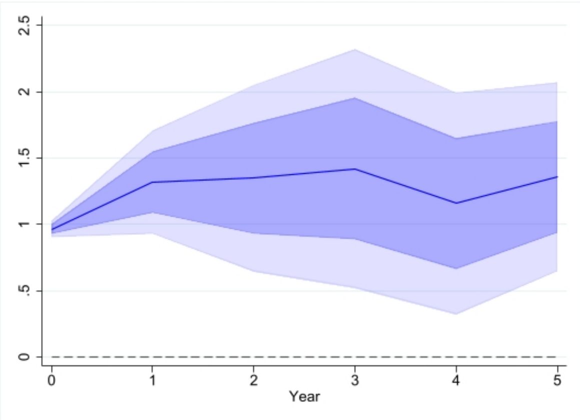

Figure 36: The impact of Residential Investments shocks on Residential Investments, from 1993-2019, excluding the Superbonus years

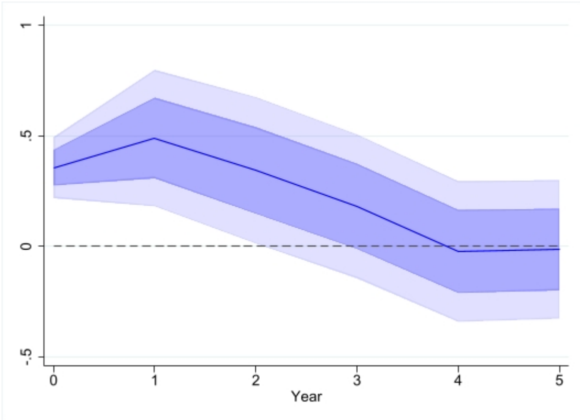

Figure 37: The impact of Residential Investments shocks on GDP, from 1993-2019, excluding the Superbonus years

A.4.2 Analysis of the impact of the Conversion Factor on Residential Investments

This section examines the influence of the conversion factor on residential investments during the second historical phase of the analysis Ramey and Zubairy (2018). To isolate its effect, we apply the lower observed conversion factor from the 1960-1992 period to assess whether the significant growth in multipliers during the second phase can be attributed to changes in this parameter. By comparing the results in Table 17 with those of the first phase in Table 12, a key finding emerges. Even when applying the lower conversion factor of the previous period (1960-1992), the multipliers in the second phase remain significantly higher - both in terms of dynamic multipliers and cumulative effects - although somewhat reduced compared to the scenario using the correct (higher) conversion factor. This implies that the conversion factor acts as an amplifier rather than a primary driver of the multiplier growth; it was not the dominant force behind the observed multiplier expansion.

A.4.3 Testing the shocks

The literature broadly agrees that government spending shocks and, more generally, autonomous demand shocks tend to exhibit greater persistence compared to monetary policy

Horizon	Elasticities	Multipliers 1993-2022 (CF 1960-1992)	Cumulative Multipliers 1993-2022 (CF 1960-1992)
0	0.2740	3.3103	3.2308
1	0.3210	3.8782	3.3569
2	0.2404	2.9040	3.7350
3	0.1820	2.1993	2.9809
4	-0.0226	-0.2729	2.2763
5	-0.0140	-0.1693	1.7850

Table 17: Responses, Multipliers and Cumulative multipliers for Residential Investments shocks on GDP from 1993 to 2022, considering the conversion Factor of the previous phase

shocks. Although the effects of monetary policy typically fade within two years, fiscal policy shocks often take longer to dissipate. In this section, we examine whether shocks that do not appear to fade within the standard 5 period horizon in my analysis eventually converge when the time frame is extended to 8-10 years, as suggested by empirical evidence.

This section examines in particular whether the elasticities of autonomous demand shocks - including autonomous demand, aggregate public spending (both phases), and residential investment -converge to zero after eight or ten horizons, testing their long-term persistence. Now, refer to Figures 38 39 40 41 and 42, which extend the analysis of Figures 5 19 21 23 and 27. In the initial five horizons, these did not show a clear tendency for the shock to return to zero. However, as the horizons are extended, it becomes evident that the shocks gradually dissipate and do not generate unstable or explosive dynamics.

A.4.4 Are the multipliers independent of other autonomous components?

This section examines whether the effect of an autonomous demand component on GDP is affected by changes in other autonomous components resulting from the same shock. The analysis relies on comparing cross-elasticities between autonomous and induced demand components (as specified in the Supermultiplier framework: exports, public spending, and residential investment representing autonomous components, with private consumption and investment constituting induced components).

This analysis is strictly limited to the elasticities obtained from local projections measuring impulse responses between demand components. The purpose of this section is not multiplier calculation, but rather to evaluate possible contemporaneous interactions among autonomous demand components that may affect GDP multipliers. The complete results of this analysis are available upon request.

The analysis begins by examining the impact of public spending on other components of demand. Regarding the effect of public spending on exports, it remains statistically insignificant upon impact and in the following year. However, from the second horizon onward, a significantly negative effect is observed.

When analyzing the effect of public spending on residential investments, the full historical series shows a positive and significant impact. However, if the years of the Superbonus (2020-2022) are excluded from the analysis, the elasticities become statistically insignificant.

From these findings, it can be deduced that the effect of public spending on GDP does not depend on its interaction with other autonomous demand components. Instead, looking at the impact on the induced components, there is a clearly positive effect (68%) through consumption, but not through the investment of private firms, which remains insignificant throughout.

Now, let's examine the impact of exports on the other components of demand. The effect of exports on residential investments is positive and significant only at horizons 0, 3, and 4, whereas their impact on public spending remains consistently small and statistically insignificant. These findings suggest that, if any interaction exists, it is primarily between exports and residential investment that could positively influence the multiplier, rather than between exports and public spending. Unlike public expenditure, exports appear to affect GDP through induced components, primarily through private business investment rather than through private consumption.

The analysis is concluded by examining the effects of residential investment on other demand components. The elasticity of a residential investment shock on exports is significant upon impact (horizon 0) and during the first period after the shock. However, when converted using the multiplier factor, these effects reach a maximum value of just 0.4. Regarding the impact of residential investment on public spending, although consistently positive, the effect remains very small in magnitude. It shows 95% significance only upon impact, declining to 68% significance in subsequent periods. Therefore, it seems plausible to conclude that the relationship between residential investment and exports may have some influence on the evaluation of the multiplier of residential investment on GDP. The elasticities between residential investment and the induced components are both positive and statistically significant upon impact (period 0) and for at least one period following the shock.

In conclusion, public expenditure shows the weakest contemporaneous interactions among autonomous demand components. Consequently, the fiscal multiplier appears to be unaffected by demand-side interference. However, the detected interaction between exports and residential investment - albeit modest in magnitude - suggests that a portion of the GDP multiplier effect may originate from this specific cross-component relationship.

A.5 Dividing Public Spending

In this section, we proceed with a higher level of disaggregation to examine changes in the government spending multiplier by distinguishing between public consumption and public investment, as suggested by Perotti (2004), Pappa (2009), Boehm (2020) or Deleidi et al. (2020). The results are summarized in Table 18 and Figures 43 44 45 and 46 . In particular, the images depicting the elasticities of public consumption and public investment effects on GDP, 44 and 46, clearly show that the largest impact on GDP comes from public consumption, which remains significant for up to four years after the shock. In contrast, the effect of public investment is never significant. The multipliers for public investments are also considerably lower, as are the cumulative multipliers. These findings are consistent with those of Perotti (2004), but diverge from those of Deleidi et al. (2020), who report significant multipliers greater than one.

The rationale behind these results reflects both the general characteristics and some unique aspects of Italy's economic structure.

Horizon	Elasticities Public Consumption	Elasticities Public Investments	Multipliers Public Consumption	Multipliers Public Investments	Cumulative Multipliers Public Consumption	Cumulative Multipliers Public Investments
0	0.4811	0.0330	2.5541	1.0734	2.5202	1.0726
1	0.8834	0.0558	4.6892	1.8128	3.2530	1.6200
2	0.7605	0.0447	4.0371	1.4540	2.9972	1.5190
3	0.8093	0.0110	4.2964	0.3568	2.9152	1.3267
4	0.8296	0.0058	4.4039	.01877	2.8847	1.1658
5	0.4432	-0.0856	2.3528	-2.7820	2.6389	0.4549

Table 18: Responses, Multipliers and Cumulative multipliers for Public Consumption and Public Investments shocks on GDP

The higher public consumption multiplier stems, first and foremost, from its immediate translation into aggregate demand and, subsequently, GDP. Public consumption has a direct and rapid impact on disposable income of households, particularly lower-income families, which exhibit a higher marginal propensity to consume. In a low-growth economy with stagnant incomes, such as Italy, households tend to spend a large share of any additional income they receive.

Public investment, on the other hand, has delayed effects due to the time required for planning, tendering, and execution. In addition, many public investment projects may involve the purchase of capital goods or materials from abroad. This could reduce the multiplier effect, as part of the spending "leaks" out of the domestic economy. Public consumption, on the contrary, is more likely to target locally provided services or domestically produced consumer goods, resulting in less leakage abroad.

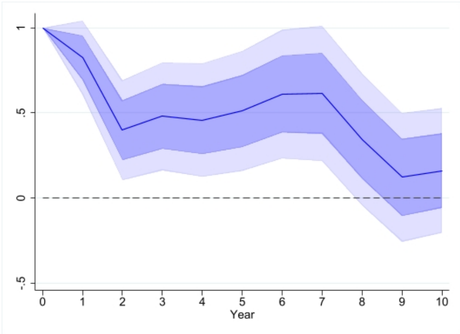

Figure 38: The impact of Autonomous demand shocks on Autonomous Demand considering 10 horizons

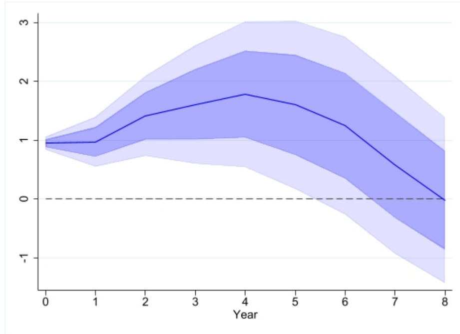

Figure 39: The impact of Public Spending shocks on Public Spending for the period 1960-1992 considering 8 horizons

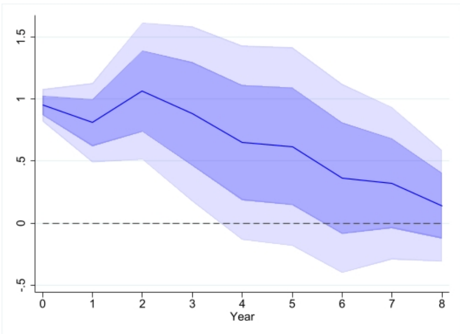

Figure 40: The impact of Public Spending shocks on Public Spending for the period 1993-2022 considering 8 horizons

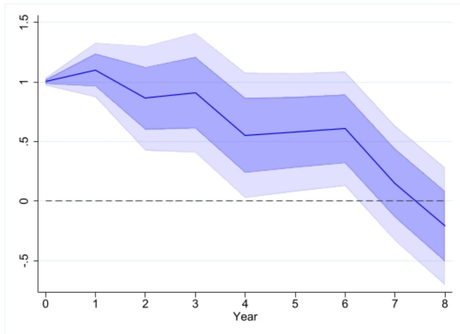

Figure 41: The impact of Residential Investments shocks on Residential Investments considering 8 horizons

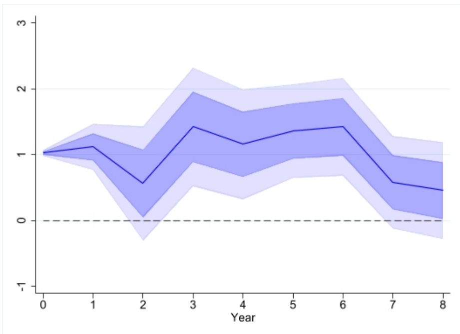

Figure 42: The impact of Residential Investments shocks on Residential Investments for the period 1993-2022 considering 8 horizons

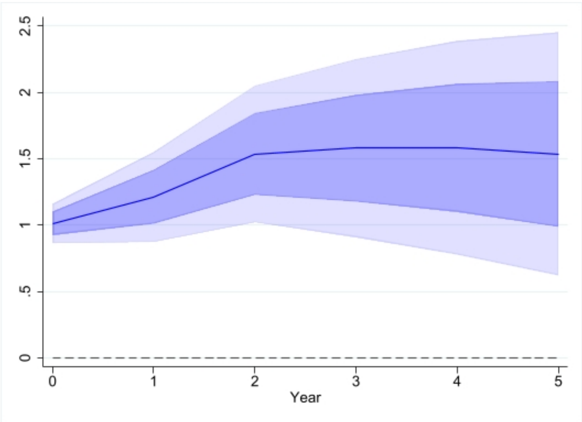

Figure 43: The impact of Public Consumption shocks on Public Consumption

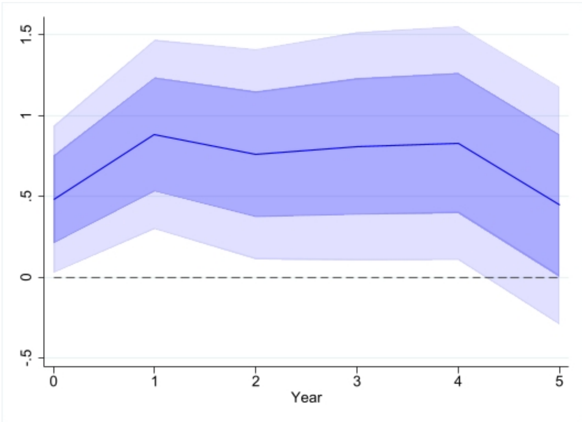

Figure 44: The impact of Public Consumption shocks on GDP

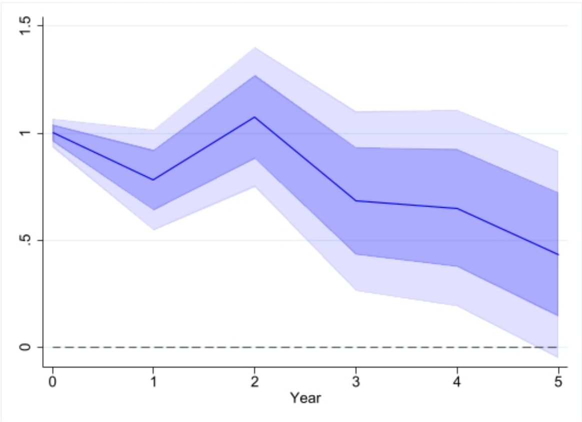

Figure 45: The impact of Public Investments shocks on Public Investments

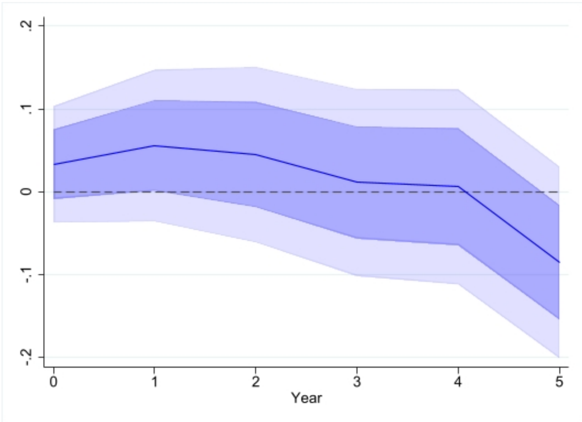

Figure 46: The impact of Public Investments shocks on GDP