Kaldor–Verdoorn's Law: Do Institutions Matter? Evidence from Italian Provinces

Matteo Deleidi (University of Bari)
Davide Romaniello (Roma Tre University)
Luigi Salvati (Roma Tre University)
Francesca Tosi (University of Bologna)

Kaldor-Verdoorn's law, as is well known, predicts that demand growth has a positive effect on productivity growth. A rich literature studies the effects of institutions on economic performance and productivity dynamics, while the literature on the interaction between institutional variables, on the one hand, and the effect of demand on productivity, on the other, is scarce. To date, no such studies are available with regard to Italy. Starting from the consideration that such a country is characterized by strong differentials in growth, productivity and institutional settings between the Centre-North and the South, in this paper we study the effect of institutional variables, in particular the so-called IQI index, on the functioning of Kaldor-Verdoorn's law in Italy. To do this, we make use of panel SVAR models applied to NUTS-3 Italian data provided by ISTAT and the IQI dataset (developed by Nifo & Vecchione) for the period 2004-2019. Although findings validate Kaldor-Verdoorn's law, the quality of institutions does not influence productivity, neither in the northern nor in the southern provinces. This implies that, at least from the point of view of the functioning of Kaldor-Verdoorn's law, preferential investments in the most productive areas of the country are not justified.

Keywords: Kaldor-Verdoorn's Law, Mezzogiorno, Panel data
Jel classification: E24, J24, O43

1. Introduction

Italy is characterized by a strong divide between the Centre-North and the South in social and economic conditions. The regions of the so-called Mezzogiorno (regions of the South and Islands) perform worse in terms of labour market, crime, poverty, productivity and so on. The problem of the so-called Southern question has arisen since the decades immediately following the unification of the country in 1861. After the Second World War, there was a period of strong growth of the South compared to other areas of the country, but such a growth was interrupted starting from the 70s and subsequently it has never been repeated in the same terms. To this day, the Southern question is still unresolved.

In the contemporary academic and political debates, there has been much discussion about the reasons for the differences between the South and the rest of the country. Pervasiveness of organized crime, attitude of the population, socio-cultural and anthropological characteristics, historical and political motivations, economic interests, infrastructural deficiencies, different quality of institutions, are just some of the reasons cited. These are, of course, elements which influence each other. Their combined effect, therefore, is not easy to grasp.

Among the elements in which the gap is most evident, productivity plays a major role. According to the available data, the latter is much higher in the Centre-North regions than in those of the South. Here, too, the causes are to be found in a number of elements, ranging from infrastructural deficiencies to the characteristics of the labor market.

Among the reasons often cited to explain the low economic performance of the regions of the South, the low level of quality of institutions, understood in a broad sense, which would characterize this area of the country, is often cited. Institutions, in this sense, include both political institutions and, in general, the so-called "rules of the game" (North, 1990, 1991), including "social capital" (Putnam, 1993).

Recently, an approach to measuring how the quality of institutions has an impact on productivity has emerged in the literature (Iasco Pereira et al., 2022). In particular, it assumes the approach to productivity dynamics known as the Kaldor-Verdoorn law, which describes the effects that aggregate demand growth has on productivity growth, to estimate the effect that the quality of institutions exerts on the growth of productivity through the KV law.

In this article we try to apply the approach of Iasco Pereira et al. (2022) to the Italian provinces, with the aim of measuring how the quality of institutions influences the working of the Kaldor-Verdoorn law. Unlike that article, in which an econometric approach using instrumental variables is used, in our article we will address the problem of potential endogeneity through the use of the panel SVAR methodology, which will also allow us to measure impulse reaction functions (IRFs) for the different variables of interest.

We will recall (section 2) the literature on institutions, social capital and growth. In addition, we will briefly summarize some characteristics of the economy of the South. Next (section 3), we will deal with a theoretical review of the Kaldor-Verdoorn law, also underlining the criticisms to an interpretation the does not allow for the incorporation of historical considerations and elements of path-dependency to the models that refer to this law. This is followed (section 4) by a brief review of the main empirical works on the Kaldor-Verdoorn law, even with respect to the Italian Mezzogiorno. Finally, (section 5), empirical estimates are made on the relationship between productivity, aggregate demand, and institutional quality. Section 6 concludes.

2. Institutions and growth. Italy and the case of Mezzogiorno.

In the economic literature, there is broad consensus on the fact that institutions have an important role in creating economic conditions conducive to growth.

Among the first examples of literature focused on the role of institutions, it is possible to refer to two works by Ronald Coase. In Coase (1937), transaction costs and the role of contracts are the main determinants of the birth of the institution of the enterprise, while Coase (1960) examines the problem of externalities and how it can be solved through decentralized bargaining, given the condition of zero transaction costs.

More recently, starting from the works by Douglass North (1990, 1991), which defines institutions as "humanly devised constraints that structure political, economic and social interactions", a large literature has developed with the aim of explaining the way in which institutions influence the growth paths of economies (Williamson, 2000; Sokoloff & Engerman, 2000; Engerman & Sokoloff, 1994, 2002; for a recent review of the literature, see Lloyd & Lee, 2018). This strand of literature is known as New Institutional Economics (NIE).

NIE has had important developments even in research about economic performance in different countries or groups of countries. In particular, Acemoglu et al. (2001), by using mortality rates as an indicator of the possibility of creating extractive institutions, try to explain why the European process of colonization has had different effects in different countries in Africa (and, in general, in countries in which the European colonization had place).

Institutions, as defined by Douglass North, are not just political institutions. Nevertheless, a great importance in the literature is covered by precisely this type of institutions. Persson and Tabellini (1999, 2002a, 2002b) introduce a theoretical framework in which political institutions influence the functioning of economies and the latter, in turn, exert a feedback effect on institutions. This strand has taken the name of "New Political Economy" (NPE).

The broader concept of institutions also refers to the role of so-called social capital. This concept, introduced in its modern definition by Putnam (1993), can be summarized as follows, using the words of the same author: “By analogy with notions of physical capital and human capital – tools and training that enhance individual productivity – “social capital” refers to features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit. Social capital enhances the benefits of investment in physical and human capital”.

While Putnam highlights the positive effects of social capital, described as a kind of stock that leads to more prosperous societies through its accumulation, Bourdieu (1986) tended to highlight the role that institutions – and, in particular, social capital – have in perpetuating class differences. Bourdieu also highlights the similarities between the concept of social capital and that of capital in the economic-financial sense. While “Capital is accumulated labor”, “the social world is accumulated history”. In his words:

> Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group – which provides each of its members with the backing of the collectivity-owned capital, a ‘credential’ which entitles them to credit, in the various senses of the word.

Italy plays an important role in the history of the idea of social capital, in particular by constituting a sort of experiment showing how it influences institutions and, in this way, economic performance. To explain the differences between the North and South of the country, Putnam (1993) uses an explanation according to which the areas of the country characterized by a better tradition of social

capital are also those with the best institutions and, consequently, with the best economic performance and, in general, the best quality of life of the population.

Italy, indeed, is notoriously characterized by strong development and growth differentials between regions (Nuts-2 level) and between macro-regions (Nuts-1 level). Since the unification of the country, which took place in 1861, the problem has arisen of the disparities between the macro-regions of the Centre-North and the so-called *Mezzogiorno* (consisting of the macro-regions South and Islands, composed of Sardinia and Sicily). The latter performs significantly worse in indicators relating to growth, unemployment, and poverty (see Graziani, 1978 and 2000; Viesti, 2009, 2013, 2021; Arestis et al., 2017). For example, according to data relating to 2021, the first year after the COVID-19 pandemic, the unemployment rate (15-74 years, Istat data) in the South was equal to 16.4%, compared to 8.6% in the Center and 6% in the North (compared to a national value of 9.5%). This phenomenon is particularly worrying among young people aged between 18 and 29 (34.9% in the South, 21.6% in the Centre and 14.2% in the North; for Italy in general, the value is 22%) and women (15-74 years, with percentages respectively equal to 18.7%, 9.7% and 7.1%; the figure for Italy is 10.6%).

The Mezzogiorno regions are also characterized by a high percentage (40% based on Tosi, 2018) of 'not in education, employment or training' (NEET) individuals. As for the incidence of individual relative poverty (measured as a percentage of people living in families in relative poverty on the total number of residents), this value is equal to 25.3% in the South, 10% in the Centre and 9% in the North (against a national value of 14.8%).

The imbalances between the various areas of the country are also reflected in significantly lower labour productivity in the regions of the South. Accetturo et al. (2022) estimate this differential, recording average levels of productivity, measured as value added per hour worked, about 24% lower than in the Centre and North for the total economy and almost 30% when only the private sector is considered.

Part of the literature that has dealt with the North/South divide focuses precisely on the role of institutions in the broad sense. Banfield & Fasano (1958), in this regard, coined a term, "amoral familism", which would later be very successful. In essence, the authors conclude, the backwardness of the Mezzogiorno would be due to the tendency of its inhabitants to "maximize the material, short-run advantage of the nuclear family" and "assume that all others will do likewise". Consequently, this would jeopardise the social relations that allow a harmonious growth of society. A'hearn (1998), based on the analysis of data relating to the cotton industries of the South between 1861 and 1914, argues that explain the origins of the gap and deindustrialization of Southern Italy it is necessary to focus on social and institutional factors, such as inequality in income distribution, the lack of a middle class of entrepreneurs and professionals, an anti-entrepreneurial mentality, the inability to carry out impersonal forms of economic cooperation. Fargion (2009) discusses the effects of the decentralization of the welfare system, concluding that the North/South divide in this field is strongly influenced by differences in the quality of regional governments. These differences have historical and political roots that the author tries to analyze. Toth (2014), analyzing the process of regionalization of health that began in the 90s of the twentieth century, he argues how these institutional changes have had an impact on the divide, contributing to widen it. Bigoni et al. (2016), by performing a lab-in-the-field experiment, suggest that people from in North could be more prone to cooperate than those in the South. This fact could constitute one of the explanations for the divide. Felice (2018) argues that the gap already existed before unification. This would lead to substantial differences in various institutional factors, including social capital and political institutions in the strict sense, which, in turn, would influence different growth rates. Postigliola and Rota (2020) argue that the roots of the differences between the two areas of the country should be

sought in the educational reforms carried out in the North during Napoleonic era. Viesti (2021) argues that the disparities between North and South were still relatively small in 1861, although in the South some signs of weakness in infrastructures and literacy were already visible. After the unification, between the late nineteenth and early twentieth centuries, the industrialization of the North-West of the country would lead to the widening of the gap. A phenomenon that would go on, accentuating, until the beginning of the 50s. The interventions started in those years (including the establishment of the so-called "Cassa per il Mezzogiorno") manage to produce the basis for change, but the crisis of the 70s puts an end to this experiment. A period of substantial abandonment by national institutions follows, which leads the gap to widen again, up to the present day. In this reconstruction, a key role is played by the institution of the EU and its enlargement to the East, with consequences on industrial policies and on the competitiveness of the Southern industrial complex. In general, the author argues, the gap has deep historical roots and was determined by political choices at the national and local levels. Moreover, a not negligible role has been played by the substantial abandonment of the South by the political institutions (Viesti, 2009).

3. Kaldor-Verdoorn's law: the role of history and institutions

As is well known, Kaldor (1966, 1967; see also Kaldor & Mirrlees, 1962) considers the dynamics of technical progress, represented by productivity growth, as a phenomenon which is not totally exogenous, but also dependent on the growth rate of output (Lavoie, 2015; Deleidi & Mazzucato, 2019). The transmission channel hypothesized by Kaldor is the following: the expansion of the market for the good produced by the firm stimulates greater specialization[1] and the latter leads to processes of learning-by-doing and division of labor (Verdoorn, 1949), which, in turn, generate increasing returns to scale (Fingleton, 2000; Kaldor, 1957). To explain these phenomena, the theory refers to the existence of three mechanisms: i) production specialization (between and within companies); (ii) the presence of positive externalities (among enterprises, but also among different industries and regions); (iii) newly installed capital goods embodying technical progress (Kaldor, 1957, 1961, 1966, 1972; Kaldor & Mirrlees, 1962).

p = alfa + eta*y

Equation XX is called Verdoorn's law. Labour productivity growth (p) is described as the sum of two elements: exogenous technical progress (alpha) and the effect of output growth (y), the latter multiplied by a parameter, eta, which measures the increasing returns of scale. Eta is also called *scale coefficient*.

A different specification in mathematical form of this phenomenon is that described by Kaldor (1957) in his function of technical progress. As we have said, productivity growth, in this theory, is also considered to be influenced by the technical progress contained in newly installed machinery. This leads to productivity growth depending on investment, i.e., the growth of the capital stock (see also Lavoie, 2015, p. 429), based on the idea that a higher ratio of capital per worker inevitably generates the adoption of techniques characterized by higher productivity (Kaldor, 1957, p. 595). The Kaldor function can therefore be written as:

P = r + lambda*k

Here r is the rate of knowledge growth, while k represents the speed with which innovations are introduced.

[1] Among the progenitors of the idea that the expansion of the market can lead to an increase in specialization is notoriously to be counted Adam Smith (1805). Smith's ideas were later taken up by Young (1928).

Kaldor's model can help explain a mechanism by which productivity growth, generated by the expansion of the market and, therefore, of aggregate demand and production, can create a virtuous circle. Increased productivity would lead to greater competitiveness on international markets. This, in turn, would lead to greater demand for domestically produced goods and, therefore, to the functioning of the aforementioned virtuous circle (also called of “cumulative causation”; see Kaldor, 1970; Dixon & Thirlwall, 1975; Boyer & Petit, 1991).

Michl (1985) represents both phenomena (Verdoorn’s and Kaldor’s view of technical progress) with a single equation, in which epsilon represents the effects of both alpha and r:

P = epsilon + eta*y + lambda*k

These formulations have been highly regarded and have been the subject of numerous empirical analyses (see next section). However, as has been observed by Setterfield (1997), the Dixon & Thirlwall model, in particular, is characterized by the absence of space for a process being characterized by a certain degree of *path dependency* and, therefore, by the space for historical and institutional considerations.

As pointed out by Iasco Pereira et al. (2022), Setterfield's vision is inspired by the concept of interrelatedness (Frankel, 1955). This concept is in turn based on the consideration that production is inserted in a context characterized not only by the presence and use of a certain set of machines but is also influenced by the set of economic and social relations, institutions, and the presence of different levels of human capital.

All these variables are subject to historical considerations, so that different countries, characterized by different paths of these variables, will be characterized by a different reactivity to increases in demand. This could, therefore, generate lock-in phenomena (or “traps”) in which, despite the presence of increases in autonomous demand, generated, for example, by an increase in public spending by the Government, certain economies or regions are unable to take advantage of the expansion of the market, precisely by virtue of their history, in turn represented by the "quality" of their institutions.

Iasco Pereira et al. (2022), noting the absence, in the literature, of empirical works aimed at testing Setterfield's (1997) vision, tried to test its existence using data related to the quality of institutions, referring to Brazilian municipalities. To do this, following Romero & Britto (2017), they also used terms of interaction between the quality of institutions and the growth of aggregate demand.

4. Empirical literature on Kaldor-Verdoorn’s Law

Given the importance of the Kaldor-Verdoorn law in economic theory, it is not surprising that a large econometric literature (for an extensive review see Kim & Loayza, 2019) has focused on estimating the existence and magnitude of the effects theorized by Kaldor and Verdoorn.

Although much of the literature is dated after 2000, there have been attempts to estimate the coefficients of interest even in previous decades. Verdoorn (1949) estimates that its coefficient scale is 0.45, while Kaldor (1966) estimates that the coefficient linking productivity growth to labor growth, measured as elasticity, is 0.5%. Other studies confirm the existence of significant and positive effects of output growth on labor productivity, in different spatial and temporal contexts, as well as with different specifications.

1. At the national level: McCombie (1983), Thirlwall (1983), Bianchi (2002), McCombie et al. (2002), Knell (2004), Millemaci & Ofria (2014), Magacho and McCombie (2017), Tridico and

Pariboni (2018), Deleidi & Paternesi Meloni (2019); Forges Davanzati et al. (2019); Deleidi et al. (2020), Carnevali et al. (2020)

2. At the regional level, in different countries or groups of countries: Casetti (1984); McCombie & De Ridder (1984); Bernat (1996); Hansen & Zhang (1996), Kie (1997); Fingleton & McCombie (1998); Harris & Lau, (1998); Pons-Novell & Viladecans-Marsal (1999); Fingleton (2000)
3. In Italy at the regional level: Soro (1985), Ofria (2009), Fazio et al. (2013), Millemaci and Ofria (2016); Deleidi et al. (2021).

This short list gives us an idea of the extent of the empirical literature on the KV law. The scale coefficient measured by Verdoorn (1949) is around 0.45. In the dynamic version estimated by Kaldor (1966), however, the coefficient rises to 0.5. The values found by McCombie (1983), Thirlwall (1983), McCombie et al. (2002) and Knell (2004) do not deviate much from the coefficients found by Kaldor and Verdoorn. Tridico and Pariboni (2018) find a coefficient of 0.36 within a group of OECD countries, while Magacho and McCombie, in a sector-level analysis, find a value around 0.5. Millemaci and Ofria (2014) analyse several advanced economies and find values between 0.3 and 0.6. In general, the cited literature suggests that this coefficient ranges from a minimum of 0.3 to a maximum of 0.8.

5. Data, empirical strategy and estimations

Our model is estimated for the 107 Italian provinces (NUTS-3 regions) for the period 2004-2019.

The variable measuring the quality of institutions is the so-called IQI (Nifo & Vecchione, 2014), a widely used[2] composite indicator based on five sub-indicators, related to: 1) CORR: corruption – this index takes into account data on crimes against public administration, the Golden & Picci index (2005) – measuring the waste of public resources – and the number of local administrations dissolved by the national government; 2) GOV: quality of government – this index measures the administrative performance of local governments in the fields of health policies, waste management and the environment; 3) REG: quality of regulation – measures data such as firms mortality and business density, the degree of openness of the economy and other indicators of the environment in which enterprises operate; 4) ROL: rule of law – contains data on the productivity of the judiciary system, tax evasion, crimes against persons and property, shadow economy; 5) VOICE: social participation – this is an index that could be considered as a proxy for social capital, as it takes into account data such as the number of social cooperatives, the number of books published, the participation rate in elections, participation in associations, the results of standardized tests aimed at assessing the quality of education. The available data range from 2004 to 2019 and refer to the regional (NUTS2) and province (NUTS3) level.

At this point, it is necessary to make assumptions about how the individual components taken into account by the IQI index may affect the functioning of the Kaldor-Verdoorn law. The corruption-related index (CORR index) can be linked to our topic of interest through the idea that in areas most affected by corruption, public resources are diverted from firms that meet certain efficiency requirements to firms that, although less efficient, manage to capture public resources through informal connections with local policy-makers (Del Mar Salinas-Jiménez & Salinas-Jiménez, 2007; D'Agostino et al., 2016; Wu et al., 2017). These firms, therefore, may fail to transform aggregate demand increases into efficiency gains. The quality of government (GOV index) can be an indicator

[2] Data and a list of the several papers using the IQI index can be retrieved at: https://sites.google.com/site/institutionalqualityindex/home

of the ability of local governments to direct public resources to those sectors and firms that are able to take advantage of increased demand to create specialization and efficiency gains (Patrizii & Resce, 2015). The quality of regulation (REG index) can influence the attractiveness of a given area to more innovative firms, which might be discouraged from undertaking productive activities in areas characterized by low firm density or a low level of openness of the economy (Andres et al., 2007; Jalilian et al., 2007). As for the rule of law (ROL index), a low value might indicate that the environment of the province is unsuitable for the growth of firms. Consequently, more efficient firms would be discouraged from setting up their business in provinces with a low ROL index (De la Croix & Delavallade, 2011; Roth, 2022). Finally, the social capital index (VOICE index) can affect the functioning of the KV law in several ways: low levels of voting participation may indicate distrust in institutions and may favour administrations disconnected from the needs of a large part of the population, but well connected to the requests of their own interest groups. Poor test results concerning the quality of education may indicate the absence of a workforce with the qualities needed to attract innovative businesses. A low number of social cooperatives and people participating in associations may also be an indicator of a low involvement of the population in the dynamics affecting their province (Putnam, 1993; Routledge & Von Amsberg, 2003)

For the provincial GDP at current market prices, we make use of EUROSTAT data (GDP at current market prices by NUTS3 regions). We subsequently apply the GDP deflator. As for the number of employed by NUTS3 regions, we use ISTAT's time series.

In order to estimate the effects that aggregate demand and institutional variables have on productivity, we adopt an econometric strategy based on panel structural vector autoregressive modelling (P-SVAR) (Pedroni, 2013). Consequently, also to consider possible phenomena of endogeneity between aggregate demand and institutional variables, we estimate systems of equations in which all variables influence each other.

First, we estimate a VAR(n) panel in the following reduced form:

$$x_{i,t} = A_i(L)x_{i,t-n} + u_{i,t}$$

Here $x_{i,t-n}$ represents the vector of the variables we want to analyze, $A_i(L)$ is a polynomial of lagged coefficients, while $u_{i,t}$ is the error term of this reduced form.

Next, imposing an identification strategy on the equation (xxx), we get the following structural model:

$$B_{0i}x_{i,t} = B_i(L)x_{i,t-n} + e_{i,t}$$

Here B_0 represents the matrix of contemporary relationships between variables, B_i that of autoregressive coefficients, $e_{i,t}$ the vector of serially uncorrelated structural shocks.

In model 1, the variables taken into account are p, y and IQI. We assume that Y and P have no simultaneous effects on IQI; that only IQI has simultaneous effects on Y; that IQI and Y have simultaneous effects on P. With these assumptions, the identification of model 1 can be written as:

$$B_{0i}x_{it} = \begin{bmatrix} - & 0 & 0 \\ - & - & 0 \\ - & - & - \end{bmatrix} \begin{bmatrix} IQI \\ y \\ p \end{bmatrix}$$

In model 2, we consider the subindices that contribute to the IQI index, i.e., CORR, GOV, REG, ROL and VOICE, in addition to p and y.

$$B_{0i}x_{it} = \begin{bmatrix} - & 0 & 0 & 0 & 0 & 0 & 0 \\ - & - & 0 & 0 & 0 & 0 & 0 \\ - & - & - & 0 & 0 & 0 & 0 \\ - & - & - & - & 0 & 0 & 0 \\ - & - & - & - & - & 0 & 0 \\ - & - & - & - & - & - & 0 \\ - & - & - & - & - & - & - \end{bmatrix} \begin{bmatrix} CORR \\ GOV \\ REG \\ ROL \\ VOICE \\ y \\ p \end{bmatrix}$$

With regard to the results of the first model, IRFs show that productivity is positively affected by an increase in aggregate demand. The positive effect is confirmed both for the whole sample and for the sub-samples for the Centre-North and South regions. Only in the regions of the Mezzogiorno the effect tends to cancel out after 7 periods, while for the whole sample and for the central-northern regions the effect is permanent for all 10 periods considered.

Changes in IQI do not appear to influence productivity. This applies both to the entire sample and to the sub-samples relating to the different areas of the country.

[Figures 1-3 about here]

These results are substantially confirmed in the second model. The individual components of IQI have no effect on productivity, while the role of Kaldor – Verdoorn's law seems to be confirmed for the whole sample and for the two sub-samples.

The average scale coefficient value for model 1, considering the entire sample, is 0.88, a higher value than that normally found in the literature on the KV coefficient. Considering the two sub-samples, we obtain the surprising result that the coefficient (0.85) is higher in the regions of Southern Italy than in those of the Centre North (0.80). There are, however, two elements to consider. The first is related to the fact that, as already pointed out, the response of productivity to changes in output becomes non-significant in the Mezzogiorno after 7 periods, while in the Centre North it remains significant in all 10 periods. Therefore, if one considers the KV coefficient to be zero for periods 8 to 10 in the Mezzogiorno, the average scale coefficient drops dramatically (0.63). The second point concerns the weight that employment in public administration has in the Mezzogiorno. In these regions, in fact, the weight of public administration on total employment is greater than in the rest of the country. Consequently, since employment in the public sector is less responsive than that in the private sector to changes in demand, the denominator of the ratio between output and number of workers grows less quickly.

6. Concluding remarks

The regions of the South have been characterized, since the unification of Italy, by living conditions and indicators of economic performance below those of the rest of the country, in particular the more industrialized Centre-North. The literature has proposed several explanations of the divide. Currently, the gap is still wide and the discussion on the underlying reasons for the gap is still open. Among the indicators that show the most marked differences between different areas of the country, a weaker productivity dynamic stands out.

The differences between Centre-North and South are also found in various characteristics relating to the institutional setting. Here by "institutions" we mean both political institutions in the strict sense and those included in the broader set of institutions in the sense of North (1990), including

that set of social relations that in the economic literature go by the name of "social capital". In both senses, the data and the literature confirm that the southern regions have worse institutions than those of the Centre-North.

In this paper, we have adopted an approach based on a demand-led explanation of productivity dynamics, known as the Kaldor-Verdoorn approach. Following the scheme introduced by Iasco Pereira et al. (2022) for Brazilian municipalities, we subjected to econometric analysis the hypothesis that the Kaldor-Verdoorn effect is weaker where institutions are less efficient. On the sidelines, we calculated the Kaldor-Verdoorn coefficient for the Centre-North and the South. Our statistical units are the Italian provinces.

The results allow us to highlight that, unlike what was found in Iasco Pereira et al. (2022), although the estimates confirm what is already present in the literature regarding the lower Kaldor-Verdoorn coefficients recorded in the South, this does not seem to be linked to differences in institutional variables. This conclusion applies both by considering the individual aspects that make up the IQI and by looking at the IQI index as a whole.

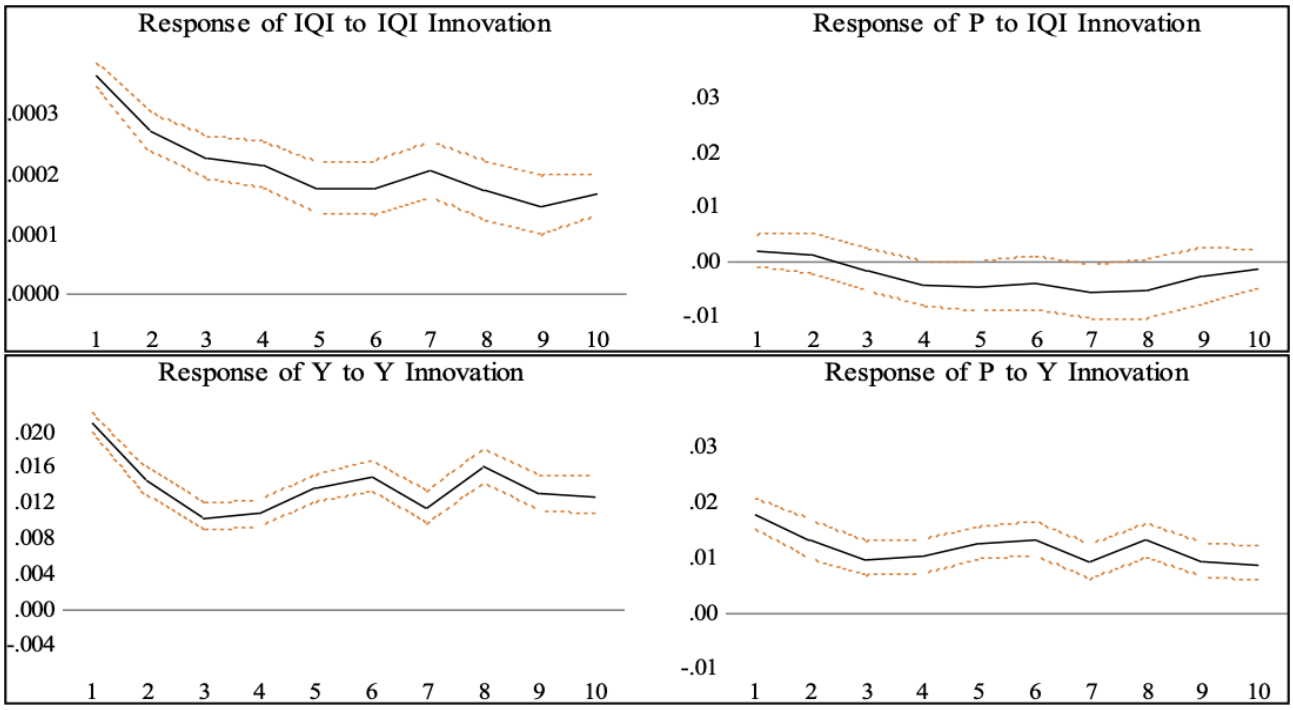
From the point of view of political debate and media discourse, these results suggest that the Southern question, at least from the point of view of the working of the Kaldor-Verdoorn law, is not a problem linked to a supposed inability of the institutional context of the southern regions to generate the conditions capable of channeling any increases in aggregate demand into increases in productivity.

From the point of view of policy suggestions, this paper contributes to the debate by suggesting that, regardless of the supply conditions represented by the so-called institutional variables, policies to support aggregate demand can have a positive effect on productivity also in the regions of the South. Furthermore, confirming what has already been found in the literature, these efforts must be aimed precisely in the regions of the South, in order to encourage catching-up from the point of view of productivity. Higher Kaldor-Verdoorn coefficients in the Centre-North regions indicate that even assuming identical policies to support demand throughout the country, the result would be to increase, rather than decrease, the gap in productivity.

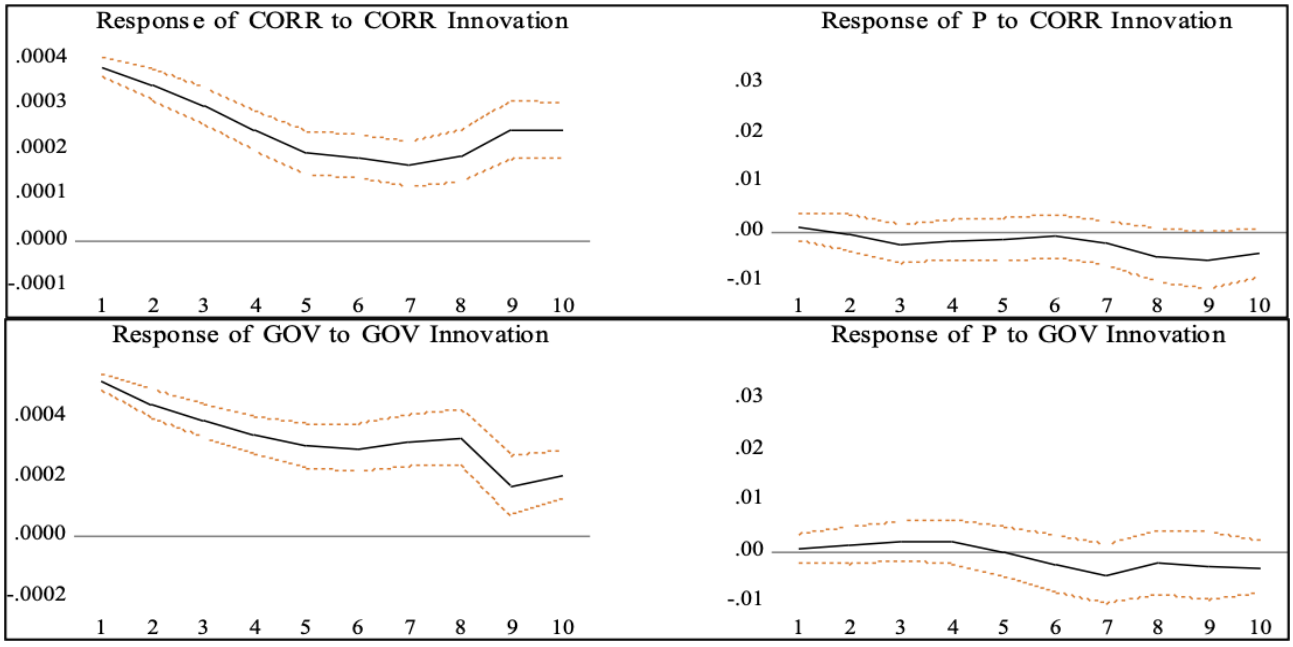
Tables and figures

Figure 1: IRFs for the entire sample

Model #1



Model #2



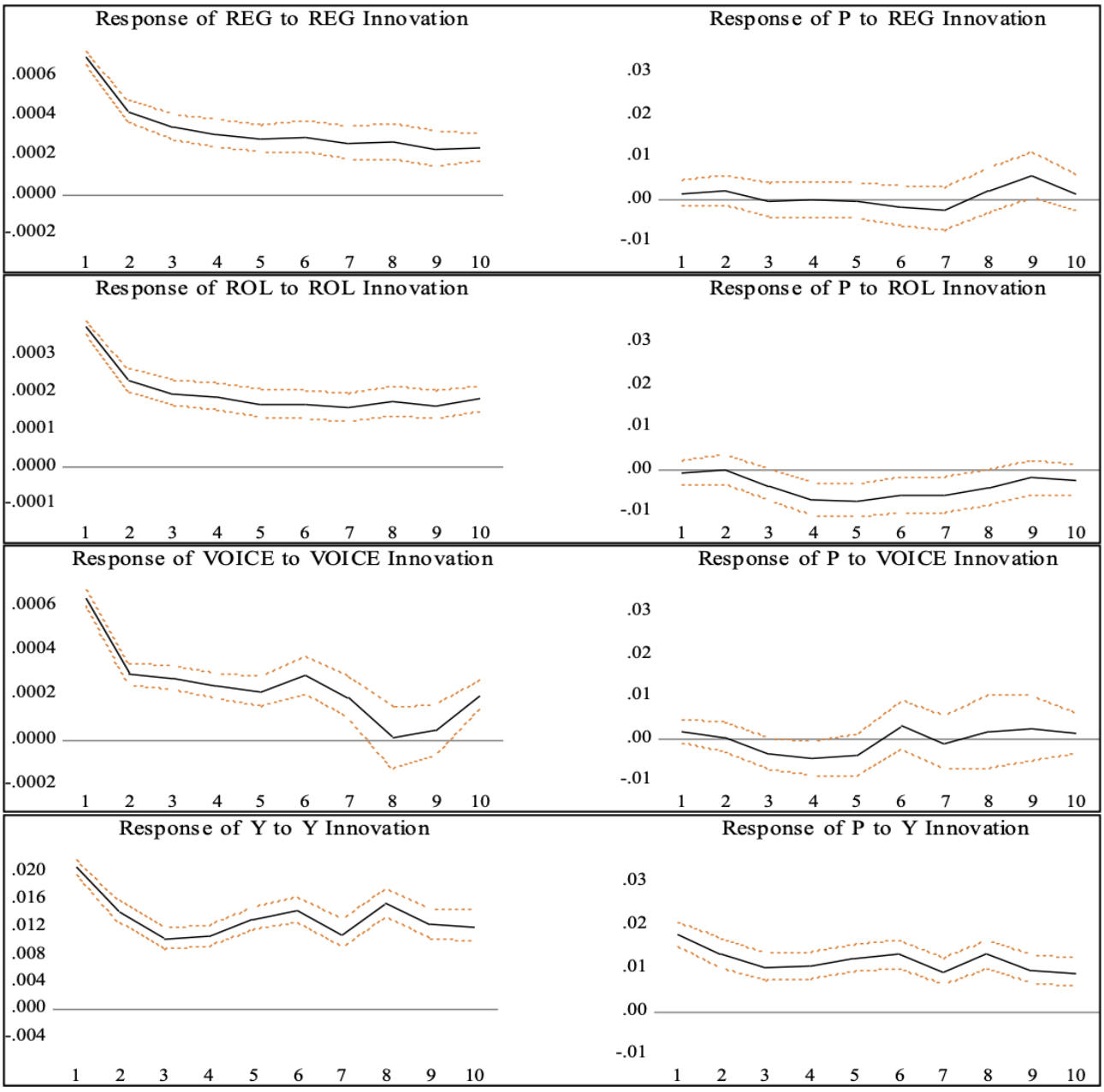
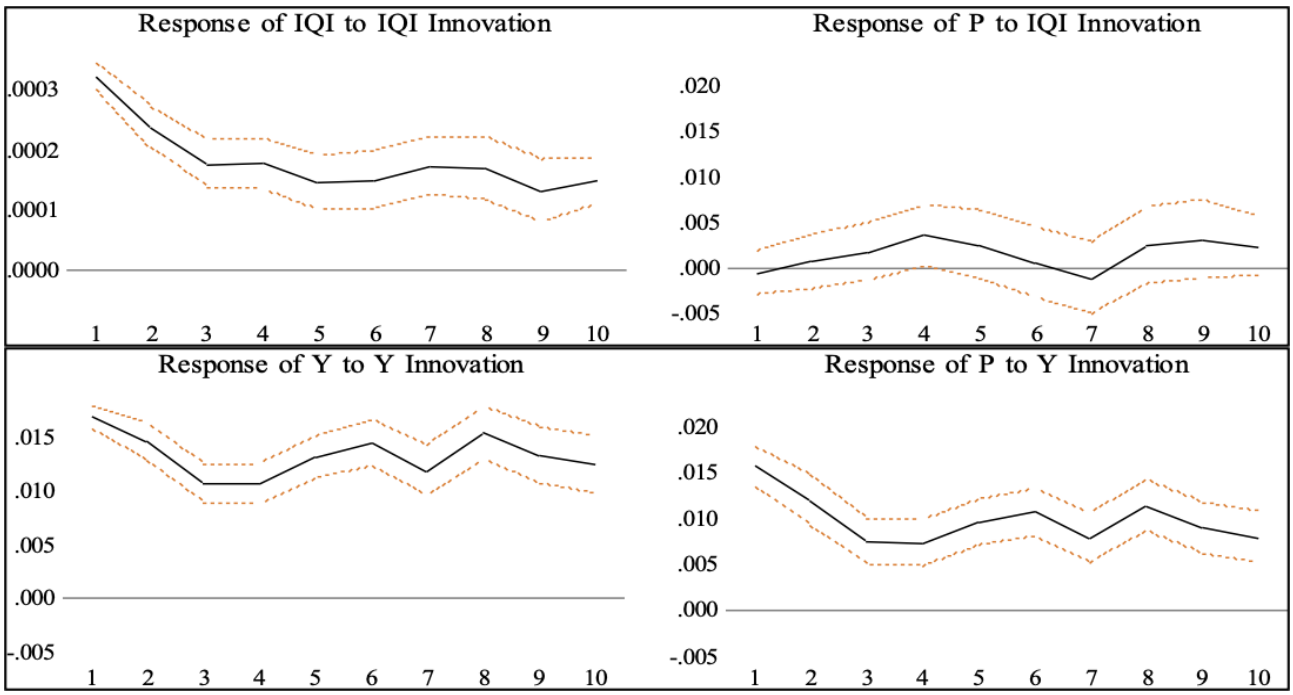
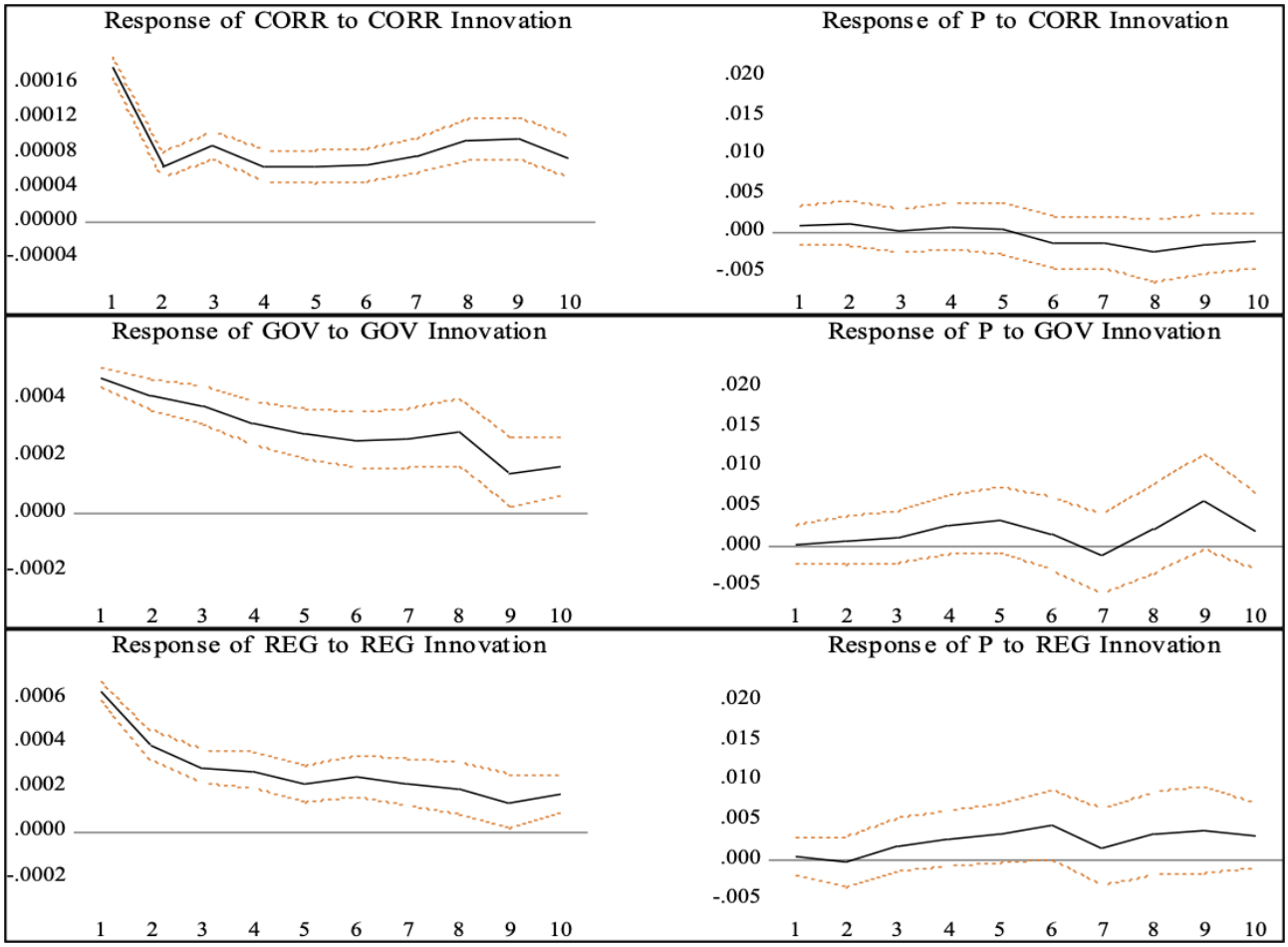

Response of REG to REG Innovation
.0006
.0004
.0002
.0000
-.0002
1 2 3 4 5 6 7 8 9 10
Response of P to REG Innovation
.03
.02
.01
.00
-.01
1 2 3 4 5 6 7 8 9 10
Response of ROL to ROL Innovation
.0003
.0002
.0001
.0000
-.0001
1 2 3 4 5 6 7 8 9 10
Response of P to ROL Innovation
.03
.02
.01
.00
-.01
1 2 3 4 5 6 7 8 9 10
Response of VOICE to VOICE Innovation
.0006
.0004
.0002
.0000
-.0002
1 2 3 4 5 6 7 8 9 10
Response of P to VOICE Innovation
.03
.02
.01
.00
-.01
1 2 3 4 5 6 7 8 9 10
Response of Y to Y Innovation
.020
.016
.012
.008
.004
.000
-.004
1 2 3 4 5 6 7 8 9 10
Response of P to Y Innovation
.03
.02
.01
.00
-.01
1 2 3 4 5 6 7 8 9 10

Figure 2: IRFs for the North-Center regions

Model #1



Model #2



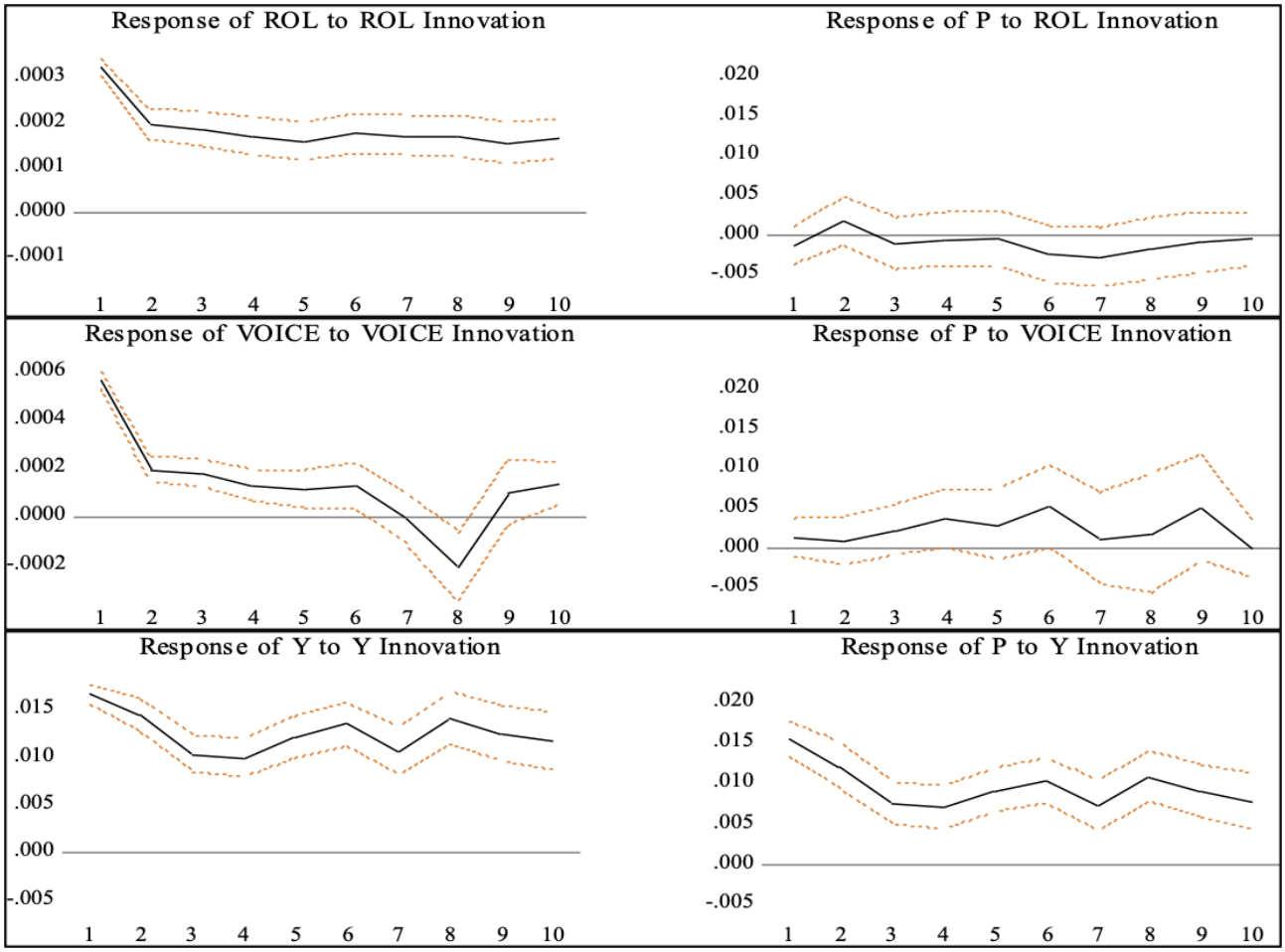
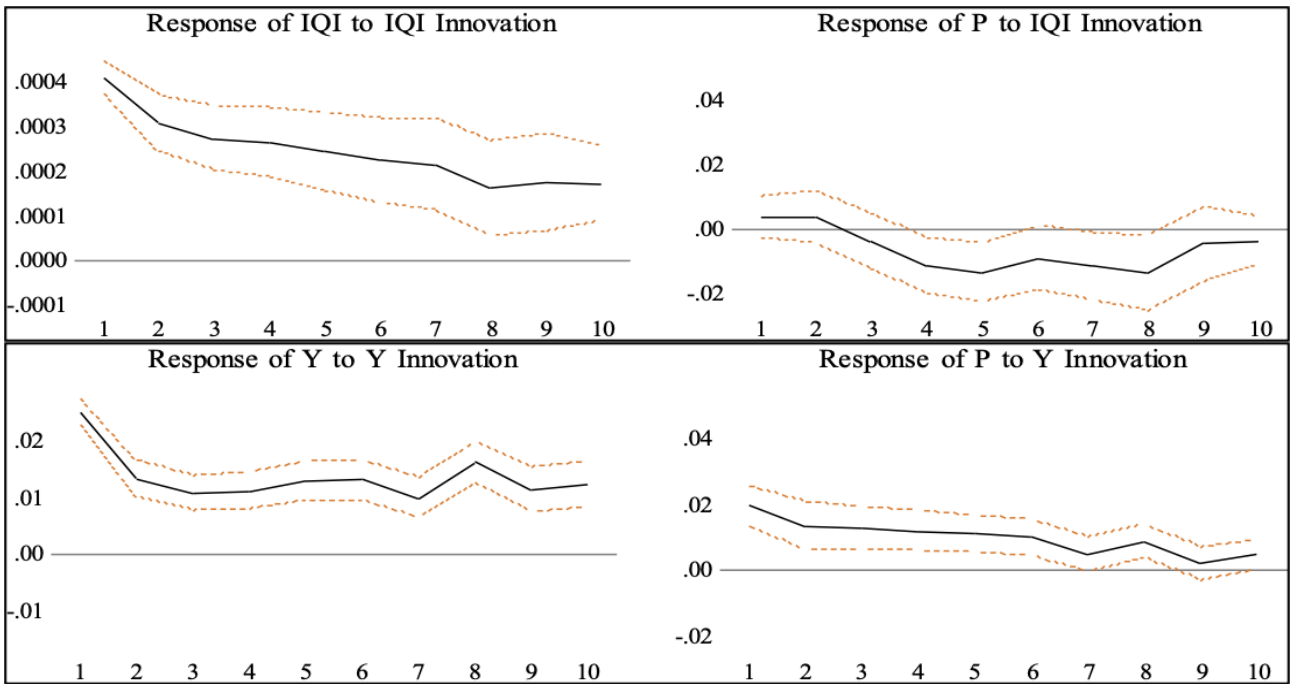
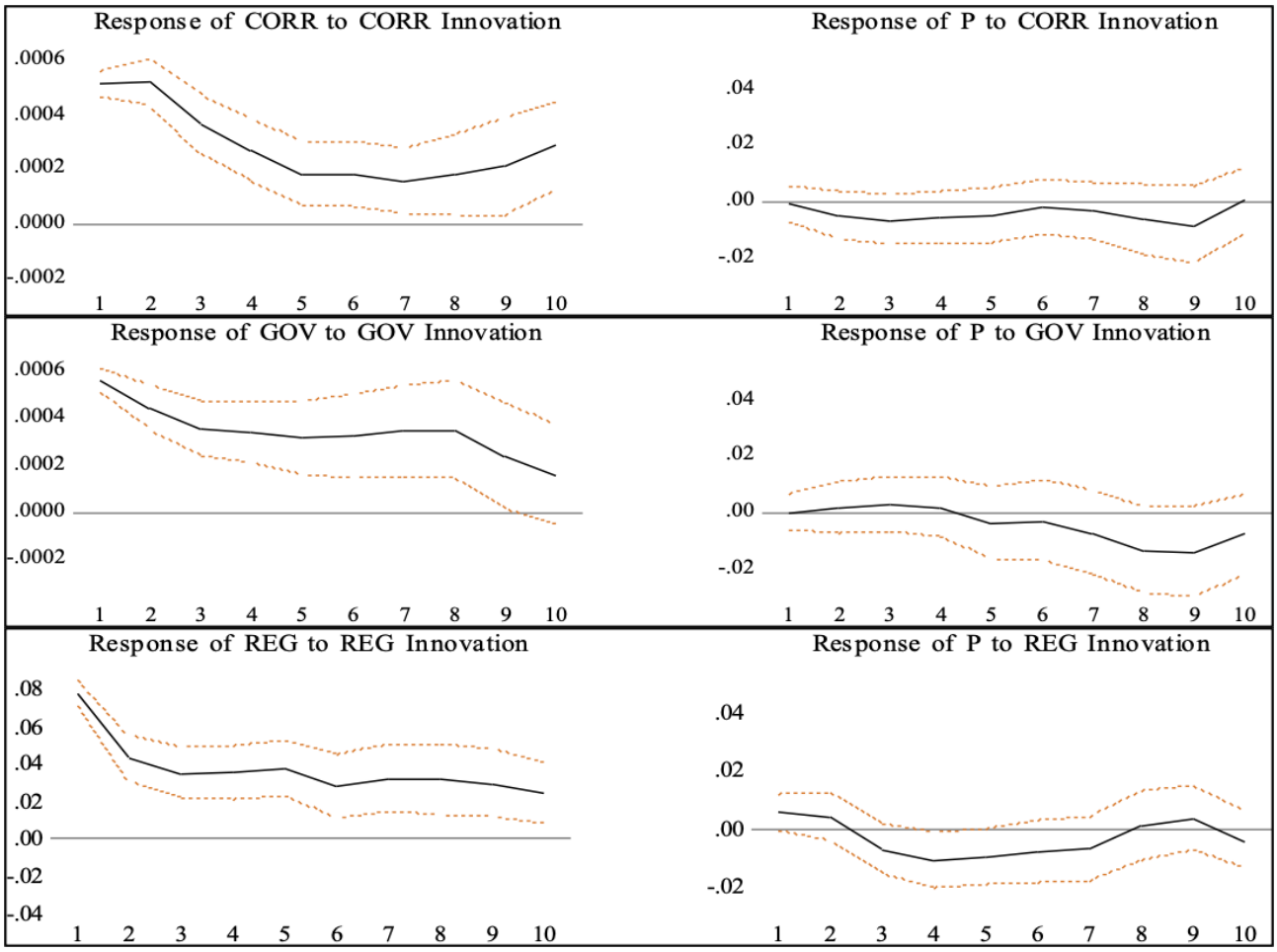

Response of ROL to ROL Innovation
.0003
.0002
.0001
.0000
-.0001
1 2 3 4 5 6 7 8 9 10
Response of P to ROL Innovation
.020
.015
.010
.005
.000
-.005
1 2 3 4 5 6 7 8 9 10
Response of VOICE to VOICE Innovation
.0006
.0004
.0002
.0000
-.0002
1 2 3 4 5 6 7 8 9 10
Response of P to VOICE Innovation
.020
.015
.010
.005
.000
-.005
1 2 3 4 5 6 7 8 9 10
Response of Y to Y Innovation
.015
.010
.005
.000
-.005
1 2 3 4 5 6 7 8 9 10
Response of P to Y Innovation
.020
.015
.010
.005
.000
-.005
1 2 3 4 5 6 7 8 9 10

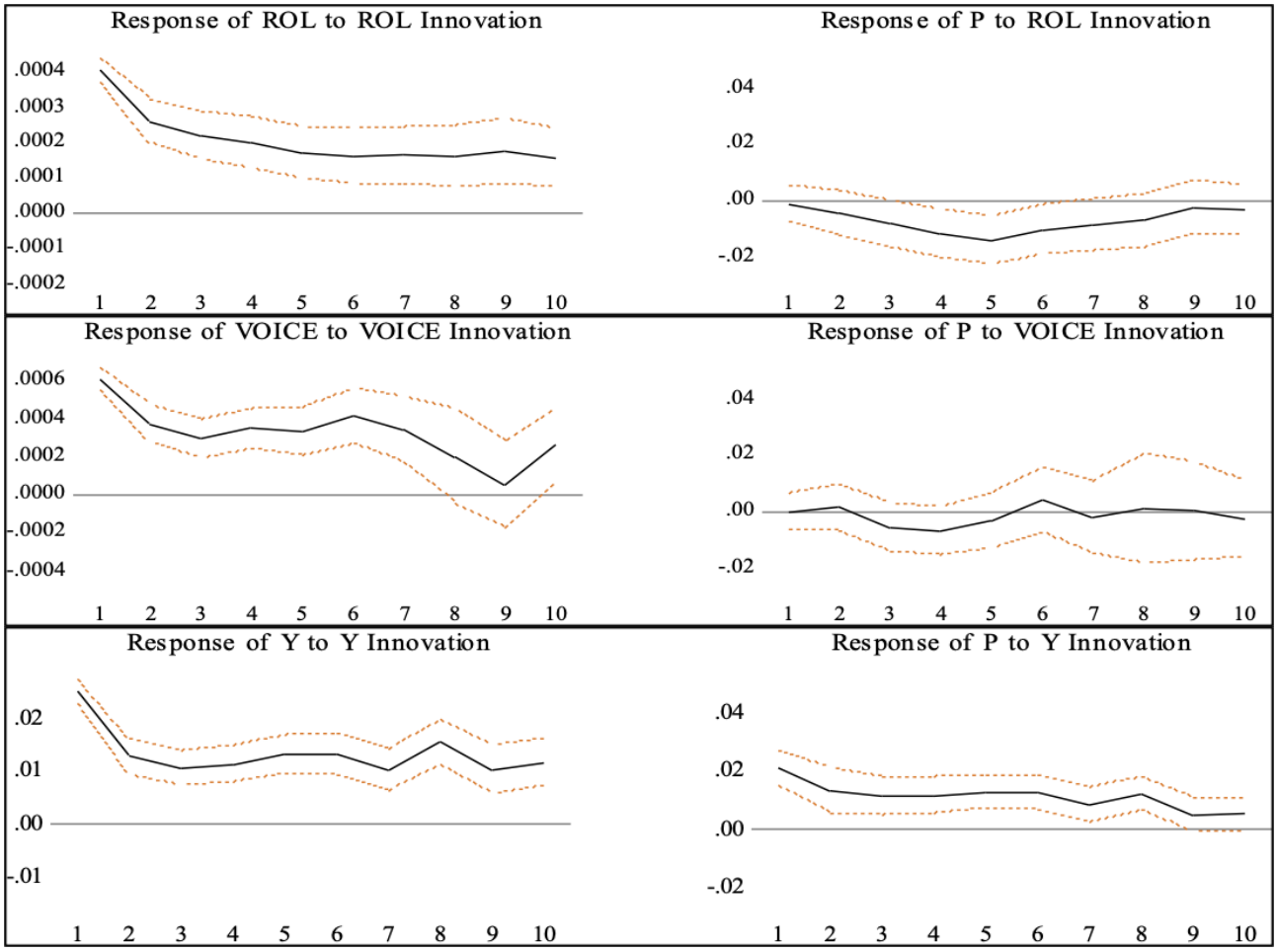
Figure 3: IRFs for the Mezzogiorno regions

Model #1



Model #2




Response of ROL to ROL Innovation
.0004
.0003
.0002
.0001
.0000
-.0001
-.0002
1 2 3 4 5 6 7 8 9 10
Response of P to ROL Innovation
.04
.02
.00
-.02
1 2 3 4 5 6 7 8 9 10
Response of VOICE to VOICE Innovation
.0006
.0004
.0002
.0000
-.0002
-.0004
1 2 3 4 5 6 7 8 9 10
Response of P to VOICE Innovation
.04
.02
.00
-.02
1 2 3 4 5 6 7 8 9 10
Response of Y to Y Innovation
.02
.01
.00
-.01
1 2 3 4 5 6 7 8 9 10
Response of P to Y Innovation
.04
.02
.00
-.02
1 2 3 4 5 6 7 8 9 10

References

A'hearn, B. (1998). Institutions, externalities, and economic growth in southern Italy: evidence from the cotton textile industry, 1861-1914. Economic History Review, 734-762.

Accetturo, A., Albanese, G., Ballatore, R. M., Ropele, T. & Sestito, P. (2022). I divari territoriali in Italia tra crisi economiche, ripresa ed emergenza sanitaria. Banca d'Italia. Questioni di Economia e Finanza. Occasional papers, n. 685, aprile 2022. url:https://www.bancaditalia.it/pubblicazioni/qef/2022-0685/QEF_685_22.pdf

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. American economic review, 91(5), 1369-1401.

Andres, L. A., Guasch, J. L., & Straub, S. (2007). Do regulation and institutional design matter for infrastructure sector performance?. *World Bank Policy Research Working Paper*, (4378).

Arestis, P., Fontana, G., & Phelps, P. (2017). Regional financialisation and financial systems convergence: evidence from Italy. Environment and Planning A: Economy and Space, 49(1), 141-167.

Bernat, G. A. (1996). Does manufacturing matter? A spatial econometric view of Kaldor's laws. Journal of Regional Science, 36(3), 463–477. https://doi.org/10.1111/j.1467-9787.1996.tb01112.x

Bianchi, C. (2002). A reappraisal of Verdoorn's law for the Italian economy (1951–1997). In J. S. McCombie, M. Pugno, & B. Soro (Eds.), Productivity growth and economic performance: Essays on Verdoorn's law (pp. 115–135). Palgrave Macmillan UK.

Boyer, R., & Petit, P. (1991). Kaldor's growth theories: past, present and prospects for the future. In Nicholas Kaldor and mainstream economics (pp. 485-517). Palgrave Macmillan, London.

Bourdieu, P. (1986). The forms of capital. In: Richardson, J., Handbook of Theory and Research for the Sociology of Education. Westport, CT: Greenwood: 241–58.

Carnevali, E., Godin, A., Lucarelli, S., & Veronese Passarella, M. (2020). Productivity growth, Smith effects and Ricardo effects in Euro Area's manufacturing industries. *Metroeconomica*, *71*(1), 129-155.

Casetti, E. (1984). Verdoorn law and the components of manufacturing productivity growth: A theoretical model and an analysis of US regional data. In Å Anderson, W. Isard, & T. Puu (Eds.), *Regional and industrial theories: models and empirical evidence.* Elsevier, Amsterdam, 295-308.

Coase, R. H. (1937). The nature of the firm.

Coase, R. H. (1960). The Problem of Social Cost. Journal of Law and Economics, 3, 1.

D'Agostino, G., Dunne, J. P., & Pieroni, L. (2016). Government spending, corruption and economic growth. *World Development*, *84*, 190-205.

De la Croix, D., & Delavallade, C. (2011). Democracy, rule of law, corruption incentives, and growth. *Journal of Public Economic Theory*, *13*(2), 155-187.

Deleidi, M., & Mazzucato, M. (2019). Putting austerity to bed: Technical progress, aggregate demand and the supermultiplier. Review of Political Economy, 31(3), 315–335. https://doi.org/10.1080/09538259.2019.1687146

Deleidi, M., & Paternesi Meloni, W. (2019). Produttività e domanda aggregata: una verifica della legge di Kaldor-Verdoorn per l'economia italiana. Economia & lavoro, 53(2), 25-44.

Deleidi, M., Paternesi Meloni, W., & Stirati, A. (2020). Tertiarization, productivity and aggregate demand: evidence-based policies for European countries. *Journal of Evolutionary Economics*, *30*, 1429-1465.

Deleidi, M., Paternesi Meloni, W., Salvati, L., & Tosi, F. (2021). Output, investment and productivity: the Italian North–South regional divide from a Kaldor–Verdoorn approach. *Regional Studies*, *55*(8), 1376-1387.

Del Mar Salinas-Jiménez, M., & Salinas-Jiménez, J. (2007). Corruption, efficiency and productivity in OECD countries. *Journal of Policy Modeling*, *29*(6), 903-915.

Dixon, R., & Thirlwall, A. P. (1975). A model of regional growth-rate differences on Kaldorian lines. Oxford Economic Papers, 27(2), 201-214.

Engerman, S. L., & Sokoloff, K. L. (1994). Factor endowments: institutions, and differential paths of growth among new world economies: a view from economic historians of the United States. NBER Historical Working Paper 0066. doi: 10.3386/h0066

Engerman, S. L., & Sokoloff, K. L. (2002). Factor endowments, inequality, and paths of development among new world economics. NBER Working Paper 9259. doi: 10.3386/w9259

Fargion, V. (1996). Social assistance and the North–South cleavage in Italy. South European Society and Politics, 1(3), 135-154

Fazio, G., Maltese, E., & Piacentino, D. (2013). Estimating Verdoorn law for Italian firms and regions. *Letters in Spatial and Resource Sciences*, *6*, 45-54.

Felice, E. (2018). The socio-institutional divide: explaining Italy's long-term regional differences. Journal of Interdisciplinary History, 49(1), 43-70.

Fingleton, B. (2000). Spatial econometrics, economic geography, dynamics and equilibrium: A 'third way'? Environment and Planning A: Economy and Space, 32(8), 1481–1498. https://doi.org/10.1068/a32211

Fingleton, B., & McCombie, J. S. (1998). Increasing returns and economic growth: some evidence for manufacturing from the European Union regions. *Oxford Economic Papers*, *50*(1), 89-105.

Frankel, M. (1955). Obsolescence and technological change in a maturing economy. The American Economic Review, 45(3), 296-319

Graziani, A. (1978). The Mezzogiorno in the Italian economy. Cambridge Journal of Economics, 2(4), 355-372

Graziani, A. (2000). Lo sviluppo dell'economia italiana. Dalla ricostruzione alla moneta europea. Bollati Boringhieri.

Hansen, J. D., & Zhang, J. (1996). A Kaldorian approach to regional economic growth in China. *Applied Economics*, *28*(6), 679-685.

Harris, R. I., & Lau, E. (1998). Verdoorn's law and increasing returns to scale in the UK regions, 1968–91: some new estimates based on the cointegration approach. *Oxford Economic Papers*, *50*(2), 201-219.

Iasco Pereira, H.C., Romero, J.P., Medeiros, V. (2021) Kaldor–Verdoorn's law and institutions: evidence from Brazilian municipalities, Cambridge Journal of Economics, Volume 45, Issue 3, May 2021, Pages 511–536

Jalilian, H., Kirkpatrick, C., & Parker, D. (2007). The impact of regulation on economic growth in developing countries: A cross-country analysis. *World development*, *35*(1), 87-103.

Kaldor, N. (1957). A model of economic growth. The Economic Journal, 67(268), 591–624. https://doi.org/10.2307/2227704

Kaldor, N. (1961). Capital, accumulation and economic growth. In F. A. Lutz & D. C. Hague (Eds.), The theory of capital (pp. 177–222). St. Martin's.

Kaldor, N. (1966). Causes of the slow rate of economic growth of the United Kingdom. Cambridge University Press; repr. in Kaldor, N. (1978). Further essays on economic theory. Holmes & Meier.

Kaldor, N. (1967). Strategic factors in economic development. Cornell University.

Kaldor, N. (1970). The case for regional policies. Scottish Journal of Political Economy, 17(3), 337-348.

Kaldor, N. (1972). The irrelevance of equilibrium economics. The Economic Journal, 82(328), 1237–1255. https://doi.org/10.2307/2231304

Kaldor, N., & Mirrlees, J. A. (1962). A new model of economic growth. The Review of Economic Studies, 29(3), 174–192. https://doi.org/10.2307/2295953

Kie, C. (1997). *The effects of flexible manufacturing contexts: Geographical patterns in the labor productivity impact of output growth*. Taylor & Francis.

Knell, M. (2004). Structure change and the Kaldor-Verdoorn law in the 1990s. *Revue d'économie industrielle*, *105*(1), 71-83.

Kim, Y. E., & Loayza, N. (2019). Productivity growth: Patterns and determinants across the world. World Bank Policy Research Working Paper, (8852).

Lavoie, M. (2015). Post-Keynesian economics: New foundations. Edward Elgar.

Lloyd, P., & Lee, C. (2018). A review of the recent literature on the institutional economics analysis of the long-run performance of nations. Journal of Economic Surveys, 32(1), 1-22.

Magacho, G. R., & McCombie, J. S. (2017). Verdoorn's law and productivity dynamics: An empirical investigation into the demand and supply approaches. *Journal of Post Keynesian Economics*, *40*(4), 600-621.

McCombie, J. S. (1983). Kaldor's laws in retrospect. Journal of Post-Keynesian Economics, 5(3), 414–430. https://doi.org/10.1080/01603477.1983.11489380

McCombie, J. S., & de Ridder, J. R. (1984). "The Verdoorn law controversy": Some new empirical evidence using US state data. *Oxford Economic Papers*, *36*(2), 268-284.

McCombie, J. S., Pugno, M., & Soro, B. (2002). Productivity growth and economic performance: Essays on Verdoorn's law. Palgrave Macmillan, UK.

Millemaci, E., & Ofria, F. (2014). Kaldor-Verdoorn's law and increasing returns to scale: a comparison across developed countries. *Journal of Economic Studies*.

Millemaci, E., & Ofria, F. (2016). Supply and demand-side determinants of productivity growth in Italian regions. *Structural Change and Economic Dynamics*, *37*, 138-146.

Nifo, A. & Vecchione, G. (2014), "Do Institutions Play a Role in Skilled Migration? The Case of Italy", Regional Studies, Volume 48, Issue 10, 2014, pages 1628-1649

North, D. C. (1990). Institutions, institutional change and economic performance. Cambridge university press.

North, D. C. (1991). Institutions. Journal of economic perspectives, 5(1), 97-112

Ofria, F. (2009). L'approccio Kaldor–Verdoorn: una verifica empirica per il Centro-Nord e il Mezzogiorno d'Italia (anni 1951–2006). *Rivista di Politica Economica*, 1(1), 179–207.

Patrizii, V., & Resce, G. (2015). Public sector contribution to competitiveness. *Italian Economic Journal*, *1*, 401-443.

Pedroni, P. (2013). Structural Panel VARs. Econometrics, *1*(2), 180-206.

Persson, T., & Tabellini, G. (1999). Political economics and macroeconomic policy. Handbook of macroeconomics, 1, 1397-1482.

Persson, T. & Tabellini, G. (2002a). Political Economics. Explaining Economic Policy. MIT Press Books, The MIT Press.

Persson, T., & Tabellini, G. (2002b). Political economics and public finance. Handbook of public economics, 3, 1549-1659.

Pons-Novell, J., & Viladecans-Marsal, E. (1999). Kaldor's laws and spatial dependence: evidence for the European regions. *Regional Studies*, *33*(5), 443-451.

Postigliola, M., & Rota, M. (2021). Institutions and literacy rates: the legacy of Napoleonic reforms in Italy. European Review of Economic History, 25(4), 757-779.

Putnam, R. (1993). The prosperous community: Social capital and public life. The american prospect, 13(4).

Romero, J. P., & Britto, G. (2017). Increasing returns to scale, technological catch-up and research intensity: endogenising the Verdoorn coefficient. Cambridge Journal of Economics, 41(2), 391-412.

Routledge, B. R., & Von Amsberg, J. (2003). Social capital and growth. *Journal of Monetary Economics*, *50*(1), 167-193.

Roth, F. (2022). The Rule of Law and Labor Productivity Growth by Businesses: Evidence for the EU, 1998–2005. In *Intangible Capital and Growth: Essays on Labor Productivity, Monetary Economics, and Political Economy, Vol. 1* (pp. 43-72).

Setterfield, M. (1997). 'History versus equilibrium'and the theory of economic growth. Cambridge Journal of Economics, 21(3), 365-378.

Smith, A. (1805). An inquiry into the nature and causes of the wealth of nations. Glasgow : At the University Press for J. & J. Scrymgeour

Sokoloff, K. L., & Engerman, S. L. (2000). Institutions, factor endowments, and paths of development in the new world. Journal of Economic perspectives, 14(3), 217-232

Soro, B. (1985). Crescita regionale a tassi differenziati: possibilità e limiti di applicazione di uno schema analitico kaldoriano. *Economia e Politica Industriale*, *12*(45), 85-107.

Thirlwall, A. P. (1983). A plain man's guide to Kaldor's growth laws. *Journal of post Keynesian economics*, *5*(3), 345-358.

Tosi, F. (2018). Caratteristiche e determinanti della condizione Neet in Italia. Polis, 32(3), 387–398. doi:10.1424/91426

Toth, F. (2014). How health care regionalisation in Italy is widening the North–South gap. Health Economics, Policy and Law, 9(3), 231-249.

Tridico, P., & Pariboni, R. (2018). Inequality, financialization, and economic decline. Journal of Post Keynesian Economics, 41(2), 236–259. doi:10.1080/01603477.2017.1338966

Verdoorn, P. J. (1949). On the factors determining the growth of labour productivity. L'Industria. In J. S. McCombie, M. Pugno, & B. Soro (Eds.), Productivity growth and economic performance: Essays on Verdoorn's law (pp. 28–36). Palgrave Macmillan UK.

Viesti, G. (2009). Mezzogiorno a Tradimento. Il Nord, il Sud e la Politica che non c'è. Laterza.

Viesti, G. (2013). 'Il Sud vive sulle spalle dell'Italia che produce' Falso! Laterza.

Viesti, G. (2021). Centri e periferie. Europa, Italia, Mezzogiorno dal XX al XXI secolo, Laterza.

Williamson, O. E. (2000). "The New Institutional Economics: Taking Stock, Looking Ahead." Journal of Economic Literature, 38 (3): 595-613.

Wu, S., Li, B., Nie, Q., & Chen, C. (2017). Government expenditure, corruption and total factor productivity. *Journal of cleaner production*, *168*, 279-289.

Young, A (1928). Increasing Returns and Economic Progress. Economic Journal 38 (12): 527–42