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Abstract: Demand-side multipliers have ruled within multisectoral models as the main indicators for policy effectiveness and key-sector determination. The causal link between new exogenous final demand and responded endogenous total output is well understood and has been the basis for such a prevalent demand-side analysis both in linear interindustry analysis and in non-linear applied general equilibrium models. In this paper we shift the perspective to supply-side injections and we do so by studying the repercussion effects of marshalling additional primary factors, labor and capital services, which are injected into the economy and give rise to a general resource reallocation. As a result, we obtain estimates of supply multipliers that provide complementary information to standard demand multipliers. We illustrate the methodology using an empirical general equilibrium model built with the most recent data for the region of Andalusia, Spain.

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1. Introduction

Simply stated, demand-side multipliers have had a ruling role in the economic analysis of the effects of discretionary policy analysis and in the examination of some structural properties of economies, both in macro and in microeconomic settings. With different levels of statistical detail and different degrees of analytical sophistication, demand multipliers of the Keynesian type have provided the informational basis for many of the expansionary policies that have been historically undertaken by governments both in developed and developing countries. The idea is simple but appealing. Each new dollar of demand for goods that gets injected into an economy produces a propagation effect that yields an overall result greater than the initial 1 dollar injected, thus the explanation of the 'multiplier' label commonly used. Despite some deep criticisms (Barro, 2012) the demand-side multiplier tool is still prevalent in empirical economics and has also become a widespread instrument in consulting (Oosterhaven & Stelder, 2002; Dietzenbacher, 2005; Robinson, 2006). In fact, the whole key-sector literature has been built entirely from demand-side calculations (Rasmussen, 1956; Chenery & Watanabe, 1958; Strassert, 1968; Miller & Lahr, 2001).

The fact that new demand injections must be somehow financed –either by raising taxes or by issuing debt– has put somehow into question the validity of the standard demand-side multiplier calculations (Guerra & Sancho, 2012). Whatever positive effects new demand may deliver in the short-run, they need to be carefully balanced against the negative effects that will ensue from the reduction of available resources in the present (via taxes) or in the future (via debt). Another criticism to standard demand-driven multipliers lays in the fact that the impulse that new injections may exert can and will always be carried out since no supply-side constraints are contemplated. Any inputs required for implementing the new demand injections, like labor or capital or materials, will be available and ready to be used. When supply constraints are taken into account, however, demand-side multipliers stop being 'multipliers' in the expansive sense of the term. They are no longer guaranteed to be greater than 1 and in fact they can even have negative values. Cardenete & Sancho (2012) use a run-of-the-mill general equilibrium model to illustrate this situation and possibilities. The supply-side of the economy, often omitted, seems to matter and matter a lot.

Recently, De Miguel et al. (2013, 2014) also realize this fact and propose a novel way to measure the general equilibrium impact of a Hicks neutral productivity improvement in the production functions. Since the change in the total factor productivity coefficients can be interpreted as an increase in the availability of aggregate sectoral value-added, their procedure allows them to introduce the concept of supply-multipliers. In general terms, a multiplier is a measure –in equilibrium– of the derivative linking an exogenous resource with an endogenous outcome. In the demand-side perspective, for example, an external resource is usually a change in government's demand whereas the endogenous outcomes are typically total sectoral output levels, although many other indicators are indeed possible. Under the supply-side point of view that we use in this paper, external changes will have to do with an increased availability in the pool of a non-produced factor of production, such as labor or capital services, and the implications thereof.

This is the main goal of this research, namely, to shift the analytical emphasis from the standard demand-driven multipliers to this complementary perspective based on the estimation of supply-side multipliers. Two aspects merit comment here. The first one is the additional information that supply-side based calculations may contribute. Instead of estimating the results of additional demand expenditures, which are subject to the aforementioned analytical debates regarding its effectiveness and prone to the often heated political controversies of the zero-sum game of budgeting, we call attention to the adequacy of looking at policies (like enhancing employment opportunities, opening up new labor niches, fostering highly skilled immigration, and/or attracting new capital) that may result in an overall improvement in the economy with substantial lesser economic and political costs than the common demand policies counterparts. The second aspect is methodological and has to do with our tool of choice. We posit too, as Robinson and Roland-Holst (1988), Cardenete and Sancho (2012) and De Miguel et al (2013, 2014), that a correct assessment of the role played by the supply-side of the economy requires an integrated general equilibrium model with full demand and supply specifications. Linear interindustry or even extended SAM (Social Accounting Matrix) models cannot capture the supply-side of the economy since, by their very construction, they contemplate an unlimited pool of primary resources always on hand to accommodate any change in production as a result of any demand-driven policies. In this sense, standard linear economic models seem to be inextricably linked to an exclusive demand-side perspective. A general equilibrium model overcomes this difficulty providing, at the same time and for a given level of disaggregation, a complete description of the most significant economic interactions.

We implement our general equilibrium model using data from the most recent SAM (Social Accounting Matrix) for Andalusia, a Spanish region, for 2010 (Campoy et al, 2017), which has been built using the most recently input-output framework available from the Andalusian Statistical Institute. Our database includes 25 productive sectors, plus all the standard institutional accounts, including two primary factors –labor and capital services–, a representative household, a saving/investment account, two types of taxes –direct income and indirect transaction taxes–, as well as a government and a consolidated external sector accounts. All in all, the SAM database is a square matrix with 33 accounts[1]. Row sums coincide with column sums, reflecting the budget balance for each and all the accounts. Model parameters are calibrated to this data set and to external substitution elasticities borrowed from the econometrics literature (Mansur & Whalley, 1989, Sancho, 2009). Calibration entails that the data set represents a state of economic equilibrium, i.e. the model so constructed reproduces all the observed empirical data as an equilibrium. We commonly refer to this initial given equilibrium as the benchmark. Once this equilibrium is established, we introduce controlled changes in the total endowments of labor and capital as proxies for the supply of primary factors and re-compute the equilibrium under two different model closure rules. This will help us in appraising the sensitivity of the results.

Section 2 introduces the main traits of the general equilibrium model that we use. In Section 3 we describe and discuss the simulation results. Finally, Section 4 concludes.

2. The general equilibrium model

We use a standard general equilibrium model that belongs to the Shoven & Walley (1984) model categorization. For the specifics of this class of general equilibrium models, we refer the reader to Ginsburgh & Keyzer (2002), Kehoe et al. (2005) and Cardenete et al. (2012). They provide a good up-to-date of the state of the art and clarify the details and technicalities that characterize these models. We will therefore be brief in the present model description.

Our model includes n=25 productive sectors and is enlarged by including both public and foreign activities. The tax system is simple. The government collects a direct

[1] The complete SAM is available upon request.

income tax and an aggregate indirect tax on transactions. Tax receipts allow the financing of public expenditure in goods and services and of welfare contributions in the form of lump-sum social transfers. Total expenditures can differ from total tax receipts and the public deficit (surplus, if positive) takes care of this. If negative, detracting from total savings; if positive adding to it. Two government closure rules are possible depending on whether the public deficit is taken as fixed (and expenditure levels adjusting to this target) or variable (with then having fixed expenditure levels).

Imports are imperfect substitutes of domestic production following an Armington (1969) hypothesis and their levels are endogenously determined through cost minimization. The Armington hypothesis requires the use of substitution elasticities between domestic and imported goods. We have adapted the empirical elasticity estimates of Welsch (2008) for three European countries. The adaptation to the peculiarities of our database structure involves using the shares between sectoral imports and sectoral output as weights. The Armington aggregation of domestically produced output and imports generates the level of total production available to all agents for intermediate production, private and public consumption, gross capital formation, etc. Theoretically speaking, two possible closure rules for the external sector are possible too, depending upon whether exports demand is fixed or variable. Because of a small country assumption, however, which is natural given the size of the region, we consider that the structure of the demand for exports is determined outside the model and unaffected by it. We reflect this given structure using a fixed coefficients activity vector for exports. Since exports are exogenous (small country assumption) and imports are endogenous (Armington assumption) the external sector deficit becomes an endogenous variable in the model.

Relative prices and activity levels of the productive sectors are endogenous variables too. Private agents –consumers and firms– behave rationally as utility and profit maximizers, respectively. We consider a representative consumer that formulates demand for current and future consumption maximizing a Cobb-Douglas utility function subject to a disposable income budget constraint. Firms are organized in productive sectors and their goal is to maximize profits. Because we assume constant returns-to-scale, profit maximization entails in practice that firms are cost minimizers. The production technology is given by a nested production function. The domestic output of a sector is obtained by combining, through a Leontief technology, outputs from the rest of sectors and value-added. In turn, this value-added is generated from primary factors (labor and capital) using a constant elasticity of substitution (CES) function aggregator. Production sectors have been classified into small, medium and high elasticity of substitution sectors following Fæhn et al. (2009).The overall output of a sector is obtained too from a CES combination of domestically produced output and imports, according to the aforementioned Armington condition.

Final and intermediate demand for goods and services and supply of goods and services by firms is coordinated through the price mechanism. Stripped to its bare essentials, an equilibrium consists of a vector of prices (*n* for goods and services and 2 for primary factors) and a vector of activity levels (*n* for goods and services and 2 primary factors) so that demand equals supply in all *n*+2 markets. We do not consider the possibility of underutilization of the available supply of factors. The reason is that we want to model the effects of increasing said supplies when their initial equilibrium use is already binding. For each of the *n* goods, total supply Y_i, which includes domestic output X_i and imported goods and services M_i, is used to satisfy intermediate demand $A_i(Y_i)$, private consumption demand C_i, public expenditures G_i, gross capital formation I_i and exports E_i. Constant-returns-to-scale, in turn, implies that the *n* prices for goods and services will satisfy the average cost rule. Two more equations and two more prices are at play, namely, labor and capital as primary factors and their respective prices. We derive aggregate demand for labor and capital by adding up their demands from each of the *n* firms, L_i and K_i. In equilibrium total demand for labor and capital will be equal to the total endowment levels of these two non-produced factors, L^0 and K^0. Walras' law implies that one of the 2*n*+2+2 system equations is redundant and plays no role. Since only relative prices matter, one of the 2*n*+2+2 variables needs to be fixed from outside the model. As a result, the number of essential equations and variables is 2*n*+2+1. As is customary, we use the price of labor as the basic standard by which value is measured, or *numéraire*. Hence all value magnitudes should always be interpreted in reference to the price of labor.

The model is closed in such a way that investment is determined by total savings (private, public and foreign). Private savings are endogenous and are the result of assigning a fixed percentage (via a marginal propensity to savings) of disposable income to savings demand. Foreign savings are related to the endogenous deficit (or surplus) of the external sector. Public savings reflect too the government deficit (or surplus). We will contemplate here two scenarios to provide some sensitivity analysis to the results. In the first one the government demand for public consumption is fixed. Since tax collections are always endogenous, this means that public savings become endogenous in the model. In the second government scenario we consider the opposite case. Now public consumption will adjust so as to keep public savings constant and equal to the benchmark value. These two polar cases represent the extreme opposite cases for public consumption policies and they offer a range of values for the simulation results. Notice that regardless of the specific government closure rule, this is always a savings driven model.

Let the vector $Y^0 = (Y_1^0, Y_2^0, ..., Y_n^0)$ denote the benchmark equilibrium levels in total output and let L^0 and K^0 be the initial endowments of labor and capital. When we introduce, say, a change ΔL in the availability of labor, the model representing the economy recalculates all the equilibrium quantities, which we now denote by vector Y^1. The labor induced output multiplier in sector *i* will be given by the derivative:

$$m_i^L = \lim_{\Delta L \to 0} \frac{Y_i^1 - Y_i^0}{\Delta L} \tag{1}$$

Alternatively, we can express it in elasticity terms:

$$\varepsilon_i^L = \lim_{\Delta L \to 0} \frac{(Y_i^1 - Y_i^0) / Y_i^0}{\Delta L / L^0} \tag{2}$$

Similar calculations for the supply-side multipliers m_i^K and ε_i^K stemming from changes ΔK in the level of capital follow exactly the same logic. Once a new equilibrium is achieved, a complete battery of other indicators is of course possible and easily obtained. All we need is to use the new basic quantity and price equilibrium levels to evaluate all kind of derived magnitudes. Should we be interested in estimating the real effects on gross domestic product, we could use a Laspeyres quantity index. For gauging the effects on private welfare, for instance, we would be advised to use an equivalent variation measure, since it has the nice property of not depending on the chosen model numéraire. And so on with many more indicators.

3. Results and discussion

In this section we carry out the simulations that will give us specific sectorial values for the estimation of supply multipliers. The basic calculation proceeds from assuming a 1 percent increase in the availability of primary factors, labor and capital. The model then recalculates the new equilibrium magnitudes under two different closure rules for the government. These rules capture polar government behavior in deciding its expenditure rules and give us the range of variation that can be attributed to the said policies. Under closure rule 1 the government acts to maintain the public deficit fixed and thus public consumption in goods and services adjusts so as to match the evolution of tax receipts. Under closure rule 2 the government prioritizes its level of expenditure in public consumption and any variation in tax collections is disregarded. Thus the balance between tax income and expenditure, i.e. the public deficit, is now variable and will be determined in equilibrium. In total, we report four simulations. Each of the changes in the availability of labor and capital will be coupled with the two closure rules.

Our starting point is a benchmark equilibrium for the regional economy. Once we shock the model with a factor's supply change, we obtain a new equilibrium vector of total output. Table 1 reports the multiplier results for both labor and capital being increased 1 percent. We choose to list the elasticity expressions (ε_i^L and ε_i^K) for the multipliers because these figures provide normalized values for sectoral output changes that are somehow independent of the level of the introduced percentage shock. As it is common, we approximate the equilibrium value of the 25 sectoral elasticities by calculating the arch elasticity between the two available reference points, i.e. the initial and final equilibrium points. The final row in Table 1 shows the weighted elasticity average for the whole economy obtained using the share of sectoral total output as weights. At first glance, the aggregate multiplier effects fluctuate around 0.5 percent. A 1 percent increase in labor availability, for instance, would cause a change in aggregate total output somewhere between 0.46 and 0.54. This approximate 1 → ½ rule is worth remembering as a descriptor of the influence of labor in the gross output of the regional economy. Similar considerations apply to the effects of increasing the supply of capital, in this case with figures which are slightly above those of labor under both closure rules. Total output seems to be, even if only slightly, more reactive to the availability –or lack thereof– of capital. Overall, capital losses would be marginally more detrimental to the economy than labor losses.

[Table 1 around here]

Table 1 shows the detail of the specific sectoral elasticities. The interpretation is straightforward. In sector 1, "Agriculture, livestock and fisheries", an increase of a 1 percent in labor supply would translate into an increase of only 0.168 percent in scenario 1 (0.2 percent in scenario 2). In general, total sectoral output reaction seems to be inelastic, i.e. less than 1. Sector 14, “Construction”, is the noted exception. It presents the highest multiplier elasticities under both government policy scenarios with values of 1.108 and 1.927. It is the only sector with labor induced elasticities above 1. We observe the same sectoral response in Construction when we simulate changes in the availability of capital. The least reactive sector to labor supply is, in average terms, sector 20, “Real estate services”. For capital, sector 23, “Non-commercial services”, is the least reactive sector most likely because this is a sector with weak sectoral dependences and new capital inflows do not trigger any specialized competitive advantage within it.

In Graph1.1 we have ordered the 25 production sectors from lowest to highest elasticity values when labor supply is expanded. We can distinguish two different categories depending on whether a sector’s elasticity is below or above the reported average for the economy. This is a distinction that may be of interest for identifying regional key sectors from a supply perspective. These would be the sectors most reactive to new labor inflows, as measured by their induced elasticities, and with sectoral values above the economy’s average effect. For robustness sake, we may want to consider only the intersection of sectors which share this property under both closure rules scenarios. These would be sectors 8, 9, 10, 11, 12, 14, 18 and 21, a total of 8 out of 25 sectors. As a general tendency, numerical results are slightly higher under the second closure rule, when government expenditure are kept at the initial given levels and is not being subject to the dampening effects induced by a fixed public deficit. As mentioned earlier Sector 14, “Construction”, shows an unchallengeable hegemony and outperforms all the other sectors.

[Graph 1.1 around here]

In Graph 1.2, we shift the attention to the ordering of supply-side multipliers derived from changes in the availability of capital, again under the same two closure rules. The weighted average elasticity values are very similar in both cases (0.54 versus 0.56 percent). Once again, the “Construction” sector registers the highest capital induced supply multipliers, with elasticity values ranging between 1.576 and 1.728, around three times the weighted average behavior. These are the only “elastic” (i.e. greater than 1) values within the set of 25 production sectors. A quick glance at the data also shows that capital induced multipliers present smaller variance than labor induced multipliers under both scenarios. It is also relevant to notice that supply-side key sectors, i.e. those most reactive to new capital inflows under the two closure rules, coincide with those detected under new labor inflows. The reason lies most likely with the close weight these two primary factors present in the empirical data (53.50% for capital endowments and 46.50% for labor endowments with respect total value added) and the symmetrical way (through a standard CES production function) their presence is modeled.

[Graph 1.2 around here]

It might also be interesting to visualize the impact of the initial shock from a sectoral resource usage perspective. We therefore address the question of how the additional endowments of labor or capital end up affecting resource allocation and how the new level of factors are eventually distributed among the 25 factors' demanding sectors. Table 2 shows how a 1 percent increase in the total available labor or capital endowments contributes to the growth in sectoral labor or capital. For ease of interpretation all reported sectoral figures reflect the elasticity values:

$$\begin{aligned} \eta_i^L &= \lim_{\Delta L \to 0} \frac{(L_i^1 - L_i^0)/L_i^0}{\Delta L / L^0} \\ \eta_i^K &= \lim_{\Delta K \to 0} \frac{(K_i^1 - K_i^0)/K_i^0}{\Delta K / K^0} \end{aligned} \tag{3}$$

The weighted average at the last row of this Table shows that in equilibrium, and for the whole economy, a 1 percent increase in the labor endowment (or capital) will give rise to a 1 percent increase in its use, across all sectors. This observation is intuitively clear and, of course, can also be mathematically proved.

[Table 2 around here]

The simulation results show, once again, that "Construction" (sector 14) gathers the lion's share in pulling new labor and new capital, a reflection of the already observed fact that this is the sector whose output is most reactive to the inflows of new primary factors. On average terms, the elasticity effects on "Construction" are slightly above 2 while reaching a 2.885 value for labor inflows under the second closure rule.

As before, we reorder the results in Graphs 2.1 (for labor inflows) and 2.2 (for capital inflows) from min to max under both closure rules. From a resource usage perspective, the key sectors would be those sectors able to catch under new inflows of both factors higher than average (i.e. above 1) new labor and new capital. They would be sectors 9, 10, 14, 18, and 21 with "Construction" being once again the undisputed leader.

[Graphs 2.1 and 2.2 around here]

4. **Concluding remarks**

We have used the interdependent structure of a general equilibrium model to obtain an approximation to multipliers from a supply perspective. Thanks to the empirical nature of the model, we are able to simulate the calculation of the implicit Jacobian matrix by introducing a small change in the endowments of labor and capital. The consequent equilibrium readjustments allow us to measure the triggered effects on total output and the induced labor and capital reallocation. Both collections of indicators show in a novel way the possible effects that supply oriented policies may bring about. On an aggregate level, the main highlight to remember is the approximate 1 → ½ elasticity rule, i.e. a 1 percent increase in the supply of labor (or capital) will give rise, on average terms, to about 0.5 percent increase in total output. This result seems to be robust to alternative expenditure policies by the regional government.

The disaggregate nature of the general equilibrium model provide also detailed sectoral information. "Construction" appears always as the sector with the highest capacity to benefit from new inflows of labor and capital, under all scenarios. This sector's multiplier is the only one whose reaction elasticity is above 1. This result suggests the overdependence of the economy on a sector that has been socially maligned after the severe recession that followed the burst of the housing market bubble in Spain as a country and in Andalusia as a region as well. On a more hopeful note, the next three most reactive sectors, as measured by their multipliers, are sectors 21 ("Professional, scientific and technical services"), 9 ("Manufacture of computers, electronic, optical and electric devices") and 10 ("Equipment making and repair industry"). These are industry based sectors that require high skill labor abilities that would provide the economy with a more solid labor force. On the opposite side of the sectoral spectrum our results show that the least reactive belong to old type activity sectors (sectors 2, 6 for instance) and agriculture (sector 1).

It is well-known that Andalusia, as a region, has been on the receiving end of European Funds. Traditionally, these funds have played the role of enhancing the availability of factors in the economy. In some cases they have boosted the supply of specific capital in the region (via new infrastructures) or the specific supply of labor (via employment programs for young people). Our model, with its inherent and unavoidable limitations, provides a way of looking at these situations from a novel way. Finer disaggregation of the database regarding types of factors would be extremely useful for ascertaining the differential effects associated to labor types classified by skill or demographic properties. Sector specific capital (or capital available for a class of affine sectors but not to the other sectors) would also help in obtaining a more comprehensive analysis of supply multipliers. These are data limitations that can be overcome with the cooperation of the statistical authorities. More detailed information would enrich the modeling and the results of the empirical analysis. Anyhow, the message is that supply multipliers also matter and they should therefore be calculated as informational pieces for any government's decision making and probably on equal footing as demand multipliers.

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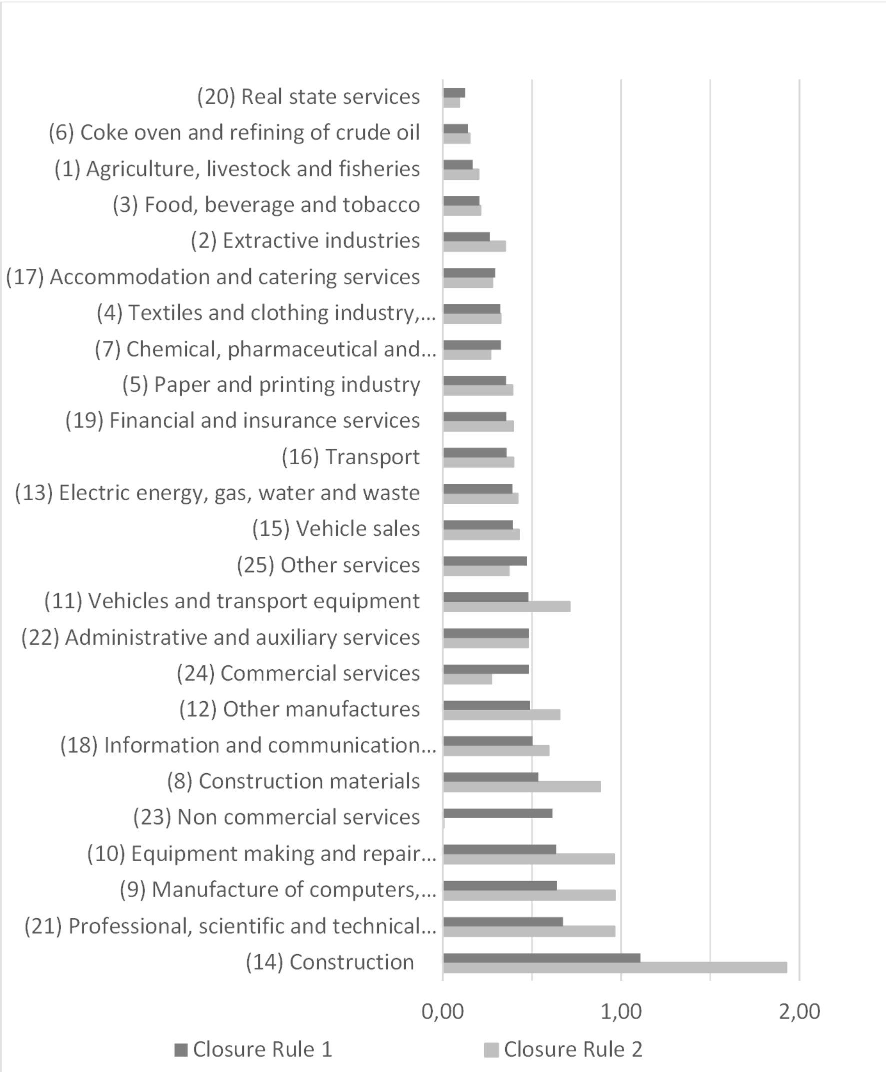
Tables and Graphs

Table 1: Regional supply multipliers for output (in elasticity form)

		SUPPLY MULTIPLIER ε_i^L		SUPPLY MULTIPLIER ε_i^K	
		CLOSURE RULE 1		CLOSURE RULE 2	
		1	2	1	2
1	Agriculture, livestock and fisheries	0,168	0,200	0,286	0,292
2	Extractive industries	0,264	0,350	0,321	0,337
3	Food, beverage and tobacco	0,205	0,211	0,315	0,316
4	Textiles and clothing industry, leather and footwear industry	0,322	0,324	0,335	0,335
5	Paper and printing industry	0,355	0,391	0,371	0,377
6	Coke oven and refining of crude oil	0,141	0,150	0,168	0,169
7	Chemical, pharmaceutical and plastics industry	0,325	0,267	0,264	0,253
8	Construction materials	0,536	0,882	0,685	0,749
9	Manufacture of computers, electronic, optical and electrical devices	0,640	0,965	0,782	0,842
10	Equipment making and repair industry	0,636	0,961	0,785	0,845
11	Vehicles and transport equipment	0,481	0,712	0,571	0,614
12	Other manufactures	0,489	0,655	0,571	0,602
13	Electric energy, gas, water and waste	0,390	0,420	0,471	0,477
14	Construction	1,108	1,927	1,576	1,728
15	Vehicle sales	0,392	0,426	0,421	0,427
16	Transport	0,358	0,397	0,368	0,375
17	Accommodation and catering services	0,295	0,277	0,485	0,482
18	Information and communication services	0,503	0,594	0,610	0,627
19	Financial and insurance services	0,357	0,395	0,516	0,524
20	Real state services	0,126	0,092	0,684	0,678
21	Professional, scientific and technical services	0,674	0,962	0,838	0,892
22	Administrative and auxiliary services	0,481	0,477	0,456	0,455
23	Non commercia lservices	0,615	0,006	0,114	0,002
24	Commercial services	0,482	0,272	0,288	0,249
25	Other services	0,471	0,369	0,302	0,283
	WeightedAverage	**0,460**	**0,535**	**0,545**	**0,559**

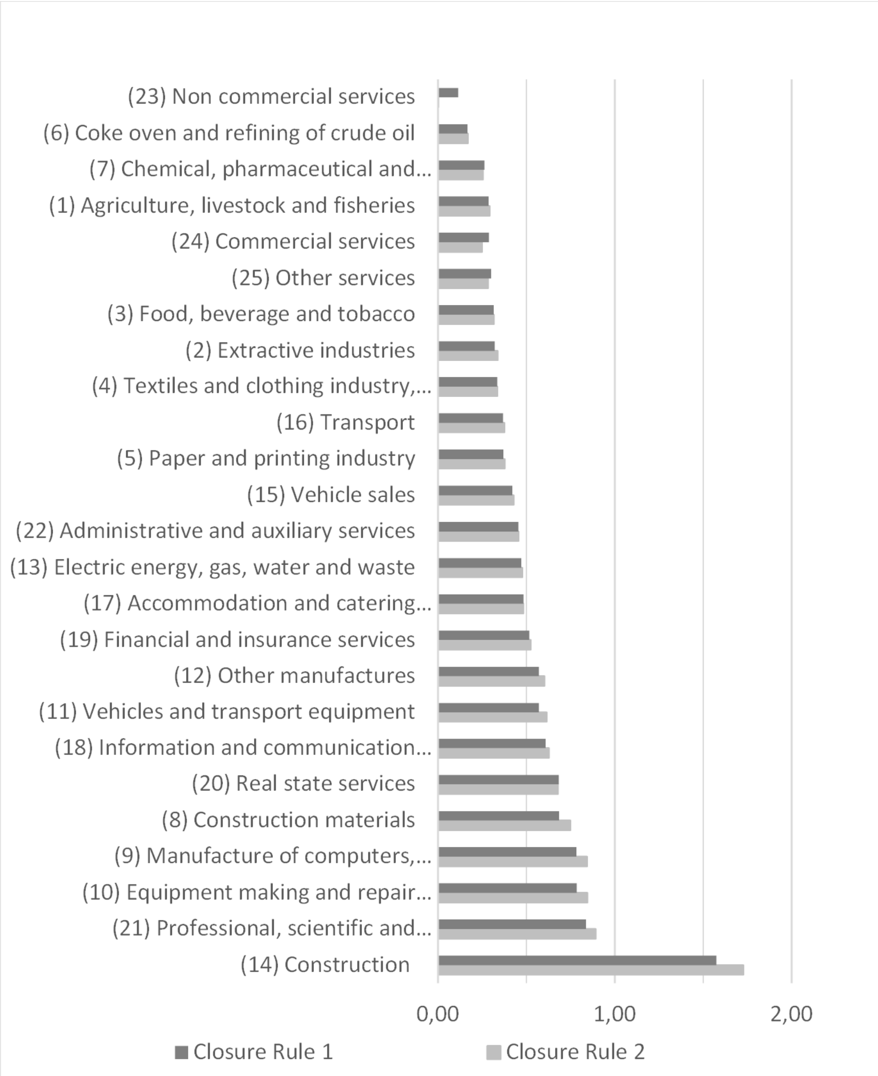
Source: Own elaboration from AGEM_Andalusia

Graph 1.1: Ordering of elasticity output multipliers in response to expanded labor supply.



Source: Own elaboration from AGEM_Andalusia

Graph 1.2: Ordering of elasticity output multipliers in response to expanded capital supply.



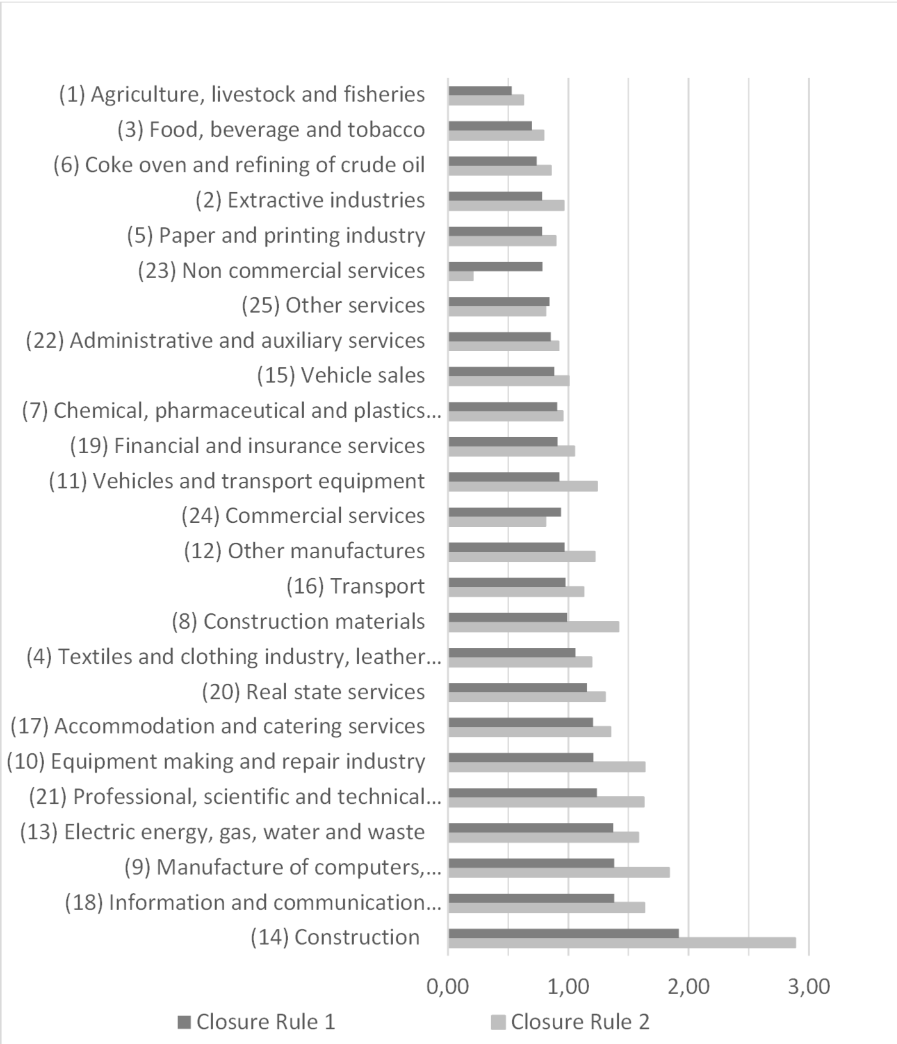
Source: Own elaboration from AGEM_Andalusia

Table 2: Regional supply multipliers for factors use (in elasticity form)

		SUPPLY MULTIPLIER η_i^L		SUPPLY MULTIPLIER η_i^K	
		CLOSURE RULE 1		CLOSURE RULE 2	
		1	2	1	2
1	Agriculture, livestock and fisheries	0,530	0,627	0,414	0,415
2	Extractive industries	0,782	0,961	0,851	0,849
3	Food, beverage and tobacco	0,699	0,793	0,862	0,844
4	Textiles and clothing industry, leather and footwear industry	1,059	1,192	0,646	0,636
5	Paper and printing industry	0,782	0,895	0,982	0,968
6	Coke oven and refining of crude oil	0,738	0,854	0,614	0,600
7	Chemical, pharmaceutical and plastics industry	0,908	0,954	0,724	0,698
8	Construction materials	0,990	1,417	1,271	1,315
9	Manufacture of computers, electronic, optical and electrical devices	1,380	1,837	1,089	1,139
10	Equipment making and repair industry	1,208	1,635	1,256	1,300
11	Vehicles and transport equipment	0,927	1,238	1,164	1,187
12	Other manufactures	0,969	1,220	1,132	1,143
13	Electric energy, gas, water and waste	1,375	1,580	0,882	0,873
14	Construction	1,921	2,885	2,153	2,285
15	Vehicle sales	0,883	1,004	0,971	0,958
16	Transport	0,978	1,127	1,133	1,114
17	Accommodation and catering services	1,205	1,350	0,968	0,948
18	Information and communication services	1,383	1,631	1,123	1,122
19	Financial and insurance services	0,911	1,048	1,004	0,995
20	Real state services	1,154	1,304	0,711	0,704
21	Professional, scientific and technical services	1,238	1,627	1,316	1,354
22	Administrative and auxiliary services	0,856	0,918	1,119	1,096
23	Non comercial services	0,785	0,205	0,977	0,835
24	Commercial services	0,939	0,811	0,871	0,812
25	Other services	0,844	0,809	0,966	0,924
	WeightedAverage	1,00	1,00	1,00	1,00

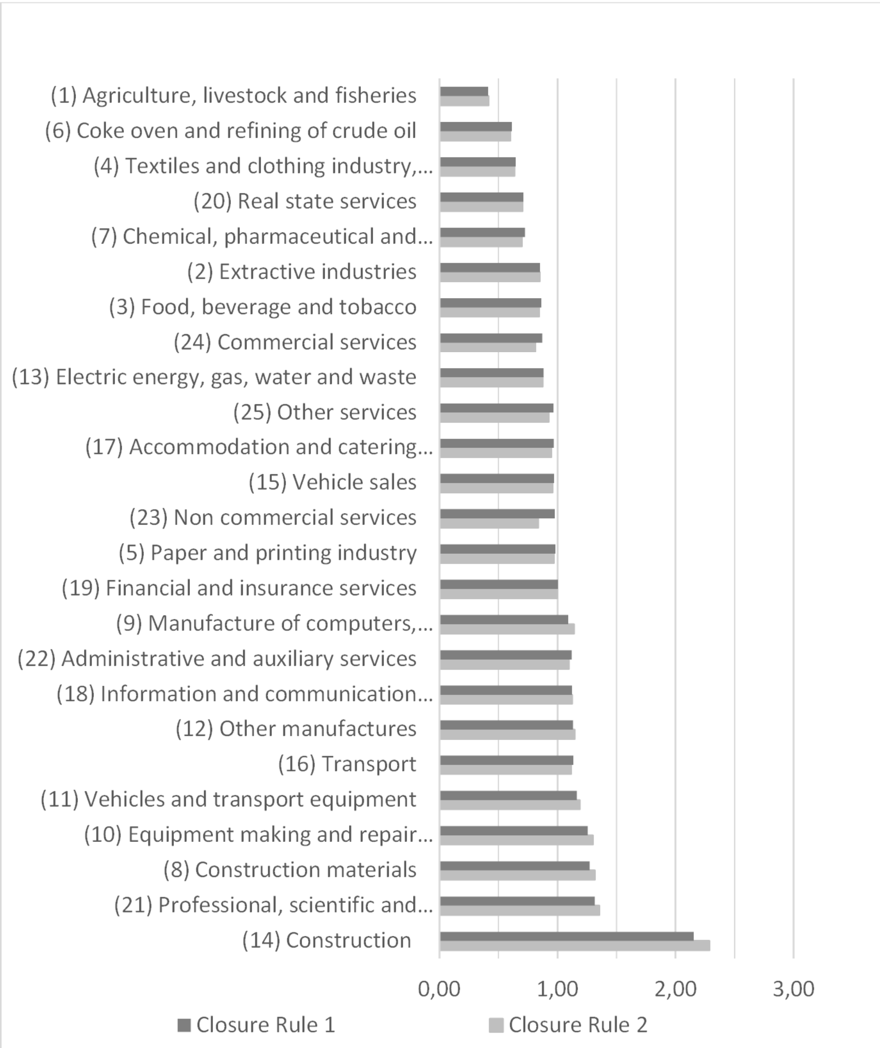
Source: Own elaboration from AGEM_Andalusia

Graph 2.1: Ordering of the changes in sectoral labor use resulting from a 1 percent increase in total labor supply.



Source: Own elaboration from AGEM_Andalusia

Graph 2.2: Ordering of the changes in sectoral capital use resulting from a 1 percent increase in total capital supply.



Source: Own elaboration from AGEM_Andalusia