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THE FOREIGN-TRADE LEAKAGES IN THE GREEK ECONOMY: EVIDENCE FROM THE SUPPLY AND USE TABLE FOR THE YEAR 2010*

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ABSTRACT

Using input-output table data and constructing a system of relevant indices, this paper sheds some new light on the foreign-trade "leakages" in the Greek economy for the "pre-adjustment" year of 2010. The findings suggest that, due to profound intersectoral imbalances, (i) a well-targeted effective demand management policy could be mainly based on the service and primary production sectors; while (ii) industrial policy would be necessary and could primarily focus on nine industrial commodities, which are identified as the main leakages in the Greek economy.

Keywords: Foreign-trade leakages, Greek economy, Industrial policy, Key-commodities, Management of effective demand

JEL Classification: C67, D57, E61, F14, O25

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Introduction

During the period 2008-2010, the Greek economy faced serious external and fiscal imbalances. The Greek governments attempted to correct those imbalances by the application of contractionary fiscal and internal devaluation policies, such as indiscriminate reductions in government expenditures, increases in taxes and cuts in unit labour costs. These policies resulted to a significant improvement of the state budget primary deficit but with a GDP contraction (for the period 2010-2013) of about 22.2% (in constant prices of 2010) and a rate of unemployment of about 27.5%. In the same period, the exports were reduced by 3.3% and the imports by 15.5% (in constant prices of 2010), while the export market share of world's total was reduced by 9.4% (according to Hellenic Statistical Authority and World Bank data).

It need hardly be argued that the analysis of the external sector is a necessary condition for the determination of the Greek economy's total imbalances. The objective of this paper is to shed some new light on the foreign-trade "leakages" in the Greek economy. For this purpose, we use:
(i). Data from the Supply and Use Table (SUT) of the Greek economy for the year 2010 (which describes 63 commodities);[1] and
(ii). A *system* of basic and derivative indices associated with the constituent components of gross national expenditure and the external sector of the economy, respectively.

It should be noted from the outset that, in 2010, the unemployment rate was at 12.7%. The so-called twin deficits, i.e. the government budget deficit and the current account deficit, amounted to 11.1 % and 10.1% of GDP, respectively, while the trade balance deficit was 6.8% (according to Bank of Greece data). The public debt reached 146% of GDP, the "net international investment position" was at minus 97.9%, and the *net* national savings was minus 24 billion euro or 13% of the net national disposable income (according to Hellenic Statistical Authority data).[2] Therefore, that year could be considered as *representative* for the detection of leakages in the external sector, unlike 2014 or 2015, when the economy had already shrunk dramatically. That does not mean of course that the

[1] For the data, see Appendix I in the present paper. As is well-known, the SUTs may be considered as the empirical counterpart of joint production systems and, therefore, constitute a more realistic representation of the economic system than the Symmetric Input-Output Tables.

[2] After entering the European Monetary Union, the net annual national savings in Greece became systematically negative. During the period 2000-2010, the total net external borrowing of the country amounted to 148% of its total net investments. For a macroeconomic analysis of the falling tendency of savings in the Greek economy, see Katsimi and Moutos (2010); Mariolis (2017, ch. 2).

research should not be extended in both time directions (although so far the most recent SUT is that for the year 2011).

The remainder of the paper is structured as follows. Section 2 describes the system of indices. Section 3 presents and evaluates the empirical results. Finally, Section 4 concludes.

The System of Indices

For each produced commodity $i\ (=1,2,...,n)$ it holds true that

$$X_i = IC_i + C_i + I_i + EX_i - IM_i \quad (1),$$

where X_i denotes the gross domestic production, IC_i the intermediate consumption, C_i the total final consumption expenditure (by households and government), I_i the gross capital formation (gross fixed capital formation and changes in inventories), EX_i the exports, and IM_i the imports of commodity i. The sum $IC_i + C_i + I_i$ denotes the gross national expenditure for commodity i, while $X_i - IC_i$ denotes the gross value added of commodity i.

Dividing equation (1) by X_i we obtain

$$1 = \delta_{ICi} + \delta_{Ci} + \delta_{Ii} + \delta_{EXi} - \delta_{IMi} \quad (2),$$

where $\delta_{ICi} \equiv IC_i / X_i$, $\delta_{Ci} \equiv C_i / X_i$, $\delta_{Ii} \equiv I_i / X_i$, $\delta_{EXi} \equiv EX_i / X_i$, and $\delta_{IMi} \equiv IM_i / X_i$. When $\delta_{ICi} > 1$, the gross value added of commodity i is negative.

Now, we can introduce the following derivative indices:

(i). Index of gross domestic savings: For each produced commodity we may write

$$S_i = I_i + EX_i - IM_i \qquad (3),$$

where S_i denotes the gross domestic savings in commodity i. Dividing equation (3) by X_i we obtain

$$\delta_{Si} = \delta_{Ii} + \delta_{EXi} - \delta_{IMi} \quad (4),$$

or, invoking equation (2),

$$\delta_{Si} = 1 - (\delta_{ICi} + \delta_{Ci})$$

where $\delta_{Si} \equiv S_i / X_i$ denotes the index of gross domestic savings in commodity i.

(ii). Index of normalized trade balance:

$$\delta_{\mathrm{TB}i} \equiv (EX_i - IM_i)/(EX_i + IM_i) = (\delta_{EXi} - \delta_{IMi})/(\delta_{EXi} + \delta_{IMi})$$

(iii). Index of "revealed comparative advantage" (see, e.g. Laursen 1998):

$$\delta_{\mathrm{RCA}i} \equiv \alpha_i (\delta_{TBi} - \delta_{TB}),$$

where

$$\alpha_i \equiv 2[(EX_i + IM_i)/(EX + IM)],$$

$$EX \equiv \sum_{i=1}^{n} EX_i \ , \ IM \equiv \sum_{i=1}^{n} IM_i \ ,$$

is a coefficient of normalization, and

$$\delta_{TB} \equiv (EX - IM)/(EX + IM).$$

Positive (negative) values for $\delta_{\mathrm{RCA}i}$ imply comparative advantage (disadvantage), while all values sum up to zero.

(iv). Index of intra-commodity trade (Grubel-Lloyd index):

$$\delta_{\mathrm{ICT}i} \equiv 1-[\left|EX_i - IM_i\right|/(EX_i + IM_i)] = 1-[\left|\delta_{EXi} - \delta_{IMi}\right|/(\delta_{EXi} + \delta_{IMi})]$$

(v). Index of self-sufficiency:

$$\delta_{\mathrm{SS}i} \equiv X_i/(X_i + IM_i - EX_i) = 1/(1+\delta_{IMi} - \delta_{EXi}) \quad (5).$$

From equations (1) and (5) it follows that

$$X_i = \delta_{\mathrm{SS}i}(IC_i + C_i + I_i),$$

which implies that $\delta_{\mathrm{SS}i}$ could be conceived of as a (partial) multiplier of gross national expenditure.

(vi). Index of total import dependency:

$$\delta_{\mathrm{IDE}i} \equiv IM_i/(X_i + IM_i - EX_i) = \delta_{IMi}/(1+\delta_{IMi} - \delta_{EXi}) \quad (6).$$

From equations (1) and (6) it follows that

$$X_i = (1-\delta_{\mathrm{IDE}i})(IC_i + C_i + I_i) + EX_i,$$

which implies that, for a given value of the exports, $1-\delta_{\mathrm{IDE}i}$ could be conceived of as a multiplier of gross national expenditure.

(vii). Index of import dependency of capital goods:

$$\delta_{\mathrm{IDK}i} \equiv IM_i/(X_i + IM_i - EX_i - C_i) = \delta_{IMi}/[1+\delta_{IMi} - (\delta_{EXi} + \delta_{Ci})] \quad (7).$$

From equations (1) and (7) it follows that

$$X_i = (1-\delta_{\mathrm{IDK}i})(IC_i + I_i) + C_i + EX_i$$

which implies that, for given values of both the total final consumption and the exports, $1-\delta_{\mathrm{IDK}i}$ could be conceived of as a multiplier of the sum of intermediate consumption and gross capital formation.

As is easily checked, when $\delta_{EXi} < 1$: (i) $\delta_{\mathrm{SS}i}$ is positive and, when $\delta_{\mathrm{TB}i} > (<)\ 0$, greater than (less than) 1; (ii) $\delta_{\mathrm{IDE}i} < 1$; and (iii) $\delta_{\mathrm{IDK}i} \geq \delta_{\mathrm{IDE}i}$.

Finally, we should briefly consider some involved economic policy dilemmas or trade-offs. Thus, we call "effective" those economic policies (macroeconomic, trade or structural) that increase the index of self-sufficiency and, at the same time, decrease the two indices of import dependency, i.e. $\dot{\delta}_{\mathrm{SS}i} > 0$ and $\dot{\delta}_{\mathrm{IDE}i} < 0$, $\dot{\delta}_{\mathrm{IDK}i} < 0$, where the superposed dot denotes differentiation with respect to time. Differentiation of equation (2) gives

$$0 = \dot{\delta}_{ICi} + \dot{\delta}_{Ci} + \dot{\delta}_{Ii} + \dot{\delta}_{EXi} - \dot{\delta}_{IMi}$$

or, setting $\delta_{Ki} \equiv \delta_{ICi} + \delta_{Ii}$,

$$\dot{\delta}_{Ci} + \dot{\delta}_{Ki} = -(\dot{\delta}_{EXi} - \dot{\delta}_{IMi}) \quad (8).$$

Differentiation of equations (5) and (6) gives

$$\dot{\delta}_{\mathrm{SS}i} = (\dot{\delta}_{EXi} - \dot{\delta}_{IMi})/(1 + \delta_{IMi} - \delta_{EXi})^2 \quad (9),$$

and, respectively,

$$\dot{\delta}_{\mathrm{IDE}i} = [\delta_{IMi}\dot{\delta}_{EXi} + (1 - \delta_{EXi})\dot{\delta}_{IMi}]/(1 + \delta_{IMi} - \delta_{EXi})^2 \quad (10).$$

From equations (8), (9) and (10) it follows that an effective economic policy necessarily involves

$$\dot{\delta}_{Ci} + \dot{\delta}_{Ki} < 0$$

i.e. it reduces at least one of δ_{Ci} and δ_{Ki}, and, when, for instance, $\delta_{EXi} < 1$,

$$\dot{\delta}_{IMi} < \dot{\delta}_{EXi} < [-(1 - \delta_{EXi})/\delta_{IMi}]\dot{\delta}_{IMi} \ .$$

Furthermore, equation (7) can be written as $\delta_{IMi} = \delta_{\text{IDK}i}\delta_{Ki}$. Differentiating this latter equation and substituting into equation (8) yields

$$\dot{\delta}_{Ci} = -(1-\delta_{\text{IDK}i})\dot{\delta}_{Ki} + \delta_{Ki}\dot{\delta}_{\text{IDK}i} - \dot{\delta}_{EXi},$$

from which it follows that, *when* $\delta_{\text{IDK}i} \geq 1$, an effective economic policy ($\dot{\delta}_{\text{IDK}i} < 0$) that does not decrease δ_{EXi} necessarily involves $\dot{\delta}_{Ci} < 0$ (even when $\dot{\delta}_{Ki} < 0$).

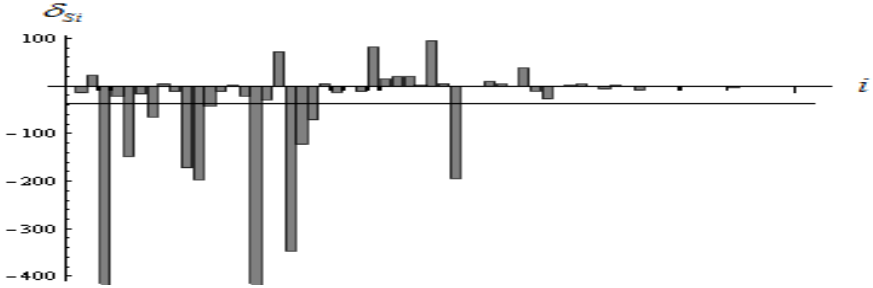
Empirical Results and Evaluation

The application of this system of indices to the SUT of the Greek economy for the year 2010 produced results that could be summarized as follows:

(i). The graphs in Figure 1 represent the values of the derivative indices for each commodity.[3] The non-zero horizontal line gives the Arithmetic Mean (*AM*) of the relevant index. Also, the graphs report the largest (*Max*) and smallest (*Min*) values of each index.

Figure 1: The values (%) of the derivative indices for the Greek economy

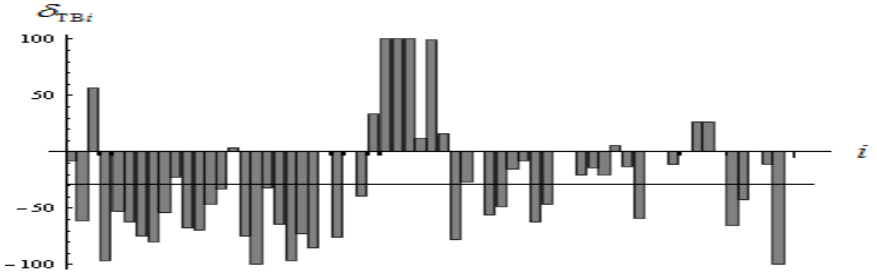
Index of gross domestic savings



AM = -36.3%, *Max* = 95.8% (*i* = 32), *Min* = -614.3% (*i* = 4)

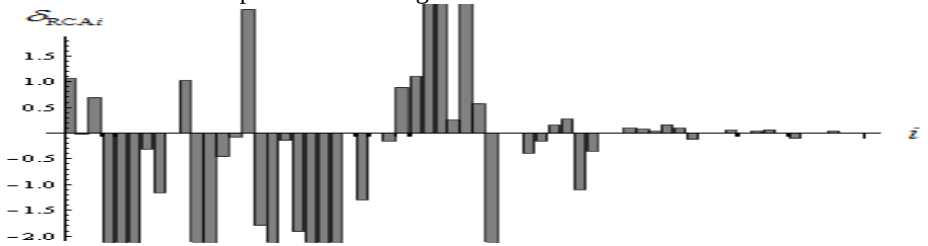
[3] The numerical results (for both the basic and the derivative indices) are reported in Appendix II.

Index of normalized trade balance



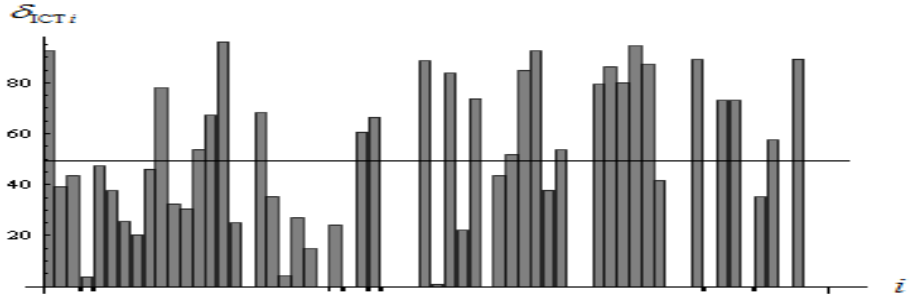
AM = -28.2%, *Max* = 100% (*i* = 28, 29, 30), 99.1% (*i* = 32), *Min* = -100% (*i* = 17, 62), -96.1% (*i* = 4)

Index of revealed comparative advantage



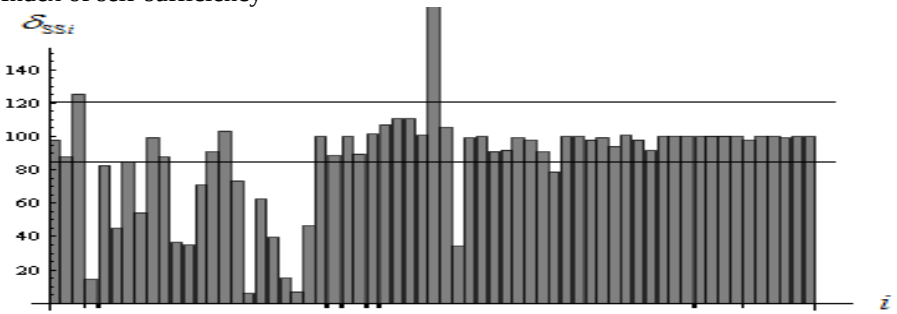
AM = 0, Max = 35.5% (*i* = 32), *Min* = -10.4% (*i* = 4)

Index of intra-commodity trade



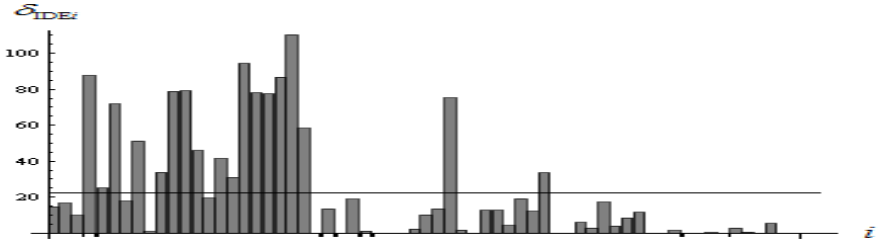
AM = 49.2%, *Max* = 96.1% (*i* = 15), *Min* = {0 (*i* = 17, 28, 29, 30), 0.9% (*i* = 32)}

Index of self-sufficiency



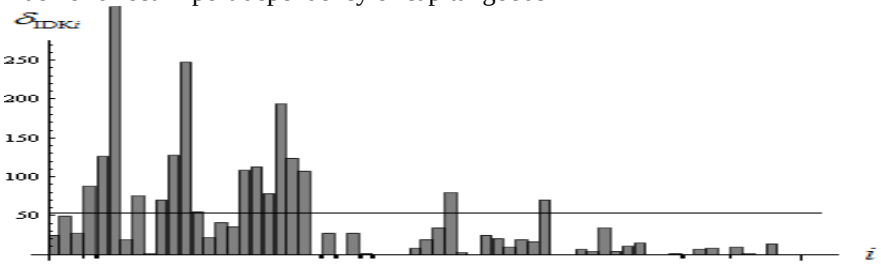
AM = 121.0%, *Max* = 2385.0% (*i* = 32), *Min* = 5.6% (*i* = 17)
(Excluding the commodity 32: *AM* = 84.4%, *Max* = 125.4% (*i* = 3))

Index of total import dependency



AM = 22.6%, *Max* = 110.5% (*i* = 21), positive *Min* = 0.0004% (*i* = 62)

Index of direct import dependency of capital goods



AM = 52.8%, *Max* = 1071.1% (*i* = 6), positive *Min* = 0.03% (*i* = 62)

(ii). Using the indices of revealed comparative advantage and normalized trade balance, the internationally tradable commodities (i.e. exported or/and imported commodities) of the Greek economy can be categorized into three groups ("product mapping scheme", Widodo 2008). As Table 1 shows (where the

symbol "$\overline{\delta}$" indicates the arithmetic mean of an index), there are twenty-nine commodities with comparative disadvantage ("Group C"): nineteen of them (or $19/29 \cong 66\%$) are industrial commodities. By contrast, there are twenty-three commodities with comparative advantage ("Groups A and B"): three of them (or $3/23 \cong 13\%$) are industrial commodities.

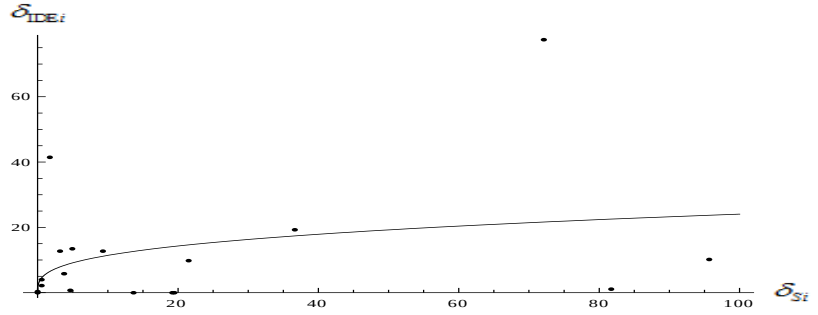
Table 1: Product mapping scheme for the Greek economy

Group A $\delta_{\text{RCA}i} > 0,\ \delta_{\text{TB}i} > 0$	Group B $\delta_{\text{RCA}i} > 0,\ \delta_{\text{TB}i} < 0$
i = 3, 15, 27, 28, 29, 30, 31, 32, 33, 48, 55, 56. Total number = 12 $\overline{\delta}_{\text{RCA}} = 4.2,\ \overline{\delta}_{\text{TB}} = 48.4,\ \overline{\delta}_{\text{ICT}i} = 51.6$	i = 1, 10, 35, 39, 40, 45, 46, 47, 49, 53, 61. Total number = 11 $\overline{\delta}_{\text{RCA}} = 0.3,\ \overline{\delta}_{\text{TB}} = -15.2,$ $\overline{\delta}_{\text{ICT}i} = 84.7$
	Group C $\delta_{\text{RCA}i} < 0,\ \delta_{\text{TB}i} < 0$
	i = 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24, 26, 34, 37, 38, 41, 42, 50, 58, 59, 62. Total number = 29 $\overline{\delta}_{\text{RCA}} = -1.8,\ \overline{\delta}_{\text{TB}} = -65.3,$ $\overline{\delta}_{\text{ICT}i} = 34.6$

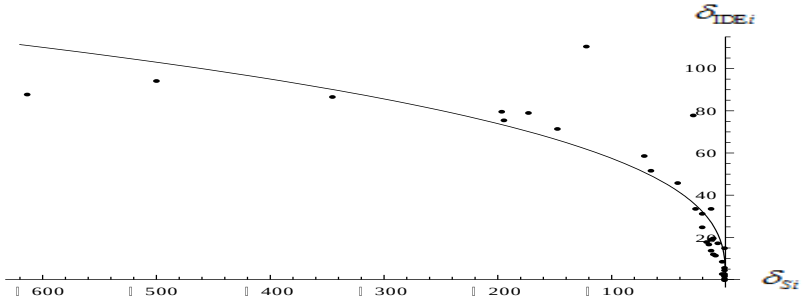
(iii). Regarding the internationally tradable sector, there exist eighteen commodities with positive gross domestic savings (four of them belong to the industry sector) and thirty-four commodities with negative gross domestic savings (eighteen of them belong to the industry sector). The two graphs in Figure 2 show that, for the positive-saving (the negative-saving) commodities, there is no (there is) a significant power function regression between the index of total import dependency, $\delta_{\text{IDE}i}$, and the index of gross domestic savings, δ_{Si}. These findings seem to indicate that positive savings are more correlated with gross capital formation than with trade balance, while negative savings are more

correlated with trade balance than with gross capital formation (consider equations (4) and (6)).

Figure 2: Total import dependency versus gross domestic savings indices



$$\delta_{Si} > 0 : \delta_{\mathrm{IDE}i} = 5.4\ (\delta_{Si})^{0.32},\ R^2 \cong 0.35$$



$$\delta_{Si} < 0 : \delta_{\mathrm{IDE}i} = 10.8\ (-\delta_{Si})^{0.36},\ R^2 \cong 0.92$$

From all these findings, the associated numerical results and the hitherto analysis, we arrive at the following conclusions:

(i). In general, there appears to be an underlying pattern in our empirical results: bad index values are concentrated in industrial commodities, whereas good index values are concentrated in service commodities. This view is further supported by the figures in Table 2, which reports the arithmetic mean of main indices for the primary production, industrial and service commodities. Thus, it can be stated that the industry sector is the "weak link" in the Greek economy.

Table 2: The arithmetic mean of the main indices for the primary production, industrial and service commodities of the Greek economy

	$\overline{\delta}_{ICi}$	$\overline{\delta}_{Si}$	$\overline{\delta}_{\mathrm{TB}i}$	$\overline{\delta}_{\mathrm{RCA}i}$	$\overline{\delta}_{\mathrm{ICT}i}$	$\overline{\delta}_{\mathrm{SS}i}$	$\overline{\delta}_{\mathrm{IDE}i}$	$\overline{\delta}_{\mathrm{IDK}i}$
Primary Production	41.9	2.2	-4.0	0.6	58.4	103.6	13.7	33.6
Industry	117.5	-93.6	-57.3	-1.9	39.8	63.8	46.8	114.9
Services	53.3	-1.3 [4.2](i)	-7.7	1.4	56.2	160.5 [96.9](ii)	7.2	11.8
Total Economy (*AM*)	77.2	-36.3	-28.2	0	49.2	121.0 [84.4](ii)	22.6	52.8

Notes: (i) excluding the commodity 34 ($\delta_{Si} = -194.3\%$); and (ii) excluding the commodity 32.

(ii). More specifically, there exist ten industrial and one service commodities that present extremely bad index values and, therefore, constitute the main foreign-trade leakages in the Greek economy. These commodities are reported in Table 3: it is observed that they all belong to Group C of Table 1, and it should also be noted that, in value terms, their imports correspond to about 667% of their exports and 66% of the economy's total imports, while their exports correspond to 18% of the economy's total exports. At least nine of these commodities, i.e. those with $\delta_{\mathrm{IDK}i} > 1$, could be the immediate objective of a well-designed industrial policy programme.[4]

[4] However, as Pianta (2014, 281-82) stresses: "The crisis of 2008 has brought Europe to a stagnation. In the first quarter of 2014 real GDP in the 28 countries of the EU has grown by 0.3% only compared to the previous quarter. The continent has been divided between a slow-growing "centre" with financial and political power, and a "periphery" in depression, with no political influence, high public debt, high unemployment. […] With 2008 values for industrial production [defined as real output in mining, manufacturing, public utilities; construction is excluded] equal to 100, in 2013 only Germany, Austria and the Netherlands had an index that had suffered limited slumps during the recession and had returned to pre-crisis levels. […] Southern Europe has experienced a dramatic loss of industrial production; 2013 values are 88 for Portugal, 79 for Italy, 76 for Spain, 73 for Greece. As a result of the prolonged European crisis, a permanent loss of production capacity is taking place in most industries and most countries, with a major destruction of economic activities in the Southern 'periphery'."

Table 3: The main commodity leakages in the external sector of the Greek economy, and their indices

i	Nomenclature	δ_{ICi}	δ_{Si}	$\delta_{\mathrm{TB}i}$	δ_{RCAi}	$\delta_{\mathrm{ICT}i}$	$\delta_{\mathrm{SS}i}$	$\delta_{\mathrm{IDE}i}$	$\delta_{\mathrm{IDK}i}$
4	Mining and quarrying	714.3	-614.3	-96.1	-10.3	3.9	14.1	87.7	87.7
5	Food products, beverages and tobacco products	23.8	-20.6	-52.6	-3.1	47.4	82.7	25.1	125.8
6	Textiles, wearing apparel and leather products	39.4	-147.3	-62.5	-3.1	37.5	44.9	71.7	1071.1
11	Chemicals and chemical products	168.1	-172.3	-67.5	-3.6	32.5	36.5	78.8	127.1
12	Basic pharmaceutical products and pharmaceutical preparations	102.8	-197.1	-69.5	-3.4	30.5	35.0	79.3	247.3
17	Computer, electronic and optical products	373.3	-500.6	-100	-4.1	0	5.6	94.4	108.2
18	Electrical equipment	79.2	-29.0	-32.0	-0.2	68.0	62.2	78.0	113.0
20	Motor vehicles, trailers and semi-trailers	81.6	-346.3	-96.0	-2.6	4.0	15.1	86.7	193.2
21	Other transport equipment	62.4	-122.3	-72.9	-5.2	27.1	6.9	110.5	124.1
22	Furniture; other manufactured goods	72.0	-70.8	-85.3	-2.3	14.7	46.3	58.3	107.5
34	Warehousing and support services for transportation	280.7	-194.3	-78.0	-6.3	22.0	34.0	75.3	79.0

(iii). By contrast, there exist one primary production, one industrial and nine service commodities that are characterized by index values better than those of the total Greek economy and, therefore, constitute the "key-commodities" in its external sector. These commodities are reported in Table 4: it is observed that they all belong to Group A of Table 1, and it should also be noted that, in value terms, their imports correspond to about 5% of their exports and 1.5% of the economy's total imports, while their exports correspond to 54% of the economy's total exports.

(iv). These conclusions are compatible with those of an empirical study on the "static Sraffian matrix multiplier" of autonomous demand (government consumption expenditures, investments and exports) for the Greek economy, which also uses data from the SUT for the year 2010 (Mariolis and Soklis 2018). According to that study, (a) an effective demand management policy could be mainly based on the service sector; (b) the whole economic system, and

especially its industry sector, is heavily dependent on imports; and (c) the main commodity leakages in the external sector of the Greek economy (see Table 3 in the present paper) are characterized by particularly low output and employment multipliers and, at the same time, by particularly high import multipliers.[5] Although there are differences between the two studies with respect to the identification of the key-commodities, only commodity 33 ("Air transport services") is a key-commodity in the external sector (see Table 4 in this paper) and, at the same time, an anti-key-commodity in terms of the Sraffian multipliers.

Table 4: The key-commodities in the external sector of the Greek economy, and their indices

i	Nomenclature	δ_{ICi}	δ_{Si}	$\delta_{\mathrm{TB}i}$	$\delta_{\mathrm{RCA}i}$	$\delta_{\mathrm{ICT}i}$	$\delta_{\mathrm{SS}i}$	$\delta_{\mathrm{IDE}i}$	$\delta_{\mathrm{IDK}i}$
3	Fishing products	28.3	21.5	56.3	0.7	43.7	125.4	9.8	26.5
27	Constructions	13.6	81.7	33.5	0.9	66.5	101.1	1.1	1.2
28	Wholesale and retail trade and repair services of motor vehicles and motorcycles	32.3	13.6	100	1.1	0	107.1	0	0
29	Wholesale trade services, except of motor vehicles and motorcycles	39.9	19.4	100	5.9	0	110.5	0	0
30	Retail trade services, except of motor vehicles and motorcycles	40.2	19.3	100	3.0	0	110.4	0	0
31	Land transport services and transport services via pipelines	27.6	0.6	11.5	0.1	88.5	100.6	2.2	8.0
32	Water transport services	2.2	95.8	99.1	35.5	0.9	2385.0	10.1	19.3
33	Air transport services	37.1	5.0	16.2	0.6	83.8	105.2	13.5	34.6
48	Advertising and market research services	99.5	0.5	5.6	0.2	94.4	100.5	3.9	3.9
55	Education services	1.9	0.1	27.0	0.04	73.0	100.1	0.1	6.0
56	Human health services	2.2	0.1	27.0	0.1	73.0	100.1	0.2	7.8

Concluding Remarks

This paper identified the main commodity leakages and the key-commodities in the external sector of the Greek economy for the "pre-adjustment" year of 2010. It has been detected that a well-targeted effective demand management policy is

[5] In fact, their output multipliers are all less than one. It is also noted that the commodity 21 ("Other transport equipment") is characterized by negative output and employment multipliers, and by an import multiplier which is almost equal to one.

necessary but *not* sufficient for the recovery of this economy; that is to say, industrial policy is also needed. More specifically, demand policy could be mainly based on the service and the primary production sectors, which include twenty commodities with revealed comparative advantage and ten from the eleven key-commodities of the whole economy. By contrast, the industry sector includes only three commodities with revealed comparative advantage, is heavily dependent on imports and characterized by negative gross domestic savings, low intra-commodity specialization, and unfavourable demand multiplier effects. Industrial policy could primarily focus on nine industrial commodities that exhibit particularly high direct import dependency of capital goods.

It seems that the intratemporal and intertemporal application of this diagnostic index and Sraffian multiplier system to input-output table data from the "South" and "North" of the Eurozone would be of particular interest for both structural and policy studies.

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Appendix I: A Note on the Data

The SUT of the Greek economy for the year 2010 is provided via the EUROSTAT website, http://epp.eurostat.ec.europa.eu. The available SUT describes 65 products and industries. However, the elements associated with the commodities "Imputed rents of owner-occupied dwellings" and "Services provided by extraterritorial organisations and bodies" are all equal to zero and, therefore, we remove them from our analysis. Thus, we derive a SUT that describes 63 products.

The described products and their correspondence to CPA (Classification of Products by Activity) are reported in Table A.I.1, where the commodities 1 to 3 belong to "Primary production". The commodities 4 to 27 belong to "Industry": (i) the commodity 4 corresponds to "Mining and quarrying"; (ii) the commodities 5 to 23 correspond to "Processing products"; (iii) the commodity 24 corresponds to "Energy"; (iv) the commodities 25 and 26 correspond to "Water supply and waste disposal"; and (v) the commodity 27 corresponds to "Construction". The commodities 28 to 63 belong to "Services", while the commodities 54 to 57 are primarily related to the "Public Sector". The industry that produces as a "primary product" the commodity 63 ("Services of households as employers; undifferentiated goods and services produced by households for own use") is the only one that does not use intermediate inputs and, therefore, the elements of the corresponding column of the Use Matrix are all equal to zero. The commodities 4, 24, 25, 32, 47, 51, 54, 56, 60 and 63 are produced by only one industry, while the industries 2, 3, 26, 43, 60, 62 and 63 produce only one commodity. The symbol "*" indicates products that are neither imported nor exported. It should be noted, however, that commodity 36 ("Accommodation and food services") and commodity 52 ("Travel agency, tour operator and other reservation services and related services"), which are related to tourism activities, display zero exports and imports because the SUTs record only the total travel receipts and payments and not the respective payments for each product. These exports-receipts (imports-payments) constitute the 19.5% (the 3.0%) of the total exports (the total imports) of the Greek economy for the year 2010.

Finally, the physical unit of measurement of each product is that unit which is worth of a monetary unit (in the SUT of the Greek economy, the unit is set to 1 million euro).

Table A.I.1: Product Classification

No	CPA	Nomenclature
1	A01	Products of agriculture, hunting and related services
2	A02	Products of forestry, logging and related services
3	A03	Fish and other fishing products; aquaculture products; support services to fishing
4	B	Mining and quarrying
5	C10-C12	Food products, beverages and tobacco products
6	C13-C15	Textiles, wearing apparel and leather products
7	C16	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
8	C17	Paper and paper products
9	C18	Printing and recording services
10	C19	Coke and refined petroleum products
11	C20	Chemicals and chemical products
12	C21	Basic pharmaceutical products and pharmaceutical preparations
13	C22	Rubber and plastics products
14	C23	Other non-metallic mineral products
15	C24	Basic metals
16	C25	Fabricated metal products, except machinery and equipment
17	C26	Computer, electronic and optical products
18	C27	Electrical equipment
19	C28	Machinery and equipment n.e.c.
20	C29	Motor vehicles, trailers and semi-trailers
21	C30	Other transport equipment
22	C31-C32	Furniture; other manufactured goods
23*	C33	Repair and installation services of machinery and equipment
24	D35	Electricity, gas, steam and air-conditioning
25*	E36	Natural water; water treatment and supply services
26	E37-E39	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
27	F	Constructions and construction works
28	G45	Wholesale and retail trade and repair services of motor vehicles and motorcycles
29	G46	Wholesale trade services, except of motor vehicles and motorcycles
30	G47	Retail trade services, except of motor vehicles and motorcycles
31	H49	Land transport services and transport services via pipelines
32	H50	Water transport services
33	H51	Air transport services
34	H52	Warehousing and support services for transportation
35	H53	Postal and courier services
36*	I	Accommodation and food services
37	J58	Publishing services
38	J59-J60	Motion picture, video and television programme production services, sound recording and music publishing; programming and

		broadcasting services
39	J61	Telecommunications services
40	J62-J63	Computer programming, consultancy and related services; information services
41	K64	Financial services, except insurance and pension funding
42	K65	Insurance, reinsurance and pension funding services, except compulsory social security
43*	K66	Services auxiliary to financial services and insurance services
44*	L68B	Real estate services (excluding imputed rent)
45	M69-M70	Legal and accounting services; services of head offices; management consulting services
46	M71	Architectural and engineering services; technical testing and analysis services
47	M72	Scientific research and development services
48	M73	Advertising and market research services
49	M74-M75	Other professional, scientific and technical services; veterinary services
50	N77	Rental and leasing services
51*	N78	Employment services
52*	N79	Travel agency, tour operator and other reservation services and related services
53	N80-N82	Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services
54*	O84	Public administration and defence services; compulsory social security services
55	P85	Education services
56	Q86	Human health services
57*	Q87-Q88	Social work services
58	R90-R92	Creative, arts and entertainment services; library, archive, museum and other cultural services; gambling and betting services
59	R93	Sporting services and amusement and recreation services
60*	S94	Services furnished by membership organisations
61	S95	Repair services of computers and personal and household goods
62	S96	Other personal services
63*	T	Services of households as employers; undifferentiated goods and services produced by households for own use

Appendix II: The Numerical Results

The numerical values of the basic and derivative indices are reported in Tables A.II.1 and A.II.2, respectively. The symbol "*" indicates commodities that are neither imported nor exported. In the fourth column of Table A.II.1, the values in square brackets correspond to the index of gross fixed capital formation. Finally, in both tables, the last three rows give the arithmetic mean, *AM*, the standard deviation, *SD*, and the coefficient of variation, $CV \equiv SD / AM$, while the values in parentheses are the monetary value of the index for the total economy.

Table A.II.1: The numerical values (%) of the basic indices for the Greek economy

i	δ_{ICi}	δ_{Ci}	δ_{Ii}	δ_{EXi}	δ_{IMi}
1	58.7	41.6	1.8 [0.9]	12.9	15.0
2	38.7	75.9	-0.1 [1.4]	4.7	19.1
3	28.3	50.2	1.3 [0]	28.1	7.8
4	714.3	0	-3.7 [0]	12.3	622.9
5	23.8	96.8	0.3 [0]	9.4	30.3
6	39.4	207.9	-24.5 [0]	36.8	159.6
7	113.6	3.4	0.9 [0.6]	3.0	20.9
8	106.5	57.9	19.2 [0]	10.7	94.4
9	93.0	2.5	5.1 [0]	0.2	0.8
10	52.7	59.5	1.7 [0]	24.5	38.4
11	168.1	104.2	1.8 [0]	41.8	215.9
12	102.8	194.3	-11.1 [0]	40.7	226.7
13	117.7	23.5	-0.1 [0]	23.9	64.9
14	101.1	10.1	-0.6 [0]	10.8	21.4
15	98.3	0.1	-1.6 [0]	43.3	40.1
16	102.0	18.4	15.9 [4.0]	6.1	42.4
17	373.3	227.3	1178.0 [1145.8]	0	1678.7
18	79.2	49.8	31.7 [31.0]	64.6	125.3
19	25.0	3.0	226.4 [225.7]	42.2	196.6
20	81.6	364.7	215.0 [194.3]	11.8	573.0
21	62.4	159.9	1231.7 [1213.6]	252.0	1606.0
22	72.0	98.8	45.0 [42.7]	10.0	125.8
23*	93.8	1.5	4.7 [7.8]	0	0
24	56.0	57.3	0 [0]	2.1	15.4
25*	54.6	45.4	0 [0]	0	0
26	76.2	35.7	0 [0]	9.2	21.1
27	13.6	4.7	80.6 [84.6]	2.3	1.1
28	32.3	54.1	6.9 [6.6]	6.6	0
29	39.9	40.7	9.9 [9.4]	9.5	0
30	40.2	40.5	9.9 [9.4]	9.4	0
31	27.6	71.8	0 [0]	2.8	2.2
32	2.2	2.0	0 [0]	96.2	0.4
33	37.1	57.9	0 [0]	17.8	12.9
34	280.7	13.6	0 [0]	27.4	221.8
35	96.5	4.3	0 [0]	1.1	1.8
36*	11.8	88.2	0 [0]	0	0
37	36.5	54.3	19.2 [19.2]	3.9	14.0
38	54.6	42.1	12.3 [12.4]	4.9	13.9
39	46.4	54.7	0 [0]	3.1	4.3
40	62.3	1.1	39.3 [39.3]	16.9	19.6
41	83.2	27.2	0 [0]	3.1	13.5
42	60.3	66.5	0 [0]	15.5	42.3
43*	96.3	3.7	0 [0]	0	0

44*	22.5	77.0	0.5 [0.5]	0	0
45	89.9	6.3	5.9 [5.9]	3.9	6.0
46	88.7	12.0	0 [0]	2.2	2.9
47	54.5	51.6	0 [0]	12.2	18.3
48	99.5	0	0 [0]	4.3	3.8
49	87.0	15.0	0 [0]	6.7	8.7
50	86.8	22.4	0 [0]	3.3	12.5
51*	99.6	0.7	0 [0]	0	0
52*	42.9	57.1	0 [0]	0	0
53	93.4	6.9	0 [0]	1.2	1.5
54*	0.0	100	0 [0]	0	0
55	1.9	98.0	0 [0]	0.2	0.1
56	2.2	97.7	0 [0]	0.3	0.2
57*	4.3	95.7	0 [0]	0	0
58	32.0	70.3	0 [0]	0.6	3.0
59	58.4	42.0	0 [0]	0.2	0.6
60*	6.1	93.9	0 [0]	0	0
61	39.8	61.3	0 [0]	4.4	5.5
62	1.4	98.6	0 [0]	0	0.0003
63*	0.1	99.9	0 [0]	0	0
AM	77.2 (42.0)	59.1 (56.3)	49.6 [48.5] (10.2 [10.3])	15.3 (10.7)	101.2 (19.3)
SD	101.6	64.0	214.8 [210.2]	35.0	304.2
CV	1.3	1.1	4.3 [4.3]	2.3	3.0

Table A.II.2: The numerical values (%) of the derivative indices for the Greek economy

i	δ_{Si}	$\delta_{\mathrm{TB}i}$	$\delta_{\mathrm{RCA}i}$	$\delta_{\mathrm{ICT}i}$	$\delta_{\mathrm{SS}i}$	$\delta_{\mathrm{IDE}i}$	$\delta_{\mathrm{IDK}i}$
1	-0.3	-7.6	1.06	92.4	97.9	14.6	24.7
2	-14.6	-60.8	-0.02	39.2	87.4	16.7	49.6
3	21.5	56.3	0.69	43.7	125.4	9.8	26.5
4	-614.3	-96.1	-10.31	3.9	14.1	87.7	87.7
5	-20.6	-52.6	-3.08	47.4	82.7	25.1	125.8
6	-147.3	-62.5	-3.09	37.5	44.9	71.7	1071.1
7	-17.0	-74.6	-0.31	25.4	84.8	17.7	18.3
8	-64.4	-79.6	-1.16	20.4	54.4	51.4	75.0
9	4.5	-54.0	-0.01	46.0	99.4	0.8	0.8
10	-12.2	-22.1	1.01	77.9	87.8	33.7	70.5
11	-172.3	-67.5	-3.60	32.5	36.5	78.8	127.1
12	-197.1	-69.5	-3.41	30.5	35.0	79.3	247.3
13	-41.2	-46.2	-0.46	53.8	70.9	46.0	55.2
14	-11.2	-32.7	-0.07	67.3	90.5	19.3	21.3
15	1.6	3.9	2.4	96.1	103.4	41.4	41.4
16	-20.4	-75.0	-1.79	25.0	73.3	31.1	36.0
17	-500.6	-100	-4.06	0	5.6	94.4	108.2
18	-29.0	-32.0	-0.15	68.0	62.2	78.0	113.0

19	72.0	-64.6	-1.91	35.4	39.3	77.3	78.2
20	-346.3	-96.0	-2.58	4.0	15.1	86.7	193.2
21	-122.3	-72.9	-5.16	27.1	6.9	110.5	124.1
22	-70.8	-85.3	-2.34	14.7	46.3	58.3	107.5
23*	4.7	—	—	—	100	0	0
24	-13.3	-75.8	-1.29	24.2	88.3	13.6	27.5
25*	0	—	—	—	100	0	0
26	-11.9	-39.3	-0.15	60.7	89.4	18.8	27.6
27	81.7	33.5	0.89	66.5	101.1	1.1	1.2
28	13.6	100	1.09	0	107.1	0	0
29	19.4	100	5.85	0	110.5	0	0
30	19.3	100	3.03	0	110.4	0	0
31	0.6	11.5	0.26	88.5	100.6	2.2	8.0
32	95.8	99.1	35.47	0.9	2385.0	10.1	19.3
33	5.0	16.2	0.57	83.8	105.2	13.5	34.6
34	-194.3	-78.0	-6.25	22.0	34.0	75.3	79.0
35	-0.8	-26.2	0.002	73.8	99.2	1.8	1.9
36*	0	—	—	—	100	0	0
37	9.2	-56.3	-0.39	43.7	90.9	12.7	25.0
38	3.3	-48.2	-0.15	51.8	91.7	12.8	20.8
39	-1.1	-15.2	0.15	84.8	98.9	4.2	9.2
40	36.6	-7.6	0.27	92.4	97.3	19.1	19.3
41	-10.4	-62.2	-1.09	37.8	90.6	12.3	16.3
42	-26.8	-46.4	-0.35	53.6	78.9	33.4	70.1
43*	0	—	—	—	100	0	0
44*	0.5	—	—	—	100	0	0
45	3.8	-20.7	0.1	79.3	98.0	5.9	6.3
46	-0.7	-13.7	0.07	86.3	99.3	2.9	3.3
47	-6.1	-20.1	0.04	79.9	94.2	17.2	33.5
48	0.5	5.6	0.20	94.4	100.5	3.9	3.9
49	-2.0	-13.0	0.09	87.0	98.0	8.6	10.0
50	-9.2	-58.4	-0.12	41.6	91.5	11.5	14.4
51*	0	—	—	—	100	0	0
52*	0	—	—	—	100	0	0
53	-0.3	-11.1	0.06	88.9	99.7	1.5	1.6
54*	0	—	—	—	100	0	—
55	0.1	27.0	0.04	73.0	100.1	0.1	6.0
56	0.1	27.0	0.07	73.0	100.1	0.2	7.8
57*	0	—	—	—	100	0	0
58	-2.3	-64.9	-0.1	35.1	97.7	2.9	9.3
59	-0.3	-42.5	-0.001	57.5	99.7	0.6	1.0
60*	0	—	—	—	100	0	0
61	-1.1	-10.6	0.03	89.4	99.0	5.4	13.8
62	-0.0004	-100	-10^{-5}	0	99.99	0.0004	0.03
63*	0	—	—	—	100	0	0
AM	-36.3 (1.6)	-28.2 (-28.5)	0	49.2 (71.5)	121.0 (92.1)	22.6 (17.8)	52.8 (37.0)
SD	116.8	52.7	5.6	30.9	291.2	30.3	140.8
CV	-3.2	-1.9	—	0.6	2.4	1.3	2.7