INPUT-OUTPUT TABLES AND FOREIGN INPUTS DEPENDENCY: METHODOLOGICAL NOTE

Sarah Guillou

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CONTACT US

OFCE
10 place de Catalogne | 75014 Paris | France
Tél. +33 1 44 18 54 24

www.ofce.fr

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ABOUT THE AUTHORS

Sarah Guillou, Sciences Po-OFCE, France
Email Address: sarah.guillou@sciencespo.fr

ABSTRACT

The note presents the computation of industry foreign inputs dependency using input-output tables. It gives details on each level of dependency and finish with the infinite computation using the Leontief inverse matrix. It ends with some evidence by using WIOT data from 2000 to 2014 which shows the high growth of the technical dependency to Chinese inputs over the past 15 years. Construction, Telecommunications and Chemicals are Chinese-dependent sectors among the 20 first which also contribute a lot to the French economy. Nevertheless, for France and European countries, the dependency to Chinese inputs is well behind the dependency to European inputs.

KEYWORDS

Input-output Tables, Leontief matrix, inputs dependency, Chinese Inputs.

JEL

F14, F61.

Input-output Tables and Foreign inputs dependency

Methodological Note

Sarah Guillou
Sciences Po, OFCE, France.

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Résumé :
La note présente les calculs matriciels pour calculer les coefficients de dépendance des industries aux intrants étrangers à partir des matrices inputs-outputs. Elle détaille les différents degrés de dépendance et explicite l'usage de la matrice inverse de Léontief. Pour finir, quelques résultats issus des données de *World Input-output Database* de 2000 à 2014 montrent la forte croissance de la dépendance aux intrants chinois ces 15 dernières années. Parmi les 20 premiers secteurs en niveau de dépendance, la plupart contribue assez peu au PIB français à l'exception de la construction, de la chimie et des télécommunications. Il reste que pour la France, comme pour les pays européens, le degré de dépendance technologique à la Chine est bien en-deçà de la dépendance aux intrants européens.

Summary :
The note presents the computation of industry foreign inputs dependency using input-output tables. It gives details on each level of dependency and finish with the infinite computation using the Leontief inverse matrix. It ends with some evidence by using WIOT data from 2000 to 2014 which shows the high growth of the technical dependency to Chinese inputs over the past 15 years. Construction, Telecommunications and Chemicals are Chinese-dependent sectors among the 20 first which also contribute a lot to the French economy. Nevertheless, for France and European countries, the dependency to Chinese inputs is well behind the dependency to European inputs.

JEL Codes :
F14,F61

Keywords :
Input-output Tables, Leontief matrix, inputs dependency, Chinese Inputs.

1 Input-output tables

Input-output tables are tables which describe production and consumption linkages between industries, household and government.

Set y_j, the production of sector j. Coefficients a_{ij} in the table are the value of input over the total output of the industry j. French sector 1 needs $a_{11} \times y_1$ input 1 , and $a_{21} \times y_1$ coming from industry 2. If 1 is French manufacturing, 2 is French services and 3 is Foreign manufacturing. The first order dependency of French manufacturing industry 1 to foreign manufacturing industry 3 is a_{31}.

An input-output table says that the total use of an input is equal to its production. Hence,

$$y_1 = a_{11}x_1 + a_{12}y_2 + \ldots + a_{1n}y_n + d_1 + f_1$$

where d_j is the domestic demand in good j and f_j is the foreign demand in good j.

Or more generally, for any j

$$y_j = a_{j1}y_1 + a_{j2}y_2 + \ldots + a_{jn}y_n + d_j + f_j \tag{1}$$

Intending to represent the whole industry linkages taking place in a economy and between countries's, input-output Tables have however four main limits. The first is to consider same technical coefficients to produce in an industry, discarding differences between sub-industries and firms. The second is to ignore any substitution effects between inputs in response to change in prices or rules for instance. The third is to extrapolate linkages between countries from trade statistics which is sometimes approximation.

In addition to these three standard limits another is rarely raised. It is based on the accountability of fixed capital. Domestic and foreign final demand include private consumption, governmental consumption and investment (Gross Fixed Capital Formation). For instance, the latter is a specific column in the WIOD tables. Note that the demand in capital goods and services (investment) is given at the country level and details are only known about the sector-country of origin of these capital goods and services. Hence if France is investing in R&D from the US sector of R&D services, it will be given by the column GFCF and the line US-sector 72. However we do not know which specific French sector was the demanding sector.

Value added at the end row of the table is made off labor cost as well as cost of capital.

Guillou et Mini (2019, [3]) showed that the registration of purchase of capital goods and services into GFCF is varying across countries. Some country may lower GFCF and increase inputs purchase. This is typically observable for Software and databases. Theoretically Software and databases are capital goods, but while French national statistics tend to register in full proportion these goods in GFCF, German accounters seem to underdeclare in this category while registering them in intermediary consumption. In other words, relative to Germany, French industries could be seen as under-consuming Software and Databases, while actually these goods are registered in GFCF. In consequence, considering a sector j both in France and Germany, and suppose that their inputs technical coefficients are all the same, except for the input Software, then the value added coefficient (value added over total output) of the sector j will be lower in France than in Germany.

2 Inputs Dependancy using WIOD input-output table

From the WIOD input-output table, we build the matrix A, which pattern is given in Table 2. I retain 50 sectors (dropping non-business sectors) and group foreign countries into 4 groups : EU30 (EU28 plus Switzerland and Norway), Asia excluding China, China and the rest of world.

A^{FR} (the shaded block $a_{1,FR1} \ldots a_{OT,FR50}$)

$$\begin{pmatrix}
 & FRout1 & FRout2 & \ldots & FRout50 & CHout & EUout & AS.out & OT.out \\
FRinput1 & a_{1,FR1} & a_{1,FR2} & \cdots & a_{1,FR50} & a_{1,CH} & a_{1,EU} & a_{1,AS} & a_{1,OT} \\
FRinput2 & a_{2,FR1} & a_{2,FR2} & \cdots & a_{2,FR50} & a_{2,CH} & a_{2,EU} & a_{2,AS} & a_{2,OT} \\
\vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\
FRinput50 & a_{50,FR1} & a_{50,FR2} & \cdots & a_{50,FR50} & a_{50,CH} & a_{50,EU} & a_{50,AS} & a_{50,OT} \\
CHinput & a_{CH,FR1} & a_{CH,FR2} & \cdots & a_{CH,FR50} & a_{CH,CH} & a_{CH,EU} & a_{CH,AS} & a_{CH,OT} \\
EUinput & a_{EU,FR1} & a_{EU,FR2} & \cdots & a_{EU,FR50} & a_{EU,CH} & a_{EU,EU} & a_{EU,AS} & a_{EU,OT} \\
ASinput & a_{AS,FR1} & a_{AS,FR2} & \cdots & a_{AS,FR50} & a_{AS,CH} & a_{AS,EU} & a_{AS,AS} & a_{AS,OT} \\
OTHinput & a_{OT,FR1} & a_{OT,FR2} & \cdots & a_{OT,FR50} & a_{OT,CH} & a_{OT,EU} & a_{OT,AS} & a_{OT,OT}
\end{pmatrix}$$

FIGURE 1 – Matrix Input-Output A

The direct (first order) dependency of French industries to Chinese inputs is given by the coefficients : $a_{CH,FR1}$, $a_{CH,FR2}$, ... , $a_{CH,FR50}$.

Hence at first sight, $a_{CH,FR1}$ Chinese inputs are needed to produce one unit of French sector 1. To have an idea of the second order dependency to China, we observe that to produce one unit of y_1, $a_{CH,FR2} \times a_{FR2,FR1}$ — Chinese inputs required to produce one unit of French input 2, times the number of inputs 3 needed to produce 1 unit of manufacturing y_1— , plus $a_{CH,FR3} \times a_{FR3,FR1}$ from services input ... plus $a_{CH,FR50} \times a_{FR50,FR1}$ from inputs 50, and last $a_{CH,EU} \times a_{EU,FR1}$. Note δ_1^2 the coefficient of the value of inputs coming from China at the second order from Industry 1, then :

$$\delta_1^2 = a_{CH,1} \times a_{11} + a_{CH,2} \times a_{2,1} + \ldots + a_{CH,OT} \times a_{OT1} = (L^{CH}) \left(C_1^{FRA}\right)$$

The second order dependency is then :

$$\delta_j^2 = (L_{CH}^A)(C_j^{FRA})$$

$$\begin{pmatrix} \delta_1^2 \\ \delta_2^2 \\ \vdots \\ \delta_{50}^2 \end{pmatrix} = (L_{CH}^A)(A^{FRA})$$

Let's reconsider this example step by step with all inputs :

The direct dependency to Chinese inputs of French pharmaceutical industry (j = 15) is :

$$\delta_{15}^1 = a_{CH,FR15}$$

The second order dependency to Chinese inputs of French pharmaceuticals, implies to consider that every input used by French Pharmaceutical industry may use Chinese input itself in its production.

$$\delta^2_{21} = \; a_{1,FR15} \times a_{CH,FR1} + ... + a_{46,FR15} \times a_{CH,FR46} + a_{EU,FR15} \times a_{CH,EU} + a_{CH,FR15} \times a_{CH,CH} + a_{IT,FR15} \times a_{CH,IT} + a_{AS,FR15} \times a_{CH,AS} + + a_{OTH,FR15} \times a_{CH,OTH}$$

Notice that at one point, this sum includes the coefficient $a_{CH,FR15}$ —δ^1_{15} — but it is multiplied by $a_{15,CH}$, which is the consumption of Chinese industry (in aggregate) of French input 15 ; which is not at all the direct dependency. To illustrate this, the coefficient $a_{CH,FR15} \times a_{15,CH}$ is the share of Chinese inputs

If the French industry is buying 5% of Chinese inputs, and if Chinese industries are buying 1% of French pharmaceutical inputs, this coefficient is saying that among Chinese inputs, part is made with French pharmaceutical inputs (1%) and then the direct dependency is overestimating the foreign value added of imported input.

$$\delta^2_j = (L^A_{CHN}) \left[(C^A_j)\right] = \begin{pmatrix} a_{CH,FR1} & a_{CH,FR2} & \dots & a_{CH,FR50} & \dots & a_{CH,OTH} \end{pmatrix} \begin{pmatrix} a_{1,j} \\ a_{2,j} \\ \vdots \\ a_{50,j} \\ \vdots \\ a_{OTH,j} \end{pmatrix}$$

$$\begin{pmatrix} \delta^2_1 \\ \delta^2_2 \\ \vdots \\ \delta^2_{50} \end{pmatrix} = \begin{pmatrix} a_{CH,FR1} & a_{CH,FR2} & \dots & a_{CH,OTH} \end{pmatrix} \begin{pmatrix} a_{1,1} & a_{1,2} & \dots & a_{1,50} \\ a_{1,1} & a_{1,2} & \dots & a_{1,50} \\ \vdots & & & \\ a_{50,1} & a_{50,2} & \dots & a_{50,50} \\ \vdots & & & \\ a_{OTH,1} & a_{OTH,2} & \dots & a_{OTH,50} \end{pmatrix}$$

At the third order, the aim is to account for third level dependency. For instance, the fact that the French Pharmaceutical Industry ($j = 15$) may depend from European (Belgium) inputs — $a_{EU,FR15}$ — which depends from Asian (Indian) inputs — $a_{AS,EU}$ —, which themselves depend on Chinese inputs, — $a_{CH,AS}$. Then, for each input, k, used by the Pharmaceutical French industry and not only EU, we have a third-dependency coefficient , $a_{CH,i} \times a_{i,k} \times a_{k,FR15}$.

$$\sum_i \left[a_{CH,i} \left(\sum_k a_{i,k} \times a_{k,FR15} \right) \right]$$

$$
\begin{aligned}
\delta^3_{15} = \quad & a_{CH,FR1} \times [a_{1,FR1} \times a_{1,FR15} + \ldots + a_{1,FR50} \times a_{50,FR15} + \ldots + a_{1,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,FR2} \times [a_{1,FR1} \times a_{1,FR15} + \ldots + a_{1,FR50} \times a_{50,FR15} + \ldots + a_{1,OTH} \times a_{OTH,FR15}] \\
+ \quad & \ldots \\
+ \quad & a_{CH,FR50} \times [a_{FR50,FR1} \times a_{1,FR15} + \ldots + a_{FR50,FR50} \times a_{50,FR15} + \ldots + a_{FR50,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,CH} \times [a_{CH,FR1} \times a_{1,FR15} + \ldots + a_{CH,FR50} \times a_{50,FR15} + \ldots + a_{CH,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,IT} \times [a_{IT,FR1} \times a_{1,FR15} + \ldots + a_{IT,FR50} \times a_{50,FR15} + \ldots + a_{IT,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,EU} \times [a_{EU,FR1} \times a_{1,FR15} + \ldots + a_{EU,FR50} \times a_{50,FR15} + \ldots + a_{EU,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,AS} \times [a_{AS,FR1} \times a_{1,FR15} + \ldots + a_{AS,FR50} \times a_{50,FR15} + \ldots + a_{AS,OTH} \times a_{OTH,FR15}] \\
+ \quad & a_{CH,OTH} \times [a_{OTH,FR1} \times a_{1,FR15} + \ldots + a_{OTH,FR50} \times a_{50,FR15} + \ldots + a_{OTH,OTH} \times a_{OTH,FR15}]
\end{aligned}
$$

Sum in brackets are the results of the products $(A)(C^A_j)$

The third order dependency of any sector j is then :

$$
\begin{pmatrix} \delta^3_1 \\ \delta^3_2 \\ \vdots \\ \delta^{”}_n \end{pmatrix} = \delta^3_j = (L^{CHN}) \left[(A)(A^{FRA})\right]
$$

Note that,

$$
\delta^3_j = \underset{(1,54)}{(L^{CHN})} \left[\underset{(54,54)}{A} \underset{(54,50)}{A^{FR}} \right]
$$

At the fourth order, the aim is to account for fourth level dependency. For instance, the fact that the French Pharmaceutical Industry ($j = 15$) may depend on French basic Chemicals — $a_{FR11,FR15}$ — which depends from European (Irish) inputs — $a_{EU,FR11}$ — which depends from Asian (Indian) inputs — $a_{AS,EU}$ —, which themselves depend on Chinese inputs, — $a_{CH,AS}$. In that specific case of chemicals input, we have to consider : $a_{CH,AS} \times a_{AS,EU} \times a_{EU,FR11} \times a_{FR11,FR15}$. Then, for each input, k, used by the Pharmaceutical French industry and not only chemicals, we have a fourth-dependency coefficient going through EU then Asia, $a_{CH,AS} \times a_{AS,EU} \times a_{EU,k} \times a_{k,FR15}$. But consider that it could go through another path up to China : $a_{CH,h} \times a_{h,g} \times a_{g,k} \times a_{k,FR15}$. So the fourth-dependency coefficient for a French industry j is :

$$
\delta^4_{FRj} = \sum_h a_{CH,h} \times \left[\sum_g a_{h,g} \times \left(\sum_k a_{g,k} \times a_{k,FRj} \right) \right]
$$

In matrix multiplication, the scalar δ^4_{FRj} is : [1]

$$
\delta^4_{FRj} = L^{CHN} \times \left[A \left(A C^{FRA}_j \right) \right]
$$

and the whole vector of industry fourth-dependency coefficient is :

$$
\begin{pmatrix} \delta^4_{FR1} \\ \delta^4_{FR2} \\ \vdots \\ \delta^4_{FRn} \end{pmatrix} = L^{CHN} \times \left[A \left(A A^{FRA} \right) \right]
$$

1. Conformability rules work $(1, 54) \times (54, 54) \times (54, 54) \times (54, 1)$.

For an m level of dependency, the vector of n industries is :

$$\begin{pmatrix} \delta^m_{FR1} \\ \delta^m_{FR2} \\ \vdots \\ \delta^m_{FRn} \end{pmatrix} = (L^{CHN})(A)^{m-2}(A^{FRA})$$

Full technical Dependency up to the level m is the sum of deltas :

$$\delta = \delta^1 + \delta^2 + \ldots + \delta^m = L^{CHN}A^{FRA} + L^{CHN}AA^{FRA} + L^{CHN}A^2A^{FRA} + \ldots + L^{CHN}A^{m-2}A^{FRA}$$

The vector of industries m-dependency to Chinese output is :

$$\delta = L^{CHN}\left[I + (A) + (A)^2 + \ldots + (A)^{m-2}\right](A^{FRA})$$

If m goes to infinity then,

$$\delta = L^{CHN}\left[I - A\right]^{-1}(A^{FRA})$$

$$\begin{pmatrix} \delta_1 \\ \delta_2 \\ \vdots \\ \delta_n \end{pmatrix} = L^{CHN}\left[I - A\right]^{-1}\left[A^{FR}\right]$$

We end up with a vector of industry coefficient of dependency. To obtain a weighted average for the country we multiply the vector of deltas by the share of each industry over the total ouput.

$$\delta^{FRA} = \begin{pmatrix} sh_1 & sh_2 & \ldots & sh_n \end{pmatrix}\begin{pmatrix} \delta_1 \\ \delta_2 \\ \vdots \\ \delta_n \end{pmatrix}$$

2.1 Inverse of Leontief Matrix

Can we solely use the inverse of the Leontief Matrix to conclude about dependency ?

Given Equation (1), stating the equilibrium between use (demand) and production (supply) : For any j of French industries plus output from foreign industries :

$$y_j = a_{j1}y_1 + a_{j2}y_2 + \ldots + a_{jj}y_j + \ldots + a_{jn}y_n + d_j + f_j$$

$$\begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \\ \vdots \\ y_{OT} \end{pmatrix} = \left[I - A\right]^{-1}\left[D^{FR} + D^f\right] = \left[I - A\right]^{-1}D^{global}$$

$$\begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \\ \vdots \\ y_{OT} \end{pmatrix} = \begin{pmatrix} 1-a_{1,FR1} & -a_{1,FR2} & \dots & -a_{1,FRn} & -a_{1,CH} & \dots & -a_{1,OT} \\ -a_{2,FR1} & 1-a_{2,FR2} & \dots & -a_{2,FRn} & -a_{2,CH} & \dots & -a_{2,OT} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ -a_{n,FR1} & -a_{n,FR2} & \dots & 1-a_{n,FRn} & -a_{n,CH} & \dots & -a_{n,OT} \\ -a_{CH,FR1} & -a_{CH,FR2} & \dots & -a_{CH,FRn} & 1-a_{CH,CH} & \dots & -a_{CH,OT} \\ \vdots & \vdots & \dots & \vdots & \vdots & \dots & \vdots \\ -a_{OT,FR1} & -a_{OT,FR2} & \dots & -a_{OT,FR50} & -a_{OT,CH} & \dots & 1-a_{OT,OT} \end{pmatrix}^{-1} \left[D^{global}\right]$$

$$Y = [I-A]^{-1}\left(D^{global}\right)$$

$$\begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \\ \vdots \\ y_{OT} \end{pmatrix} = \begin{pmatrix} \iota_{1,FR1} & \iota_{1,FR2} & \dots & \iota_{1,FR50} & \iota_{1,CH} & \dots & \iota_{1,OT} \\ \iota_{2,FR1} & \iota_{2,FR2} & \dots & \iota_{2,FR50} & \iota_{2,CH} & \dots & \iota_{2,OT} \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \vdots \\ \iota_{50,FR1} & \iota_{50,FR2} & \dots & \iota_{50,FR50} & \iota_{50,CH} & \dots & \iota_{50,OT} \\ \iota_{CH,FR1} & \iota_{CH,FR2} & \dots & \iota_{CH,FR50} & \iota_{CH,CH} & \dots & \iota_{CH,OT} \\ \vdots & \vdots & \dots & \vdots & \vdots & \dots & \vdots \\ \iota_{OT,FR1} & \iota_{OT,FR2} & \dots & \iota_{OT,FR50} & \iota_{OT,CH} & \dots & \iota_{OT,OT} \end{pmatrix} \begin{pmatrix} D_1 \\ D_2 \\ \vdots \\ D_n \\ \vdots \\ D_{OT} \end{pmatrix}$$

Note that the production of the French Pharmaceutical industry should be such that :

$$y_{21} = \iota_{15,FR1}D_1 + \iota_{15,FR2}D_2 + \ldots + \iota_{15,CH}D_{CH} + \ldots + \iota_{15,OT}D_{OT}$$

And the production of Chinese Industries such that

$$y_{CH} = \iota_{CH,FR1}D_1 + \iota_{CH,FR2}D_2 + \ldots + \iota_{CH,CH}D_{CH} + \ldots + \iota_{CH,OT}D_{OT}$$

The coefficient $\iota_{CH,FR1}$ tells how much of the Chinese production is due to the demand of good one from France (and others). As well, the coefficient $\iota_{CH,EU}$ tells how much of the EU demand is driving Chinese production.

Thus, the coefficients $\iota_{CH,j}$, j being a French industry, tells how much an increase in French final demand for good j is dependent on Chinese production.

It embeds the need from domestic industries in intermediary inputs, because the satisfying of the final demand is conditional to the need from domestic industries. The coefficient $\iota_{i,j}$ includes both the intermediary inputs needs and the final consumption need. The $\iota_{i,j}$ coefficients matrix is used to determine the impact of a break in demand on the industry's output (see for instance Gershel *et al.*, 2020 [1] for an illustration of the covid-19 shock).

In the next section, we show that the difference can be small, see 7.

3 Some results

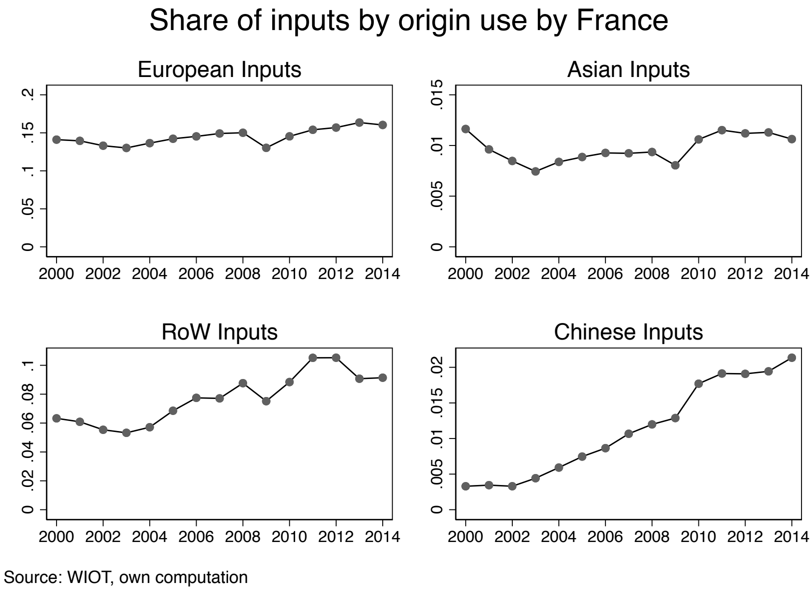
Here I use the WIOD tables which decomposes the whole economy in 56 industries and gathers 44 countries. I first stacked the matrix such as shown in Figure 2 and then compute the deltas from 2000 to 2014 (see [4] Timmer *et al.*, 2015). Table 1 shows the first, fourth and infinite level of dependency to Chinese inputs in 2014. Dependency means technical dependency and supposes that inputs substitution is not a fast process. As stated by Guillou (2020) [2], a technical dependency is neither an economic dependency nor a political dependency.

Table 1 – French total-, first- and fourth- dependency to Chinese inputs in 2014

Sectors	Code	δ^{FR}	δ^1	δ^4	Share of total output
Textile	C13-15	.101	.03	.016	.004
Electrical Equipement	C27	.086	.024	.014	.005
Electonic & Computer	C26	.082	.024	.013	.006
Other transport equipment	C30	.076	.016	.013	.016
Motor Vehicles	C29	.071	.017	.012	.014
Machinery & Equipment	C28	.060	.015	.010	.010
Furniture and other manufacturing	C31-32	.058	.015	.009	.004
Paper and Paper product	C17	.048	.010	.008	.004
Repair and installation mach/ equip.	C33	.048	.011	.008	.013
Coke and refined petroleum	C19	.048	.030	.009	.013
Wood products	C16	.040	.007	.007	.003
Basic Metals	C24	.039	.006	.007	.009
Rubber and Plastic Products	C22	.039	.007	.007	.008
Chemicals	C20	.037	.006	.007	.018
Metal Products	C25	.037	.007	.006	.013
Construction	F	.035	.006	.006	.073
Agriculture	A03	.035	.006	.006	.001
Water Transport	H50	.035	.005	.006	.004
Air Transport	H51	.035	.007	.006	.005
Telecommunications	J61	.034	.007	.006	.05

Share of output is the value of each sector output at factor prices over the total French output

Figure 2 – Share of Chinese Inputs in total French Industry



The table 1 shows that, 1/ the sectors which depend the most on Chinese inputs are those expected : textile, electric and electronic equipement as well as transport equipement ; 2/ the total dependency is higher than the first-order dependency but the ranking of sectors is more or less the same and the higher order level of dependency are increasingly lower and lower ; 3/ the sectors which depend the most on Chinese inputs are not a large share of total French output (including all sectors even non-business) ; 4/ Construction, Telecommunications and Chemicals are Chinese-dependent sectors among the 20 first which also contribute a lot to the French economy.

The weighted coefficient measuring the French dependency towards the Chinese inputs reached 2.1% in 2014. If the computation would have been made on the whole disaggregated matrix, instead of stacking the EU, Asia and the rest of the world, the coefficient would have been a little higher — 2.7% — which means that if we had the full disagregated matrix (around 146 countries instead of 44), the measure of dependency would be slightly higher. It is noticeable to observe how important is the dependency towards European countries (here including the United Kingdom, Norway and Switzerland) which turns around 15%. But the most striking evolution actually concerns Chinese inputs, which is an ongoing rise.

This pattern regarding the EU and China is observed for all French European partners — Italy, Germany, Spain, and the United Kingdom — as well as the United States (see Figures 4, 5, and Figure 6). The evolution relative to China is specially amazing for the Netherlands.

To finish, we compute the total economy dependency towards imports and compare it to the industry dependency in inputs. Figure 7 shows for France (left-hand graph) and Germany (right-hand graph) that considering the whole total consumption (both in intermediaries and final good) is more demanding in foreign goods and services. Germany appears more open to foreign inputs than France, but both countries followed the same path.

Figure 3 – Share of Chinese Inputs in France (unstacked matrix)

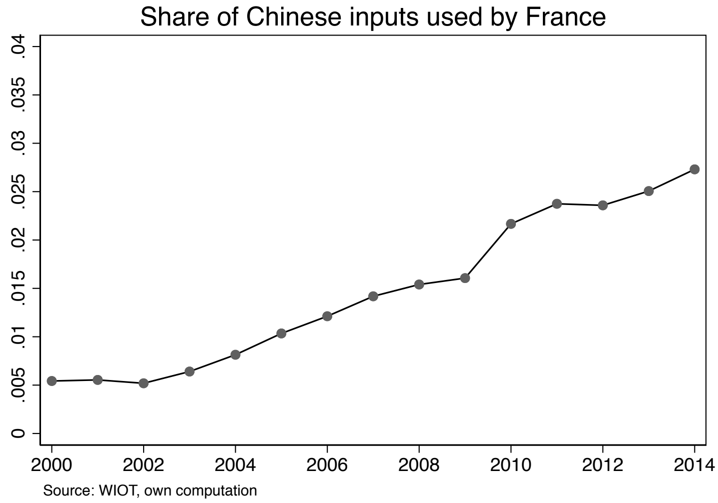


Figure 4 – Share of Chinese Inputs by country : Germany and Netherlands

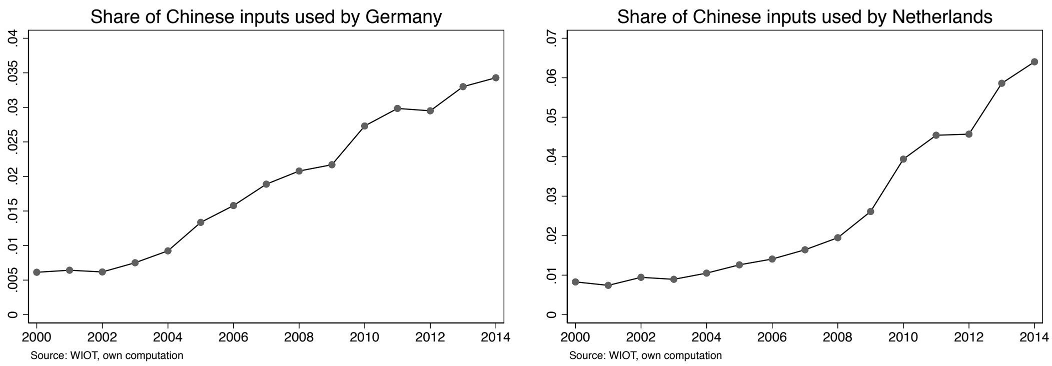


Figure 5 – Share of Chinese Inputs by country : Spain and Italy

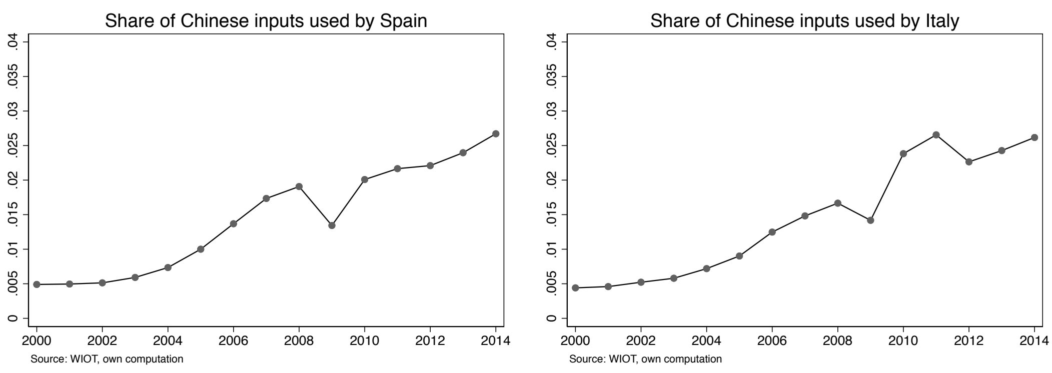


Figure 6 – Share of Chinese Inputs by country : United States and United Kingdom

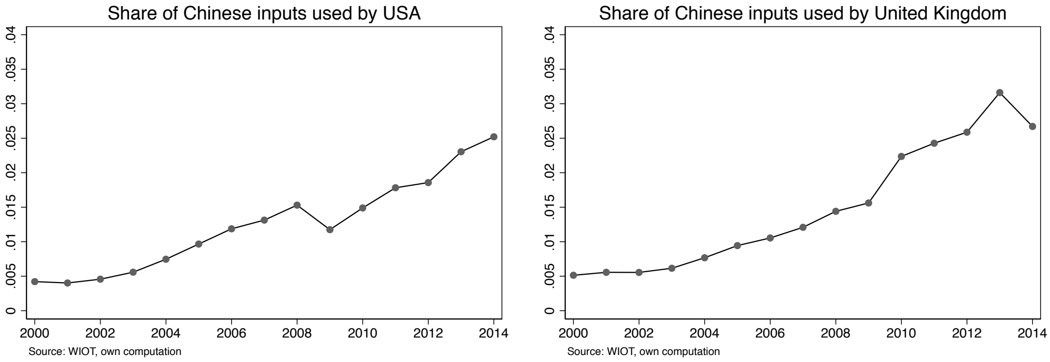
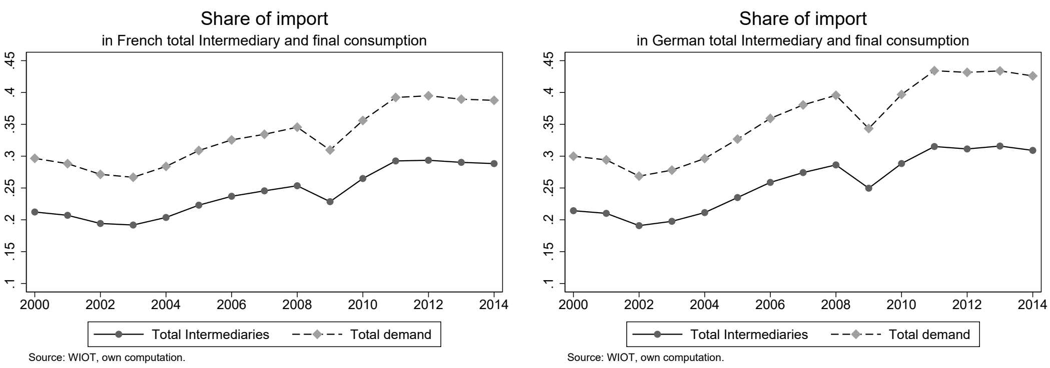


Figure 7 – Share of Imported Inputs in France and Germany



Références

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Its 1981 founding charter established it as part of the French Fondation nationale des sciences politiques (Sciences Po), and gave it the mission is to "ensure that the fruits of scientific rigour and academic independence serve the public debate about the economy". The OFCE fulfils this mission by conducting theoretical and empirical studies, taking part in international scientific networks, and assuring a regular presence in the media through close cooperation with the French and European public authorities. The work of the OFCE covers most fields of economic analysis, from macroeconomics, growth, social welfare programmes, taxation and employment policy to sustainable development, competition, innovation and regulatory affairs.

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