

TRADE OPENNESS INDICATORS



National Confederation of Industry
Brazil
CNI. THE STRENGTH OF THE BRAZILIAN INDUSTRY

METHODOLOGY

Version 4.0

Brasília-DF

July/2016

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Introduction

The trade openness indicators make it possible to analyze the degree to which the Brazilian economy is integrated into the world economy and the extent to which industry and industrial sectors are exposed to external shocks.

Four indicators are calculated: export to output ratio, import penetration ratio, imported input share, and net export to output ratio.

Based on the trade openness indicators, analyses of the impact of external shocks on the economy due, for example, to exchange rate depreciation can consider both the effect on revenues from foreign sales and on competition with imported goods and the effect on costs of imported inputs.

Background

The trade openness indicators have been prepared by FUNCEX since 1998 and the methodology is published in Haguenaer, Markwald and Pourchet (1998) and in Fonseca, Carvalho and Pourchet (2000).

The partnership between FUNCEX and CNI for releasing the trade openness indicators was established in 2011, when the export to output and import penetration ratios at 2007 constant prices began to be published.

In 2012, two new indicators were included: the imported input share and the net export to output ratio (which at the time was called net openness indicator). Furthermore, the four indicators began to be published at current prices.

In 2016, the methodology for preparing the trade openness indicators underwent a comprehensive review. In short, the revision changed the following:

- i. Calculation of the imported input share: IBGE's Input-Output Matrix (MIP) is used for calculating sectoral shares in consumption, which are multiplied by the total value of production and/or import of products to obtain the input values. Before that, the input value was obtained from the MIP and calculated by a chain-linking method for the years considered based on the growth rates of the value of production and/or import of products.
- ii. Calculation of the indicators at constant prices: the real values of production, export and import were obtained by chain-linking method based on the rates of change in volume indices, whereas now the nominal values are deflated by price indices. The deflator used to calculate production value was changed from the Producer Price Index (IPP) of the Brazilian Institute of Geography and Statistics (IBGE) to the Broad Producer Price Index (IPA) of the Getúlio Vargas Foundation (FGV), as the IPA's series is longer than that of the IPP. The IPP was also replaced by the IPA as the indicator used for estimating production value.
- iii. The indicators are no longer disseminated for the mining and quarrying industry, but rather only for manufacturing and its sectors.

The new trade openness indicators are published on an annual basis, with semi-annual reviews released in March and August. The historical data at current prices begins in 1996, while the historical data at constant prices begins in 2003.

1. Classification of industrial activities

The trade openness indicators are calculated for industrial activities based on the National Classification of Economic Activities – CNAE Version 2.0, particularly:

- The Manufacturing section
- The divisions (two digits) of the Manufacturing section.

2. Periodicity

The trade openness indicators are published on an annual basis, with semi-annual reviews of the estimates calculated for the years in which the respective Annual Survey of Industry (PIA/IBGE) has not yet been released – i.e. the years for which there are no production values for the manufacturing sectors.

In August, when the PIA survey is released, the estimated values for the reference year of the newly published PIA are replaced with the PIA values. In addition, estimates are calculated for the current year and the previous year's estimates are reviewed. In March, when the Monthly Survey of Industry – Physical Production (PIM-PF) for December is published, the previous year's estimates are reviewed.

3. Calculation of trade openness indicators

3.1. Export to output ratio

The export to output ratio measures the importance of foreign markets for industrial production. The higher the export to output ratio, the greater the importance of foreign markets for the sector.

The export to output ratio in sector k is defined as follows:

$$CEX_k = \frac{X_k}{Y_k} \quad (1)$$

where:

X_k is the value of exports in sector k ; and

Y_k is the production value in sector k .

3.2. Import penetration ratio

The import penetration ratio measures the share of imported products in apparent consumption (the sum of production value for the domestic market and imports). The higher the penetration ratio, the higher the share of imports in the domestic market.

The import penetration ratio in sector k is defined as follows:

$$CPI_k = \frac{M_k}{(Y_k + M_k - X_k)} \quad (2)$$

where:

M_k is the value of products imported by sector k ;

Y_k is the production value in sector k ;

X_k is the value of exports in sector k ; and

$Y_k + M_k - X_k$ is the value of apparent consumption in sector k .

3.3. Imported input share

The imported input share measures the share of imported industrial inputs in total industrial inputs purchased by industry. The higher the imported input share, the higher the amount of imported inputs used by industry.

The imported input share in sector k is defined as follows:

$$CII_k = \frac{IM_k}{I_k} \quad (3)$$

where:

IM_k is the value of industrial inputs imported by sector k ;

I_k is the value of total industrial inputs used by sector k ;

3.4. Net export to output ratio

The net export to output ratio measures a sector's trade balance¹ in relation to its output. It reflects the direct impact of exchange rate changes on the sector. When the indicator is positive, the impact of exchange rate depreciation is positive. The depreciation increases the value in reals of both exports and imports. As export revenues exceed spending on imports, the sector will benefit from the depreciation. If the indicator is negative, the impact tends to be negative.

The net export to output ratio in sector k is defined as the difference between the value of exports and the value of imported industrial inputs, as a proportion of the production value in sector k .

$$CEL_k = \frac{X_k - IM_k}{Y_k} \quad (4)$$

¹ Only imports of industrial inputs are considered. As will be detailed later, only a few industrial sectors report a significant consumption of agricultural inputs, meaning that the indicator is overestimated and the real trade balance is significantly lower than the estimated balance.

where:

IM_k is the value of industrial inputs imported by sector k ;

X_k is the value of exports in sector k ; and

Y_k is the production value in sector k .

4. Variables used to calculate the trade openness indicators

4.1. Industrial production value

The production value is obtained from IBGE's PIA survey, measured in current reals, according to version 2.0 of the National Classification of Economic Activities (CNAE).

Production data have been released according to CNAE 2.0 beginning in 2007. For the 1996-2006 period, the data available are based on version 1.0 of CNAE. Using a correspondence table provided by the National Classification Commission (CONCLA), FUNCEX prepared a conversion table that converts version 1.0 values into version 2.0 values².

The PIA survey is published by IBGE with a two-year lag. For years in which the PIA survey has not yet been released, production values must be estimated.

Production values are estimated by chain-linking method based on growth rates of quantum and price indexes. The quantum index used is the Monthly Survey of Industry – Physical Production (PIM-PF) prepared by IBGE. The price index is the Broad Producer Price Index (IPA) of the FGV³.

The production value is estimated from estimates of monthly production values. For each month of the year in question, the production values are estimated from the product of the previous year's average value and the rates of change in volumes and prices in the month as compared to the previous year's average.

The production value in sector k , estimated for year t , is calculated as follows:

$$\hat{Y}_k^t = \sum_{m=1}^{12} \left[\left(\frac{Y_k^{t-1}}{12} \right) \times \left(\frac{Q_k^{m,t}}{\bar{Q}_k^{t-1}} \right) \times \left(\frac{P_k^{m,t}}{\bar{P}_k^{t-1}} \right) \right] \quad (5)$$

where:

$\left(\frac{Y_k^{t-1}}{12} \right)$ is the average monthly production value in sector k in year $t-1$;

² The production value for the three-digit CNAE 1.0 group – which corresponded to more than one CNAE 2.0 group – for the 1996-2007 period was distributed among the groups based on weights calculated from the 2007 PIA-Product survey's structure.

³ For correspondences between the IPA survey classification and CNAE 2.0, see Table A2 in the Appendix. It is worth noting that the PIM-PF survey classification does not have a physical production index for division 20 (Manufacture of chemicals) of CNAE 2.0. This index is built from the weighted average of the physical production indices 20B (Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations) and 20C (Manufacture of other chemicals). The weights were obtained from the PIM-PF calculation structure.

$Q_k^{m,t}$ is the physical production index for sector k in month m in year t ;

\bar{Q}_k^{t-1} is the average physical production index for sector k in year $t-1$;

$P_k^{m,t}$ is the IPA for sector k in month m in year t ; and

\bar{P}_k^{t-1} is the average Broad Producer Price Index (IPA) for sector k in year $t-1$;

4.2. Value of exports and imports

The values of exports and imports are obtained from the Secretariat of Foreign Trade (SECEX), in current US dollars, according to the classification of goods under the Mercosur Common Nomenclature (NCM).

For the indicators to be calculated, the values of exports and imports under the NCM must be reclassified to CNAE 2.0 so that they can be compared with production values. Moreover, all values must be in the same currency.

The export and import data are reclassified from the NCM to CNAE 2.0 using a conversion table created by FUNCEX based on a correspondence table provided by the CONCLA.

For the conversion of US dollars into Brazilian reals, it was decided to convert monthly values to minimize the effects of exchange rate changes during the year. The monthly values of exports (imports) are multiplied by the monthly average nominal exchange rate (provided by the Central Bank) and then added together to obtain the result for the year.

The value in reals of exports in sector k in year t is:

$$X_k^t = \sum_{m=1}^{12} (X_k^{m,t} \times e^{m,t}) \quad (6)$$

where:

$X_k^{m,t}$ is the value in FOB dollars of exports in sector k in month m in year t ; and

$e^{m,t}$ is the average exchange rate (R\$/US\$) in month m in year t .

The value in reals of products imported by sector k in year t is:

$$M_k^t = \sum_{m=1}^{12} (M_k^{m,t} \times e^{m,t}) \quad (7)$$

where:

$M_k^{m,t}$ is the value in FOB dollars of imports in sector k in month m in year t ; and

$e^{m,t}$ is the average exchange rate (R\$/US\$) in month m in year t .

4.3. Value of imported and domestic inputs

In order to calculate the indicator of imported input share and the net export to output ratio, one needs to know the value of domestic and imported inputs consumed by the activity sectors. For this purpose, Input-Output Matrix (MIP) tables prepared by IBGE are used. The MIP tables make it possible to identify the distribution structure of a product between intermediate consumption (input) and final consumption.

Once the distribution structure is known, the amount that will be consumed as input by each activity sector can be identified based on the production and/or import value. The percentage of the product that will be used as input for each of the sectors considered in the calculation is called distribution coefficient.

Distribution coefficients are built using a global domestic supply matrix: the sum of the supply and demand matrix for imported products (released as Table 4) and the supply and demand matrix for production at basic prices (released as Table 3).

As the trade openness indicators are calculated based on CNAE 2.0, the supply and demand matrix for production that offers the transaction values for each product i ($i = 1, 2, \dots, 110$) for each sector j ($j = 1, 2, \dots, 55$), called $N_{110 \times 55}$, must be first transformed into a matrix that offers the transaction values between sector peers, which is called $N_{55 \times 55}$.

This transformation is obtained by premultiplying matrix $N_{110 \times 55}$ by matrix $D_{55 \times 110}$, which is a matrix provided by IBGE (released as Table 7) that measures the sectoral share in the production of domestic products. The supply and demand matrix for imported products undergoes a similar transformation with the aim of generating a global supply matrix $N_{55 \times 55}$.

The estimated distribution coefficients to be used in calculating the value of imported inputs and domestic inputs is calculated as follows:

$$\alpha_{ij} = \frac{m_{ij}}{[\sum_{j=1}^n m_{ij}] + df_i} \quad (8)$$

where:

m_{ij} is the value of total domestic supply (sum of import values and domestic production) of product i that is sold to activity sector j ;

df_i is the value of total supply of product i for final demand (household or government consumption or exports)⁴; and

n is the number of sectors considered (55).

By multiplying the distribution coefficients by the production value for a specific sector, one obtains the amounts that each sector consumes from that specific sector as input. By applying the same calculation to imports, one finds the imported inputs (of a specific sector) used by the sectors considered.

⁴It is assumed that there are no inventory changes in the economy. For this purpose, the value of consumed inventories ("Inventory Change" < 1) is added to the production or import value, so what is considered is the production or import that is available. Similarly, the value of accumulated inventories ("Inventory Change" > 1) is subtracted from the production or import value.

Thus, the value of domestic input i consumed by sector j is calculated as follows:

$$ID_{ij} = Y_i \times \alpha_{ij} \quad (9)$$

where:

Y_i is the production value in sector i .

The total value of domestic inputs used by sector j is:

$$ID_j = \sum_{i=1}^n ID_{ij} \quad (10)$$

Similarly, the value of imported input i consumed by sector j is calculated as follows:

$$IM_{ij} = M_i \times \alpha_{ij} \quad (11)$$

where:

M_i is the value of imports of goods in sector i .

The total value of imported inputs used by sector j is:

$$IM_j = \sum_{i=1}^n IM_{ij} \quad (12)$$

It is worth pointing out that for the calculation of annual values of inputs used it is assumed that the distribution of both the import value and domestic production value between the different activity sectors and final demand follows the distribution of total domestic supply, which is given by the sum of MIP Tables 3 and 4.

A second hypothesis is that this distribution does not change over time, meaning that the indicators remain fixed in time. The percentage of the total supply of an input used by a sector remains unchanged, but domestic inputs can be replaced with imported inputs. In the short term, this is not a strong hypothesis, as technological and structural changes take longer to occur.

Since 1996, when the historical data of the trade openness indicators in current prices begins, the latest MIPs released by IBGE are for the years 2000 and 2005. To calculate the indicators for the 1996-2002 period, the 2000 MIP was used as a basis. Since 2003, the 2005 MIP has been used as a basis.

As described previously, the values of domestic production are extracted from the PIA survey and estimated for recent years based on the PIM-PF survey. However, both surveys only show production values for the mining and quarrying and manufacturing industries. As there are no similar surveys for the other sectors, we chose to consider only industrial inputs.

According to the 2005 MIP, industrial inputs account for 59% of the value of domestic inputs used by manufacturing sectors and for 77% of the value of imported inputs.

Agricultural inputs account for a significant share in intermediate consumption of domestic products in the Tobacco and Food and beverages sectors, with 57% and 46%, respectively. For this reason, it was decided not to calculate the imported input share and the net export to output ratio for those sectors. In the case of the Wood products sector, the share of agricultural inputs stands at 20%, while

for the Textiles and Pulp and paper sectors it amounts to 14%, so the indicators should be interpreted cautiously. In the other manufacturing sectors, the share of agricultural inputs is insignificant.⁵

5. Calculation of the indicators at constant prices

The trade openness indicators at constant prices are calculated in a similar way as those at current prices. The difference is that the real values of the variables are used instead of their nominal values, meaning that the effects of price changes are removed from the variables' nominal values.

In the case of production values, the deflator used was the Broad Producer Price Index (IPA) of the FGV. Exports and imports are deflated respectively by the Export Price Index (IPEX) and the Import Price Index (IPIM), both prepared by FUNCEX.

The deflators' series were normalized so that the 2007 index equals 100. Thus, one can say that the values at constant prices are 2007 price values.

5.1. Real industrial production value

The real industrial production value, or 2007 price values, is calculated as follows:

$$YR_k^t = \frac{Y_k^t}{IPA_k^t} \quad (13)$$

where:

Y_k^t is the nominal production value in sector k in year t ; and

IPA_k^t is the IPA for sector k in year t .

5.2. Real value of exports and imports

In the case of exports and imports, the monthly values are deflated and then aggregated to arrive at the annual value.

The monthly export and import values by CNAE 2.0 sector at the two-digit level are deflated by the respective monthly price indices of exports and imports produced by FUNCEX.

As the export and import values are measured in Brazilian reals, the IPEX and IPIM, which are measured in US dollars, also need to be converted into reals. The exchange rate considered is that observed in the same base period for the deflators, thus removing the effect of price and exchange rate changes from foreign trade values.

⁵ See Table A4 in the Appendix.

The real value of exports in month m in year t and in sector k is calculated as follows:

$$XR_k^{m,t} = \frac{X_k^{m,t}}{IPEX_k^{m,t} \times e^{m,t}} = \frac{X_k^{\$,m,t} \times e^{m,t}}{IPEX_k^{m,t} \times e^{m,t}} \quad (14)$$

where:

$X_k^{m,t}$ is the value in reals of exports in sector k in month m in year t ;

$IPEX_k^{m,t}$ is the IPEX for sector k in month m in year t ;

$e^{m,t}$ is the average exchange rate (R\$/US\$) in month m in year t ; and

$X_k^{\$,m,t}$ is the value in FOB dollars of exports in sector k in month m in year t .

and the real value of exports in year t is:

$$XR_k^t = \sum_{m=1}^{12} [XR_k^{m,t}] \quad (15)$$

The real value of imports of products in sector k in month m in year t is calculated as follows:

$$MR_k^{m,t} = \frac{M_k^{m,t}}{IPIM_k^{m,t} \times e^{m,t}} = \frac{M_k^{\$,m,t} \times e^{m,t}}{IPIM_k^{m,t} \times e^{m,t}} \quad (16)$$

where:

$M_k^{m,t}$ is the value in reals of imports of products in sector k in month m in year t ;

$IPIM_k^{m,t}$ is the IPIM for sector k in month m in year t ;

$e^{m,t}$ is the average exchange rate (R\$/US\$) in month m in year t ; and

$M_k^{\$,m,t}$ is the value in FOB dollars of imports of products in sector k in month m in year t .

and the real value of imports in year t is:

$$MR_k^t = \sum_{m=1}^{12} [MR_k^{m,t}] \quad (17)$$

6. Estimation of the indicators released in the second half

In the second half of the year, after the PIA survey is released (usually in June), the indicators for the reference year of the newly released PIA that were estimated are recalculated based on the PIA's production values. For the following year, new estimates are calculated by a chain-linking method based on the newly released production values.

In addition, estimates for the current year are calculated based on the accumulated values in the 12 months to the last month for which PIM-PF and foreign trade data are available, which is usually June.

The indicators for the current year are thus for the twelve-month period to the month for which the latest data are available. It can be used to identify the trend in the indicators in the current year.

7. Description and source of the variables used

Table 1 shows the variables and sources used to calculate the trade openness indicators.

Table 1 - Variables and sources

Variables used	Sources
Value (US\$ FOB) of exports, according to CNAE 2.0	FUNCEX
Value (US\$ FOB) of imports, according to CNAE 2.0	
Export Price Index by CNAE 2.0 sector	
Import Price Index by CNAE 2.0 sector	
Gross industrial production value: Table 1848 - General data for local industrial units with five or more employees by unit of the federation	PIA-IBGE
Physical industrial production: Table 3653 - Physical Industrial Production by section and industrial activity - Fixed-base index without seasonal adjustment (Base: 2012 average = 100) (index number)	PIM-PF-IBGE
Supply and demand for imported products (Table 4)	Input Matrix 2000-2005 Product - IBGE
Supply and demand for production at basic prices (Table 3)	
Exchange rate: Exchange rate - Free - US dollar (sale) - Average for the period - monthly (series cod. 3698)	Central Bank
IPA - <i>Origem</i> - OG - DI	FGV

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Appendix

Table A1 - Sectoral coverage of the indicators (industrial activities according to CNAE 2.0)

Code	Description
B	Indústria de transformação
10	Fabricação de produtos alimentícios
11	Fabricação de bebidas
12	Fabricação de produtos do fumo
13	Fabricação de produtos têxteis
14	Confecção de artigos do vestuário e acessórios
15	Preparação de couros e fabricação de artefatos de couro, artigos para viagem e calçados
16	Fabricação de produtos de madeira
17	Fabricação de celulose, papel e produtos de papel
18	Impressão e reprodução de gravações
19	Fabricação de coque, de produtos derivados do petróleo e de biocombustíveis
20	Fabricação de produtos químicos
21	Fabricação de produtos farmoquímicos e farmacêuticos
22	Fabricação de produtos de borracha e de material plástico
23	Fabricação de produtos de minerais não-metálicos
24	Metalurgia
25	Fabricação de produtos de metal, exceto máquinas e equipamentos
26	Fabricação de equipamentos de informática, produtos eletrônicos e ópticos
27	Fabricação de máquinas, aparelhos e materiais elétricos
28	Fabricação de máquinas e equipamentos
29	Fabricação de veículos automotores, reboques e carrocerias
30	Fabricação de outros equipamentos de transporte, exceto veículos automotores
31	Fabricação de móveis
32	Fabricação de produtos diversos

Table A2 - Correspondence between CNAE 2.0 sectors and the broad producer price indices (IPA)

CNAE 2.0 Divisions Codes/Description	IPA-FGV Survey/Description
10:Fabricação de produtos alimentícios *	IPA-OG DI: Carnes, Produtos de Carne e Pescados IPA-OG DI:Conservas de Frutas, Legumes e Outros Vegetais IPA-OG DI: Óleos e Gorduras Vegetais IPA-OG DI: Laticínios IPA-OG DI: Produtos Amiláceos e Alimentos para Animais IPA-OG DI: Açúcar IPA-OG DI: Café IPA-OG DI: Outros Produtos Alimentícios
11:Fabricação de bebidas	IPA-OG DI: Bebidas
12:Fabricação de produtos do fumo	IPA-OG DI: Produtos do Fumo
13:Fabricação de produtos têxteis	IPA-OG DI: Produtos Têxteis
14:Confecção de artigos do vestuário e acessórios	IPA-OG DI: Artigos do Vestuário
15:Preparação de couros e fabricação de artefatos de couro, artigos para viagem e calçados	IPA-OG DI: Couros e Calçados
16:Fabricação de produtos de madeira	IPA-OG DI: Produtos de Madeira
17:Fabricação de celulose, papel e produtos de papel	IPA-OG DI: Celulose, Papel e Prod. Papel
18:Impressão e reprodução de gravações	IPA-OG DI: Total das Indústrias de Transformação
19:Fabricação de coque, de produtos derivados do petróleo e de biocombustíveis	IPA-OG DI: Produtos Derivados do Petróleo e Álcool
20:Fabricação de produtos químicos *	IPA-OG DI: Produtos Químicos Inorgânicos IPA-OG DI: Produtos Químicos Orgânicos IPA-OG DI: Resinas e Elastômeros IPA-OG DI: Fibras e Filamentos Sintéticos IPA-OG DI: Defensivos Agrícolas IPA-OG DI: Sabões, Detergentes, Produtos de Limpeza e Artigos de Perfumaria IPA-OG DI: Tintas, Vernizes, Esmaltes, Lacas e Produtos Afins IPA-OG DI: Produtos e Preparados Químicos Diversos
21:Fabricação de produtos farmoquímicos e farmacêuticos	IPA-OG DI: Produtos Farmacêuticos
22:Fabricação de produtos de borracha e de material plástico	IPA-OG DI: Artigos de Borracha e Material Plástico
23:Fabricação de produtos de minerais não-metálicos	IPA-OG DI: Prod. de Minerais Não-Metálicos
24:Metalurgia	IPA-OG DI: Metalurgia Básica
25:Fabricação de produtos de metal, exceto máquinas e equipamentos	IPA-OG DI: Produtos de Metal
26:Fabricação de equipamentos de informática, produtos eletrônicos e ópticos*	IPA-OG DI:Equipamentos de Informática IPA-OG DI: Material Eletrônico, Aparelho e Equipamentos de Comunicação
27:Fabricação de máquinas, aparelhos e materiais elétricos	IPA-OG DI: Máquinas, Aparelhos e Materiais Elétricos
28:Fabricação de máquinas e equipamentos	IPA-OG DI: Máquinas e Equipamentos
29:Fabricação de veículos automotores, reboques e carrocerias	IPA-OG DI: Veículos Automotores,Reboques,Carroceria,Autopeça
30:Fabricação de outros equipamentos de transporte, exceto veículos automotores	IPA-OG DI: Outros Equipamentos de Transporte
31:Fabricação de móveis	IPA-OG DI: Móveis e Artigos do Mobiliário
32:Fabricação de produtos diversos	IPA-OG DI: Total das Indústrias de Transformação

Note: * CNAE divisions whose broad producer price indices were built from the weighted average. The weights were obtained from the calculation structure of the FGV's IPA-OG survey.

Table A3 - Correspondence between CNAE 2.0 and N55 Activities under the MIP

B Mining and quarrying

PIA-IBGE CNAE Divisions and sections	IBGE Input-Output Matrix Activities at 55 Level
5:Extração de carvão mineral	203:Outros da indústria extrativa
6:Extração de petróleo e gás natural	201:Petróleo e gás natural
7:Extração de minerais metálicos	
07-1:Extração de minério de ferro	202:Minério de ferro
07-2:Extração de minerais metálicos não-ferrosos	203:Outros da indústria extrativa
8:Extração de minerais não-metálicos	203:Outros da indústria extrativa

C Manufacturing

PIA-IBGE CNAE Divisions and sections	IBGE Input-Output Matrix Activities at 55 Level
10:Fabricação de produtos alimentícios	301:Alimentos e bebidas
11:Fabricação de bebidas	301:Alimentos e bebidas
12:Fabricação de produtos do fumo	302:Produtos do fumo
13:Fabricação de produtos têxteis	303:Têxteis
14:Confecção de artigos do vestuário e acessórios	304:Artigos do vestuário e acessórios
15:Preparação de couros e fabricação de artefatos de couro, artigos para viagem e calçados	305:Artefatos de couro e calçados
16:Fabricação de produtos de madeira	306:Produtos de madeira - exclusive móveis
17:Fabricação de celulose, papel e produtos de papel	307:Celulose e produtos de papel
18:Impressão e reprodução de gravações	308:Jornais, revistas, discos
19:Fabricação de coque, de produtos derivados do petróleo e de biocombustíveis	
19-1:Coquerias	309:Refino de petróleo e coque
19-2:Fabricação de produtos derivados do petróleo	309:Refino de petróleo e coque
19-3:Fabricação de biocombustíveis	310:Álcool
20:Fabricação de produtos químicos	
20-1:Fabricação de produtos químicos inorgânicos	311:Produtos químicos
20-2:Fabricação de produtos químicos orgânicos	311:Produtos químicos
20-3:Fabricação de resinas e elastômeros	312:Fabricação de resina e elastômeros
20-4:Fabricação de fibras artificiais e sintéticas	317:Produtos e preparados químicos diversos
20-5:Fabricação de defensivos agrícolas e desinfestantes domissanitários	314:Defensivos agrícolas
20-6:Fabricação de sabões, detergentes, produtos de limpeza, cosméticos, produtos de perfumaria e de higiene pessoal	315:Perfumaria, higiene e limpeza
20-7:Fabricação de tintas, vernizes, esmaltes, lacas e produtos afins	316:Tintas, vernizes, esmaltes e lacas
20-9:Fabricação de produtos e preparados químicos diversos	317:Produtos e preparados químicos diversos
21:Fabricação de produtos farmoquímicos e farmacêuticos	313:Produtos farmacêuticos
21-1:Fabricação de produtos farmoquímicos	
21-2:Fabricação de produtos farmacêuticos	313:Produtos farmacêuticos
22:Fabricação de produtos de borracha e de material plástico	318:Artigos de borracha e plástico
22-1:Fabricação de produtos de borracha	
22-2:Fabricação de produtos de material plástico	318:Artigos de borracha e plástico
23:Fabricação de produtos de minerais não-metálicos	
23-1:Fabricação de vidro e de produtos do vidro	320:Outros produtos de minerais não-metálicos
23-2:Fabricação de cimento	319:Cimento
23-3:Fabricação de artefatos de concreto, cimento, fibrocimento, gesso e materiais semelhantes	320:Outros produtos de minerais não-metálicos
23-4:Fabricação de produtos cerâmicos	320:Outros produtos de minerais não-metálicos
23-9:Aparelhamento de pedras e fabricação de outros produtos de minerais não-metálicos	320:Outros produtos de minerais não-metálicos

PIA-IBGE CNAE Divisions and sections	IBGE Input-Output Matrix Activities at 55 Level
24: Metalurgia	
24-1: Produção de ferro-gusa e de ferroligas	321: Fabricação de aço e derivados
24-2: Siderurgia	321: Fabricação de aço e derivados
24-3: Produção de tubos de aço, exceto tubos sem costura	321: Fabricação de aço e derivados
24-4: Metalurgia dos metais não-ferrosos	322: Metalurgia de metais não-ferrosos
24-5: Fundição	321: Fabricação de aço e derivados
25: Fabricação de produtos de metal, exceto máquinas e equipamentos	323: Produtos de metal - exclusive máquinas e equipamentos
26: Fabricação de equipamentos de informática, produtos eletrônicos e ópticos	
26-1: Fabricação de componentes eletrônicos	328: Material eletrônico e equipamentos de comunicações
26-2: Fabricação de equipamentos de informática e periféricos	326: Máquinas para escritório e equipamentos de informática
26-3: Fabricação de equipamentos de comunicação	328: Material eletrônico e equipamentos de comunicações
26-4: Fabricação de aparelhos de recepção, reprodução, gravação e amplificação de áudio e vídeo	328: Material eletrônico e equipamentos de comunicações
26-5: Fabricação de aparelhos e instrumentos de medida, teste e controle; cronômetros e relógios	329: Aparelhos/instrumentos médico-hospitalar, medida e óptico
26-6: Fabricação de aparelhos eletromédicos e eletroterapêuticos e equipamentos de irradiação	329: Aparelhos/instrumentos médico-hospitalar, medida e óptico
26-7: Fabricação de equipamentos e instrumentos ópticos, fotográficos e cinematográficos	329: Aparelhos/instrumentos médico-hospitalar, medida e óptico
26-8: Fabricação de mídias virgens, magnéticas e ópticas	329: Aparelhos/instrumentos médico-hospitalar, medida e óptico
27: Fabricação de máquinas, aparelhos e materiais elétricos	
27-1: Fabricação de geradores, transformadores e motores elétricos	327: Máquinas, aparelhos e materiais elétricos
27-2: Fabricação de pilhas, baterias e acumuladores elétricos	327: Máquinas, aparelhos e materiais elétricos
27-3: Fabricação de equipamentos para distribuição e controle de energia elétrica	327: Máquinas, aparelhos e materiais elétricos
27-4: Fabricação de lâmpadas e outros equipamentos de iluminação	327: Máquinas, aparelhos e materiais elétricos
27-5: Fabricação de eletrodomésticos	325: Eletrodomésticos
27-9: Fabricação de equipamentos e aparelhos elétricos não especificados anteriormente	327: Máquinas, aparelhos e materiais elétricos
28: Fabricação de máquinas e equipamentos	324: Máquinas e equipamentos, inclusive manutenção e reparos
29: Fabricação de veículos automotores, reboques e carrocerias	
29-1: Fabricação de automóveis, camionetas e utilitários	330: Automóveis, camionetas e utilitários
29-2: Fabricação de caminhões e ônibus	331: Caminhões e ônibus
29-3: Fabricação de cabines, carrocerias e reboques para veículos automotores	332: Peças e acessórios para veículos automotores
29-4: Fabricação de peças e acessórios para veículos automotores	332: Peças e acessórios para veículos automotores
29-5: Recondicionamento e recuperação de motores para veículos automotores	Não relacionado
30: Fabricação de outros equipamentos de transporte, exceto veículos automotores	333: Outros equipamentos de transporte
31: Fabricação de móveis	334: Móveis e produtos das indústrias diversas
32: Fabricação de produtos diversos	334: Móveis e produtos das indústrias diversas

Table A4 - Share of agricultural inputs in total inputs by CNAE 2.0 sector in 2005

Description	Imported Input	National Input
Tobacco	10,9%	56,6%
Food and beverages	43,0%	46,1%
Wood products	0,7%	20,3%
Textiles	0,5%	14,3%
Pulp and paper	26,6%	14,2%
Coke, refined petroleum products and biofuel	0,0%	5,1%
Leather, travel goods and footwear	1,4%	1,2%
Chemicals	0,7%	1,2%
Furniture and other manufacturing	0,4%	1,2%
Rubber and plastics products	1,2%	1,1%
Non-metallic mineral products	0,5%	0,7%
Pharmaceutical chemicals and pharmaceuticals	0,7%	0,5%
Metal products (except machinery and equipment)	0,4%	0,1%
Basic metals	0,2%	0,1%
Printing and reproduction of recorded media	0,2%	0,1%
Motor vehicles, trailers and semi-trailers	0,0%	0,0%
Wearing apparel	0,1%	0,0%
Computers, electronics and opticals products	0,0%	0,0%
Machinery and equipment	0,0%	0,0%
Electrical equipment	0,0%	0,0%
Other transport equipment	0,0%	0,0%

Source: Prepared by CNI based on statistics for IBGE's 2005 MIP.

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