Measurement of the Impact of Relocation on Employment

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Abstract

The study aims at analyzing the impact of movement of one of the production factors, i.e. labor in OECD countries. Two industrial sectors, namely: manufacturing and services have been included in the analysis. Data were collected from OECD sources for 1995-2000. We tried to include all OECD member countries in the analysis. However the sample is constrained by the availability of data. Inverse production function was used to examine the mobility of labor. Findings of the study suggest that foreign outsourcing is detrimental to sectoral domestic employment, especially in manufacturing. However, there is wide variation of impact on country and sector concerned in each country.

1. Introduction

In the globalized world of today the diffusion of innovations, the mobility of factors of production and the outsourcing of some production or R&D activities operate on a global scale. Due to differences in the stage of development, factor abundance and government policies, factor prices, in particular the price of labor, differ across countries. As a result of these wage differences, firms outsource some of their activities to foreign countries. Is this good or bad for domestic employment? On the one hand, domestic employment may suffer as a result of the labor displacement that follows the outsourcing of some of the activities. On the other hand, it could be argued that firms take advantage of lower labor costs or higher labor productivity abroad, pass them on in their output prices and thereby manage to attract more demand, increase sales and hire more domestic workers. The question is whether these relocations of output and various stages in the value chain have a negative or positive effect on employment in developed countries. This is the object of this paper.

Whereas the McKinsey Global Institute (2003) concluded that offshoring was detrimental to employment in the outsourcing countries, Amiti and Wei (2004a and 2005) obtain results with U.S. and U.K. data suggesting that job losses are likely to be offset by new jobs created because of outsourcing.

We shall re-examine Amiti and Wei's results, using sectoral data from 12 OECD countries for 1995 and 2000, using a similar econometric model to theirs but a different measure of outsourcing intensity, extracted from the STAN input-output tables. Amiti and Wei worked with finer industry data but on a single country (the U.S. and the U.K. respectively) and with longer panel data in the time dimension. We shall be able to exploit more of the inter-country variation.

The paper is organized as follows. In the next section we present our econometric model and data used. In Section 3, we discuss the results obtained. Finally conclusions are presented in Section 4.

2. Model

To estimate the effect of foreign outsourcing on domestic sector employment we use three types of models, adding each time some more flexibility. We always start from a production function where gross output is obtained using a combination of labor, capital stock and intermediate inputs. First, we assume that all inputs other than labor are quasi-fixed and that output is exogenous. Second, we assume that the inputs are variable but that output is fixed, and finally we also allow output to vary.

In the first model, labor demand would simply be the inverted production function solved for labor as a function of gross output, intermediate inputs and capital stock, if labor would compensate for the sluggishness in the adjustment of the other inputs. However, it may well be that the desired production level is not met because labor itself is subject to hiring and firing costs. The industry employment equation is:

$$\Delta \ln L_{it} = \beta_0 + \beta_1 \Delta \ln Y_{it} + \beta_2 \Delta \ln K_{it} + \beta_3 \Delta \ln M_{it} + \beta_4 \Delta \ln OI_{it} + \beta_I D_I + \beta_C D_C + \eta_{it} \quad (1)$$

where L_{it} is the demand for labour in industry i in year t
Y_{it} is the production (gross output) in industry i in year t
K_{it} is the capital stock used in industry i in year t
M_{it} is the level of intermediate inputs used in industry i in year t
OI_{it} is the overall outsourcing index for industry i in year t
D_I denotes industry dummies
D_C denotes country dummies
Δ is the first difference operator
η_{it} is a random error term i.i.d. distributed accounting for left-out variables.

The model is estimated in first differences to eliminate time-invariant industry effects in labor demand.

In the second model we assume that all inputs are variable and that the observed levels result from a cost minimization subject to a constrained level of output and exogenous factor prices. The technology can be represented by a dual representation, such as a cost function. The demand for labor is obtained by applying Shephard's lemma to the cost function. This approach corresponds to Amiti and Wei's model specification. The estimating equation is as follows:

$$\Delta \ln L_{it} = \alpha_0 + \alpha_1 \Delta \ln W_{it} + \alpha_2' \Delta \ln \omega_{it} + \alpha_3 \Delta \ln Y_{it} + \alpha_4 \Delta \ln OI_{it} + \alpha_I D_I + \alpha_C D_C + \varepsilon_{it} \quad (2)$$

where W_{it} is the wage rate in industry i in year t

ω_{it} is the price vector of capital and intermediate inputs in industry i in year t

ε_{it} is a random error term i.i.d. distributed accounting for left-out variables.

We know that factor demands are homogeneous of degree zero in factor prices. Therefore we impose the parametric restriction that $\alpha_1 + \alpha_2' = 0$. Again we take first differences to eliminate time-invariant industry effects. We specify a double log functional form for the labor demand specification, which is consistent with a Cobb-Douglas production function.

The third model differs from the second model in that output is also considered to be endogenous. The decision maker is seen as a profit maximizer that determines simultaneously on the inputs and the output level on the basis of exogenously given input and output prices.

The estimating equation is given by

$$\Delta \ln L_{it} = \gamma_0 + \gamma_1 \Delta \ln W_{it} + \gamma_2' \Delta \ln \omega_{it} + \gamma_3 \Delta \ln p_{it} + \gamma_4 \Delta \ln OI_{it} + \delta_I D_I + \delta_C D_C + \nu_{it} \quad (3)$$

where p_{it} is the output price in industry i in year t

ν_{it} is a random error term i.i.d. distributed accounting for left-out variables.

This time we impose the parametric restriction that $\gamma_1 + \gamma_2' + \gamma_3 = 0$ to account for homogeneity of degree zero of factor demand in factor and output prices. Again we take first differences to eliminate time-invariant industry effects and we use a double log functional form, which is consistent with a Cobb-Douglas production function.

In all three models we experiment with industry and country dummies to account for industry and country specificities not only in the levels but also in the changes of employment.

Data

Complete data were available for 12 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Korea, Norway, Sweden, US) and 26 industries[1] for two years, i.e. 1995 and 2000, except for Greece (where we have data for 1995 and 1999) and Norway (where data are for 1997 and 2001). As explained in appendices 1 and 2 we have defined industries on the basis of two digit ISIC codes, with some regrouping to have the same comparable industrial definitions across all countries. The base year for converting current to constant value is the year 2000.

The variables used in the analysis are: outsourcing index for manufacturing (OIM) and services (OIS), Wage rates (WAGES), Investment price deflator (INVP), Intermediate input (INPUT), Intermediate input price deflator (IIP), Output (OUTPUT), Output price deflator (POUT), and Capital Stock (CAP). These variables are defined as follows.

The outsourcing index measures the proportion of intermediate inputs that are imported. Amiti and Wei computed the outsourcing index in the following way:

$$OI_i = \sum_j \left[\frac{\textit{purchase of inputs } j \textit{ by industry } i}{\textit{total inputs, excluding energy, used by } i} \right] \bullet \left[\frac{M_j}{D_j} \right]$$

where Mj denotes import of intermediate input j (restricted to services), and
Dj is the domestic demand for service j.

In other words, Amiti and Wei apply the percentage of imported final demand of commodity/service j to the intermediate input use of commodity/service j by industry i to compute the indirect import of commodity/service j by industry i. They then sum the imported commodities/services used as intermediate inputs in sector i and express them in percentage of total intermediate inputs of services in sector i.

[1] In order to make comparable data for all the countries we have used aggregated data for certain industries. Aggregation of industries has been based on industry data as well data available in input-output tables. Manner in which aggregation has been done is shown in Appendix I. Country-specific merging of industries is shown in Appendix II. Appendix III presents industries included in the analysis.

We instead measure the percentage of imported intermediate inputs directly from the tables in the STAN input-output tables. The following formula has been used:

$$OI_i = \frac{total\ imported\ input\ used\ by\ industry\ i}{total\ input\ used\ by\ industry\ i}$$

We allow for different coefficients for the outsourcing index for manufacturing and services (OIM and OIS) by interacting the outsourcing index with manufacturing and services dummies.

WAGES has been computed as the ratio of labour compensation of employees (worksheet LABR) to the full time equivalent employees (worksheet EMPE_FTE) wherever we got data for EMPE_FTE. In other cases, such as Belgium, Denmark, Finland, and Germany, the number of employees (worksheet EME) has been used rather than full time equivalent employees, as worksheet EMPE_FTE was not available for these countries. In case of Sweden total employment (number engaged; worksheet EMPN) has been used as a proxy of full time employees due to lack of other data.

INVP has been computed as the ratio of gross fixed capital formation at current prices to the gross fixed capital formation at constant prices.

INPUT is the value of intermediate inputs at constant prices while IIP has been derived as the ratio of the value of intermediate inputs at current prices to the value of intermediate inputs at constant prices. Similarly OUTPUT is the value of output at constant prices whereas POUT is the ratio of the value of output at current prices to the value of output at constant prices.

Variable CAP has been measured as the value of gross fixed capital formation at constant prices. We have no data on physical capital stock and no annual data to construct a capital stock from investment data. Hence we assume that the capital stock is proportional to gross fixed capital formation.

3. Results

Table 1 presents the estimation results obtained from the inverted Cobb-Douglas production function. A likelihood ratio test clearly rejects the absence of industry and country-specific influences on sector labor demand. Industry dummies control for sector-specific technical change and country dummies control for country-specific labor market regulations and rigidities. We shall henceforth comment the results from the last column of table 1. If all inputs could be adjusted instantaneously then the elasticity of labor with respect to output should be the inverse of labor share in the value of output. In the short term we expect rigidities in labor adjustment: it takes time to hire the desired type of worker, and laws and regulations make it difficult in many countries, especially in European countries, to lay off workers without costs. This is why labor reacts slowly to increases in the level of production. We find an elasticity of 0.11. Labor follows the movement of the other inputs: the elasticity of labor with respect to intermediate inputs is 0.11 and its elasticity with respect to capital is close to zero. The insignificant coefficient for investment could be due to an error in variables problem. Fixed capital formation is only a rough proxy for capital stock. Total factor productivity growth has been made a function of foreign outsourcing. Our results clearly indicate that foreign outsourcing decreases labor demand in manufacturing. If the index increases by 10%, labor demand decreases by 12% in manufacturing. Whereas the coefficient of foreign outsourcing, while remaining significant and negative, decreases in absolute magnitude when we control for industry effects and country effects, the effect of foreign outsourcing in services becomes negative and significant only after we control for industry-specific effects.

Table 1: Employment and foreign outsourcing in OECD countries: 1995-2000+ (Conditional labor demand equation with quasi-fixed inputs, in growth rates)

	Dependent Variable: Δ ln (Employment)				Remarks
Variables	No Dummies	Country Dummies	Industry Dummies	Country & Industry Dummies	
Δ ln(OIM)	-0.1805** (-2.5433)	-0.1716** (-2.3117)	-0.1292** (-2.4425)	-0.1242** (-2.3511)	Outsourcing Index in Manufacturing
Δ ln(OIS)	0.0258 (0.7198)	0.0135 (0.3518)	-0.0737*** (-2.6439)	-0.0967*** (-3.3914)	Outsourcing Index in Services
Δ ln(INPUT)	0.1160*** (4.3702)	0.1438*** (4.4982)	0.0872*** (3.7371)	0.1096*** (4.3382)	Intermediate Input
Δ ln(CAP)	0.0472** (2.1606)	0.0377 (1.6068)	0.0240 (1.4734)	0.0042 (0.2478)	Capital formation
Δ ln(OUTPUT)	0.1473*** (5.1095)	0.1176*** (2.8598)	0.1464*** (5.9360)	0.1084*** (3.0381)	Output
Log likelihood	190.8472	198.3123	293.0747	313.8220	
N	264	264	264	264	
R^2	0.1987	0.2428	0.6306	0.6844	

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; + In some countries time points are different. Figures in parentheses are t-values.

The results do not change a lot when we let the other inputs adjust to their optimal level, i.e. when we replace the levels of capital and intermediate inputs by the prices of labor and intermediate inputs relative to investment (Table 2). The likelihood ratio test again concludes that the most preferred specification is the one corresponding to the last column, i.e. with industry and country dummies. It is thus not sufficient to correct for industry and country-specific fixed effets in the levels, but there are also specific industry and country effects in explaining the growth rates. The most important difference is obtained after controlling for industry-specific effects. According to the cross-price elasticities, labor is a substitute for intermediate inputs and slightly complementary to the capital stock. The outsourcing index has a negative coefficient in both manufacturing and services industries. The detrimental effect on labor from foreign outsourcing is slightly stronger in manufacturing than in services. A 1% increase in the proportion of intermediate inputs that are imported leads to a 0.13% reduction in employment in manufacturing and a 0.10% reduction of employment in services.

Table 2: Employment and foreign outsourcing in OECD countries: 1995-2000+
(Conditional labor demand equation with variable inputs, in growth rates)

	Dependent Variable: Δ ln (Employment)				Remarks
Variables	No Dummies	Country Dummies	Industry Dummies	Country & Industry Dummies	
Δ ln(OIM)	-0.2679*** (-3.6582)	-0.2304*** (-3.0069)	-0.1621*** (-3.0367)	-0.1334** (-2.5126)	Outsourcing Index in Manufacturing
Δ ln(OIS)	0.0202 (0.5322)	0.0246 (0.6110)	-0.0847*** (-2.9930)	-0.1003*** (-3.4934)	Outsourcing Index in Services
Δ ln(WAGES)- Δ ln(INVP)	-0.0728 (-1.340)	-0.1945** (-2.5866)	-0.1688*** (-3.7020)	-0.2557*** (-4.4651)	Wages/Investment deflator
Δ ln(IIP)- Δ ln(INVP)	0.0618 (1.1495)	0.0996* (1.7534)	0.1954*** (3.5876)	0.2292*** (4.1174)	Intermediate input/ investment price
Δ ln(OUTPUT)	0.1134*** (3.9290)	0.1981*** (4.5216)	0.0694*** (2.9698)	0.1206** (3.2965)	Gross Output
Log likelihood	177.5445	187.2284	290.1022	313.6965	
N	266	266	266	266	
R^2	0.1271	0.1884	0.6255	0.6864	

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; + In some countries time points are different. Figures in parentheses are t-values.

When we also allow output to vary and derive a labor demand equation unconditional on output (as suggested by Amiti and Ekholm, 2006), the likelihood ratio test again gives the preference to the inclusion of industry and country dummies. There is little sign of any substitutability or complementarity between labor and other two factors of production. What is interesting is to notice is that a 1% increase in the price of output increases by 0.3% to demand for labor. As output increases following the increase in the price of output, the demand for labor by almost as much as following a 1% reduction in the wage rate. The output expansion effect is not negligible. Regarding the two outsourcing indexes, we still cannot exclude a labor destroying effect due to foreign outsourcing, by about twice as much in manufacturing as in services.

Table 3: Employment and foreign outsourcing in OECD countries: 1995-2000+
(Unconditional labor demand equation, in growth rates)

	Dependent Variable: Δ ln (Employment)				Remarks
Variables	No Dummies	Country Dummies	Industry Dummies	Country & Industry Dummies	
Δ ln(OIM)	-0.2615*** (-3.5617)	-0.2769*** (-3.6522)	-0.1613*** (-2.9828)	-0.1546*** (-2.9734)	Outsourcing Index in Manufacturing
Δ ln(OIS)	0.1182*** (2.7019)	0.1089** (2.2986)	-0.0421 (-1.2310)	-0.0865** (-2.4554)	Outsourcing Index in Services
Δ ln(WAGES)- Δ ln(INVP)	-0.1327** (-2.1633)	-0.0759 (-1.0124)	-0.2649*** (-4.9402)	-0.2832*** (-4.6440)	Wages/Investment deflator
Δ ln(IIP)- Δ ln(INVP)	-0.0441 (-0.5148)	-0.1768* (-1.7687)	0.1408** (1.9944)	-0.0046 (-0.0577)	Intermediate input/ investment price
Δ ln(POUT)- Δ ln(INVP)	0.1251 (1.5088)	0.2454** (2.5624)	0.1208* (1.7073)	0.3032*** (3.7848)	Relative price Output/investment
Log likelihood	175.8774	185.1119	285.2146	313.3326	
N	264	264	264	264	
R^2	0.0978	0.1588	0.6059	0.6815	

Note: * p < 0.1; **p < 0.05; ***p < 0.01; + In some countries time points are different. Figures in parentheses are t-values.

It should be noticed that when we used industry definitions which are more disaggregated in some countries and non-existent in others, the results did not differ substantially from those presented above. We prefer the solution with more aggregated data, because then industries have the same definitions in all countries. The qualitative results (signs and significance of the coefficients) for outsourcing were also the same when we used a value-added specification of output (in which case there is no intermediate input). But we prefer the gross output specification precisely because we examine the outsourcing of intermediate inputs.

4. Conclusion

Using a cross-section of growth rates in labor employment in 26 industries of 12 OECD countries, using a measure of foreign outsourcing directly obtained from input-output data, we come to the conclusion that foreign outsourcing is detrimental to sectoral domestic employment, especially in manufacturing but also in services. The results do not depend on the assumed flexibility in factor demand and output supply. Even though there could be a boomerang effect from lower production costs due to foreign outsourcing that translate into higher demand and ultimately more employment, the direct domestic job-destroying effect predominates, at least over the five-year period that we have considered.

Two extensions of the model could be investigated in order to check the robustness of the negative effect of foreign outsourcing on labor demand. First, it may well be that factor and output prices are themselves endogenous and correlated with the error term in the estimating equations. Criscuolo (2006) has explored econometric ways to deal with this endogeneity. Another possible extension of this analysis would be to estimate the model on pooled data using fixed effects instead of working with first differences. “Within” estimators would be less subject to noise in the data than “first difference” based estimators. But to do that we would need more input-output tables. With two observations over time only, within and first-difference estimators make no difference.

Appendix I: Aggregation of Industries

Industry	Aggregation
Mining and Quarrying	Aggregate data for Mining and Quarrying have been used in the analysis rather than taking Mining and Quarrying (energy) and Mining and Quarrying (non-energy) (industry codes 2 & 3 respectively) separately.
Chemicals and Pharmaceuticals	Aggregate data for Chemicals (9) and Pharmaceuticals (10) have been used in the analysis rather than taking Chemicals and Pharmaceuticals separately.
Iron and Steel, Non-ferrous metals	Aggregate data for Iron & Steel (13), Non-ferrous metals (14), and "Fabricated metal products, except machinery & equipment" (15) have been used in the analysis.
Office, accounting and computing machinery	Aggregate data for "Office, accounting & computing machinery" (17), "Electrical machinery & apparatus, nec" (18), "Radio, television & communication equipment" (19), and "Medical, precision & optical instruments" (20) have been used in the analysis.
Motor vehicles, trailers and semi-trailers	Aggregate data for "Motor vehicles, trailers & semi-trailers" (21), "Building & repairing of ships & boats" (22), "Aircraft & spacecraft" (23), and "Railroad equipment & transport equip n.e.c." (24) have been used in the analysis.
Production, collection and distribution of electricity	Aggregate data for "Production, collection and distribution of electricity" (26), "Manufacture of gas; distribution of gaseous fuels through mains" (27), "Steam and hot water supply" (28), and "Collection, purification and distribution of water" (29) have been used in the analysis.
Land transport; transport via pipelines	Aggregate data for "Land transport; transport via pipelines" (33), Water transport (34), Air transport (35), "Supporting and auxiliary transport activities; activities of travel agencies" (36), and "Post & telecommunications" (37) have been used in the analysis.
Real estate activities	Aggregate data for "Real estate activities" (39), "Renting of machinery & equipment" (40), "Computer & related activities" (41), "Research & development" (42), and "Other Business Activities" (43) have been used in the analysis.

Appendix II: Country Specific Merging of Industries

Country	Aggregation
Austria	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Belgium	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas and Steam and hot water supply
Denmark	23 (Aircraft & spacecraft) includes Railroad equipment & transport equip nec (24)
Finland	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip nec. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
France	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Germany	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Greece	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Italy	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Norway	**1997**
	2 Mining and quarrying (energy) includes Mining and quarrying (non-energy) (3)
	Manufacture of gas; distribution of gaseous fuels through mains (27), Steam and hot water supply (28) and Collection, purification and

	distribution of water (29) are missing. Might be merged with (26) Land transport; transport via pipelines (33) might include Water transport (34), Air transport (35),and Supporting and auxiliary transport activities; activities of travel agencies (36)
	2001
	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27) and Steam and hot water supply (28)
Spain	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	27 includes Steam and hot water supply (28) Total of 27 is zero which might mean that 27 and 28 are included in 26
Sweden	9 includes Pharmaceuticals (10)
	13 includes Non-ferrous metals (14)
	22 includes Aircraft & spacecraft (23) and Railroad equipment & transport equip n.e.c. (24)
	26 includes Manufacture of gas (27 and Steam and hot water supply (28)
US	**1995**
	28 includes Sewage and refuse disposal, sanitation and similar activities (9000); 31 includes Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres; (2511), part of other human health activities (8519); 40 includes part of Building completion (4540), part of Sewage and refuse disposal, sanitation and similar activities (9000). 42 includes Technical testing and analysis (7422) and Market research and public opinion polling (7413); 43 includes part of Non-scheduled air transport (6220), Publishing of books, brochures and other publications (2211), part of Printing (2221), News agency activity (9220), part of Dramatic arts, music and other arts activities (9214); 47 includes car washes (5020), Other business activities n.e.c. (7499), Non-scheduled air transport (6220),
	2001
	29 Collection, purification and distribution of water includes Steam and hot water supply (28)

Note: 9 → Chemical
13 → Iron & Steel
22 → Building & repairing of ships & boats
26 → Production, collection and distribution of electricity

APPENDIX III: Industries Included in the Analysis

INDUSTRIES	ISIC-code	Own code
AGRICULTURE, HUNTING, FORESTRY AND FISHING	**01-05**	**1**
AGRICULTURE, HUNTING AND FORESTRY	01-02	
FISHING	05	
MINING AND QUARRYING	**10-14**	**2+3**
MINING AND QUARRYING OF ENERGY PRODUCING MATERIALS	10-12	2
MINING AND QUARRYING EXCEPT ENERGY PRODUCING MATERIALS	13-14	3
TOTAL MANUFACTURING	15-37	
FOOD PRODUCTS, BEVERAGES AND TOBACCO	**15-16**	**4**
….FOOD PRODUCTS AND BEVERAGES	15	
….TOBACCO PRODUCTS	16	
TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR	**17-19**	**5**
….TEXTILES AND TEXTILE PRODUCTS	17-18	
……..TEXTILES	17	
……..WEARING APPAREL, DRESSING AND DYING OF FUR	18	
….LEATHER, LEATHER PRODUCTS AND FOOTWEAR	19	
WOOD AND PRODUCTS OF WOOD AND CORK	**20**	**6**
PULP, PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING	**21-22**	**7**
….PULP, PAPER AND PAPER PRODUCTS	21	
….PRINTING AND PUBLISHING	22	
CHEMICAL, RUBBER, PLASTICS AND FUEL PRODUCTS	23-25	
….COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	**23**	**8**
….CHEMICALS AND CHEMICAL PRODUCTS	**24**	**9+10**
……..CHEMICALS EXCLUDING PHARMACEUTICALS	24ex2423	9
……..PHARMACEUTICALS	2423	10
….RUBBER AND PLASTICS PRODUCTS	**25**	**11**
OTHER NON-METALLIC MINERAL PRODUCTS	**26**	**12**
BASIC METALS, METAL PRODUCTS, MACHINERY AND EQUIPMENT	27-35	
BASIC METALS AND FABRICATED METAL PRODUCTS	**27-28**	**13-15**
….BASIC METALS	27	
……..IRON AND STEEL	271+2731	13
……..NON-FERROUS METALS	272+2732	14
….FABRICATED METAL PRODUCTS, except machinery and equipment	28	15
MACHINERY AND EQUIPMENT	29-33	
….MACHINERY AND EQUIPMENT, N.E.C.	**29**	**16**
….ELECTRICAL AND OPTICAL EQUIPMENT	**30-33**	**17-20**
……..OFFICE, ACCOUNTING AND COMPUTING MACHINERY	30	17
……..ELECTRICAL MACHINERY AND APPARATUS, NEC	31	18
……..RADIO, TELEVISION AND COMMUNICATION EQUIPMENT	32	19
……..MEDICAL, PRECISION AND OPTICAL INSTRUMENTS	33	20
TRANSPORT EQUIPMENT	**34-35**	**21-24**
….MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS	34	21
….OTHER TRANSPORT EQUIPMENT	35	

……..BUILDING AND REPAIRING OF SHIPS AND BOATS	351	22
……..AIRCRAFT AND SPACECRAFT	353	23
……..RAILROAD EQUIPMENT AND TRANSPORT EQUIPMENT N.E.C.	352+359	24
MANUFACTURING NEC; RECYCLING	**36-37**	**25**
….MANUFACTURING NEC	36	
….RECYCLING	37	
ELECTRICITY, GAS AND WATER SUPPLY	**40-41**	**26-29**
ELECTRICITY, GAS, STEAM AND HOT WATER SUPPLY	40	26
COLLECTION, PURIFICATION AND DISTRIBUTION OF WATER	41	29
CONSTRUCTION	**45**	**30**
WHOLESALE AND RETAIL TRADE; RESTAURANTS AND HOTELS	50-55	
WHOLESALE AND RETAIL TRADE; REPAIRS	**50-52**	**31**
....SALE, MAINTENANCE AND REPAIR OF MOTOR VEHICLES; RETAIL SALE OF FUEL	50	
....WHOLESALE, TRADE & COMMISSION EXCL. MOTOR VEHICLES	51	
....RETAIL TRADE EXCL. MOTOR VEHICLES; REPAIR OF HOUSEHOLD GOODS	52	
HOTELS AND RESTAURANTS	**55**	**32**
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