Competitiveness in Manufacturing Industries: Canada & Mexico in the US Market

Draft Methodology Paper (with presentation slides)

Competitiveness in Manufacturing Industries:

Canada and Mexico in the United States Market

This study is, in a substantial way, a continuation of work begun in the division's recent Trade Patterns[1] paper, published in March of 1993. That study showed that there was competition between Canada and Mexico in certain industries. This study expands on this topic in two ways:

1) it provides more detailed information about competing commodities in key industries;

2) it develops a new performance measure which, when combined with previous work, permits one to assess Canada's overall competitive position relative to Mexico.

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[1] Trade Patterns: Canada - United States: the manufacturing industries, 1981-1991. (Statistics Canada, Cat. No. 65-504E)

1.INTRODUCTION:

The value of trade between Canada and Mexico has traditionally been quite small. This is not expected to change significantly if the proposed North American Free Trade Agreement (NAFTA) is implemented.

Trade between these two countries and the United States, however, is another matter. In Canada's case, in any given year roughly three-quarters of its total manufacturing exports go to the United States.

In this context, a key question facing observers is: will trade between Canada and the US be affected significantly by a reduction in US trade barriers against its imports of Mexican goods? In particular, will Canadian manufactured exports be faced with increased competition from Mexican goods in the US market?

One can go a long way in answering these questions if an idea can be gained of where Canada stands relative to Mexico in terms of competitiveness. What's presented here is a general framework that attempts to do accomplish this.

2. OBJECTIVE OF THE METHODOLOGY:

Objective:

To use US import data to measure, for manufacturing industries, the competitive position of Canadian exports relative to Mexican exports in the US market.

Two points in this statement might seem ambiguous, namely

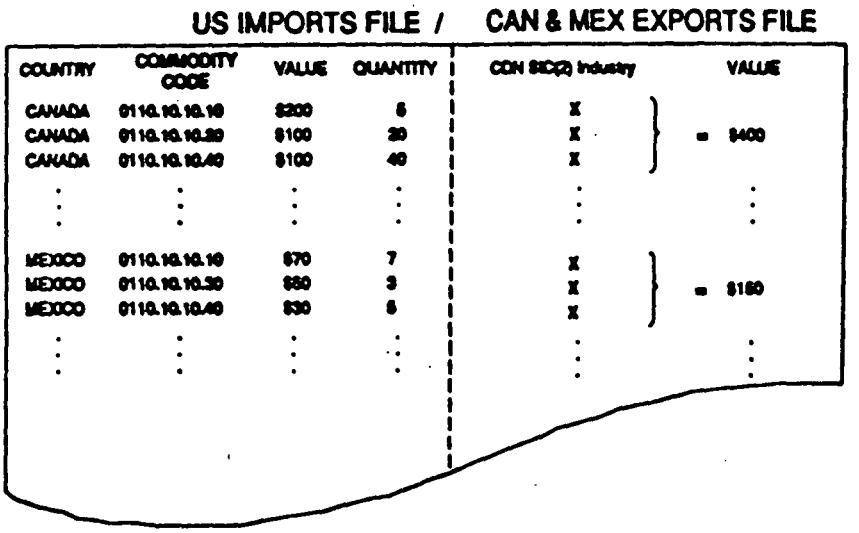
1) how US import data, which is not classified on a producing industry basis, is to be used to measure Canadian and Mexican manufacturing industry export flows;

2) what is meant by the terms "competitive position".

Both questions will be addressed in turn in what follows.

3. DATA TOPICS:

The sole source of data for this project was a detailed summary of US imports from all countries for the years 1989 and 1991. Imports from Canada and Mexico and selected fields were split from these files and we retained very much what you see on the left side of the chart below: for each country, a list of imported commodities; for each commodity, a value and a quantity.



The various goods that are imported into the United States are classified according to the 10-digit Harmonized Commodity Description and Coding System (Harmonized System or HS). The HS is a commodity classification - goods are assigned a 10-digit code based on their component materials or, where this fails, on their end use or function - goods are not classified by producing industry.

The main challenge then, was one of transforming this commodity-based classification of US imports into a producing-industry-based classification of Canadian and Mexican exports. This was achieved in two steps:

1) The first consisted in recognizing that US imports from either country are conceptually equal to either country's exports to the US. (Thus, e.g., US imports from Canada are the same as Canada's exports to the US.)

2) The second step resolves the classification issue: a system of concordances was developed with which each imported HS10 good was allocated to the Canadian industry that would be primarily producing it, if it had been produced in Canada. The industrial classification that was used was the Standard Industrial Classification (Canadian 1980 version, 4 digit level).

By assigning each of these HS-based imports to a Canadian producing industry (second step), and by a shift in perspective (first step), what was initially a statement of US imports was transformed into a statement of Canada and Mexico's industrial output that was exported to the United States, classified by industry.

In proceeding in this manner, from a unique source of data, greater consistency in recording the data was maintained than would otherwise have been possible, opening the way to making detailed comparisons with a greatly minimized risk of making erroneous comparisons.

The manufacturing industries contained in the Canadian Standard Industrial Classification are shown below; arrows mark the five largest, boxes identify those singled out for detailed study in the body of the paper.

List of Manufacturing Industries in the Canadian Standard Industrial Classification (SIC)

	Industry
	Food
	Beverages
	Tobacco
	Rubber
	Plastic
	Leather & allied
	Primary textiles
	Textile prod.
	Clothing
	Wood
	Furniture & fixtures
→	Paper & allied
	Printing, publishing & allied
→	Primary metals
	Fabricated metal prod.
	Machinery
→	Transportation equipment
→	Electrical & electronic
	Non-metallic mineral prod.
	Refined petroleum and coal
→	Chemicals
	Other manufacturing

4. THE MEANING OF "COMPETITIVE POSITION":

Having resolved the data-related issues, we can now discuss how these data were analyzed (equivalently, what the terms "competitive position" were defined to mean).

In the present scheme, two general concepts were used to measure one country's "competitive position" relative to another:

- competition: which reveals the extent to which a Canadian exporting industry is encountering Mexican competition;

- competitiveness: which, given the above level of competition, measures how well each of these industries is doing.

Competitive Position

Concept	Approach	Measure
→ COMPETITION	The Overlap	MOC
COMPETITIVENESS	Calculated unit value comparisons	MOPC

Both measures rely on making detailed commodity-level comparisons of the kind now possible.

4.1 Measuring Competition

Competition was measured with the concept of the "overlap". To understand what the overlap is, it's best to begin with its basic underlying assumption:

> goods imported into the US from both Canada and Mexico with identical HS10 classifications (of which there are in excess of 17,000) can be treated as being similar or identical exported goods that are competing in the US market.

Accepting this premise leads to the following definition of the "overlap subset":

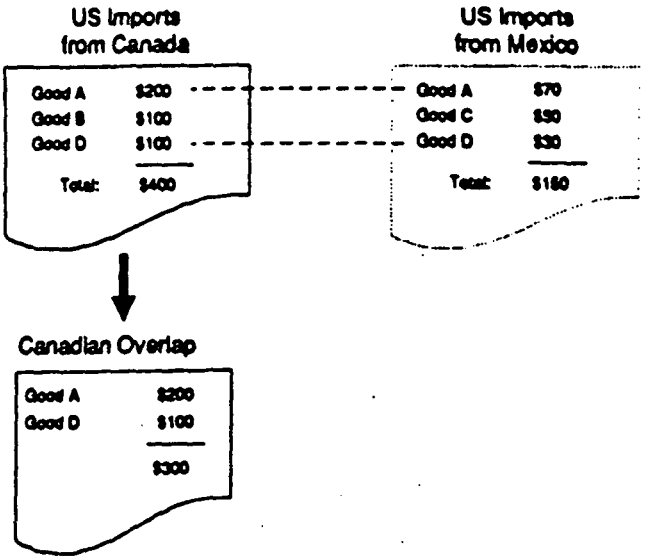
Definition: the "Overlap Subset"

The subset of commodities that
were exported by Canada and Mexico
in the same year.

The commodities that are competing directly in the US market.

How this concept can be used to measure the level of competition encountered by Canadian exports is shown in the following worked example:

The Overlap Subset & the Canadian Overlap
(Industry 'X')



The goods that the US imports from Canada, that were allocated to an exporting industry 'X' are shown. They can be split into two categories:

1) those that were imported only from Canada, and

2) those that were imported from both Canada and Mexico

Those commodities that fall into the latter category together make up the "overlap subset". Here, this subset consists in goods 'A' and 'D': they were imported from both countries. Thus, the value of Canadian industry 'X's' total exports consisted of $400, of which $300 consisted in commodities that were in direct competition. **This $300 is called the "Canadian overlap".**

With these figures, we are in a position to measure competion (i.e., the extent to which Canadian good are competing with Mexican goods):

$$MOC_x = \frac{\text{Value of Canadian Overlap Exports}}{\text{Value of Total Canadian Exports}} \cdot 100$$

$$= \frac{\$300}{\$400} \cdot 100 = 75\%$$

Thus, by this calculation, 75% of the value of what industry 'X' exports was competing with Mexican industrial output; 25% was not. This percentage (called here the MOC) will vary by industry, and allows one to identify which industries encountered a high level of Mexican competition (such as this one), and which do not.

4.2 Measuring Competitiveness

Competitiveness, the second concept used in assessing one country's "competitive position" relative to another, was measured with a number of traditional performance measures (which are assumed to be well understood)[1], and with a new measure (the MOPC -the Measure of Price Competitiveness), which is explained presently.

Competitive Position

Concept	Approach	Measure
COMPETITION	The Overlap	MOC
→ COMPETITIVENESS	Calculated unit value comparisons	MOPC

The fundamental premise underlying this performance measure is that calculated unit values can be used to determine, for each competing commodity, whether the Canadian supply is cheaper or more expensive. With this in mind, it is possible to partition competing goods into two sets:

1) those goods that are, from a Canadian perspective, at a price advantage (more competitively-priced),

2) and those goods that are, again from a Canadian perspective, at a price disadvantage (less competitively-priced).

A worked example show where this leads:

[1] They are: market share, import market share, export propensity and export dependence.

Measuring Competitiveness in Industry 'X'

Competing US Imports

Overlap Commodity	from Canada Value	Quant.	U.V.	from Mexico Value	Quant.	U.V.	Canadian Price Advantage?
Good A	$200	5	$20/u	$70	7	$10/u	NO
Good D	$100	40	$5/u	$30	10	$3/u	YES
Total:	$300			$100			

Shown above are US imports of competing commodities 'A' and 'D' of industry 'X'. These are the goods which we earlier found to be competing, and which were defined as the "overlap subset". For each of these goods, it is possible to calculate an average unit value. Canadian Good 'A', appears to be at a competitive (or price) disadvantage compared to its Mexican counterpart: each unit costs $20 to import from Canada, but only $10 from Mexico. Good 'D' presents the opposite situation: at $5 per unit, the Canadian supply is cheaper. Thus, from Canada's perspective, good A is traded at a price advantage, good D is not.

These unit value comparisons can be used to partition the Canadian overlap into two subsets:

1) the subset of goods at a price advantage (valued here at $200),

2) the subset of goods at a price disadvantage (valued at $100).

These numbers can be used to measure the competitiveness of Industry 'X' if we take this industry's value of advantaged competing exports and divided it by this industry's total competing exports. The result, expressed as a percentage, is the MOPC.

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COMPETITIVENESS IN MANUFACTURING INDUSTRIES: CANADA AND MEXICO IN THE US MARKET

HIGHLIGHTS

- Between 1989 and 1991 Canada and Mexico were among the top five exporters of manufactured goods to the United States. Canadian and Mexican exports accounted for 26.7% of US imports from all countries.
- 52.0% of Canadian merchandise exports were competing with 59.4% of similar Mexican exports in the US market.
- Competition between Canada and Mexico involved a small segment of Canada's largest exporters to the US.
- Mexican industries performed better than Canadian industries in terms of market shares, import market shares, and growth rates.
- The main Canadian industry groups in competition in the US market were transportation equipment industries, and paper and allied products industries; whereas the main Mexican industries were electric and electronic products, and transportation equipment industries.
- Canadian transportation equipment performed slightly worse than Mexico, and Canadian paper and allied products out-performed Mexican paper industries.
- The main Canadian industries in competition with Mexico were motor vehicles and newsprint.
- Canadian and Mexican industries complemented each other in the US market in 1989, but Canadian exports faced increasing competition from Mexico in 1991.
- The main commodities exported by both countries were sufficiently different to suggest complementarity in the US market. Preliminary findings indicate that Canadian commodities were less price competitive as compared with Mexican commodities between 1989 and 1991.

TRADE OVERLAP, 1989-91

	CANADA		MEXICO	
US$MIL	1989	1991	1989	1991
TOTAL MANUFACTURING	75,501	76,401	19,607	23,176
TRADE OVERLAP	28,015	35,634	10,635	14,961
% OVERLAP	37.1	46.9	54.2	64.6

WORLD'S LARGEST EXPORTERS TO THE UNITED STATES
1989-1991

COUNTRY	EXPORTS (USbil$) TO THE US		% OF TOTAL US IMPORTS	
	1989	1991	1989	1991
Japan	95.7	93.2	22.9	21.8
Canada	75.9	76.4	18.2	17.9
West Germany	24.5	25.6	5.9	6.0
Taiwan	25.2	23.7	6.0	5.5
Mexico	19.6	23.2	4.7	5.4
US imports from all countries	417.1	427.2	100	100.0

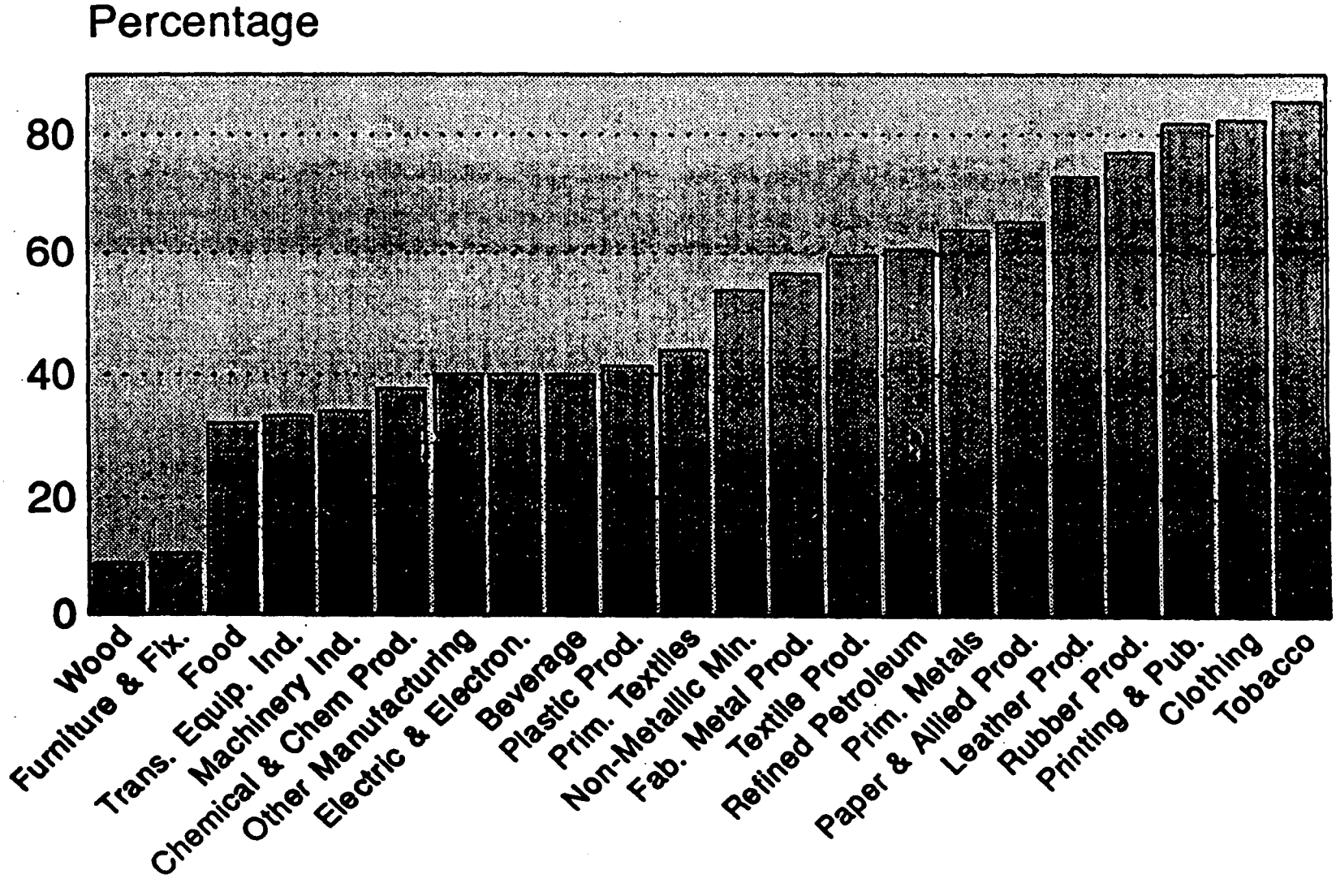
CANADIAN AND MEXICAN EXPORTS IN THE US MARKET

1989-1991 INDUSTRIES	TOTAL CANADIAN EXPORTS TO THE US ($US MIL)		TOTAL MEXICAN EXPORTS TO THE US	
	1989	1991	1989	1991
Food	1,641	2,039	507	664
Beverage	541	580	236	245
Tobacco	33	140	5	4
Rubber Prod.	794	902	116	90
Plastic Prod.	620	706	134	183
Leather Prod.	95	82	251	249
Prim. Textiles	220	364	116	139
Textile Prod.	171	201	143	237
Clothing	242	297	582	893
Wood	3,978	3,579	208	240
Furniture & Fix.	1,237	1,133	535	660
Paper & Allied Prod.	9,251	8,452	370	105
Printing & Pub.	408	349	36	67
Prim. Metals	6,845	5,973	1,022	620
Fab. Metal Prod.	2,534	2,355	736	831
Machinery Ind.	2,869	2,637	670	681
Trans. Equip. Ind.	30,591	30,520	3,567	5,329
Electric & Electron.	5,236	7,238	7,837	8,903
Non-Metallic Min.	811	760	515	507
Refined Petroleum	1,795	2,232	220	251
Chemical & Chem Prod.	4,027	4,152	564	686
Other Manufacturing	1,568	1,718	1,238	1,591
Total Manufacturing	75,501	76,406	19,607	23,176

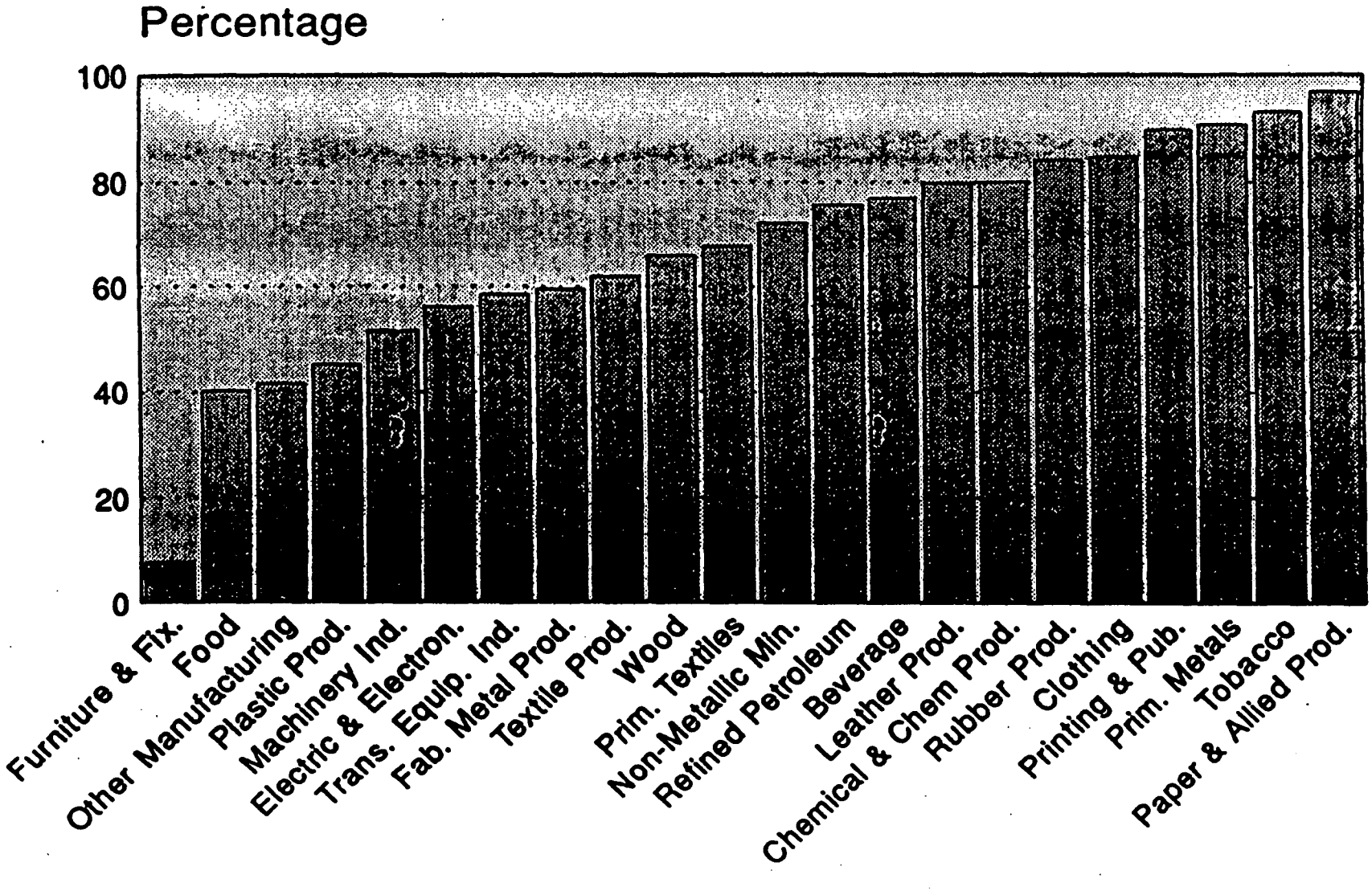
SHARE OF TOTAL OVERLAP IN TRADE BY INDUSTRY

INDUSTRY	CANADA		MEXICO	
	1989	1991	1989	1991
Food	1.7	2.0	1.8	1.9
Beverage	0.7	0.7	1.8	1.2
Tobacco	0.1	0.3	0.0	0.0
Rubber Prod.	2.4	1.8	0.9	0.5
Plastic Prod.	0.6	1.1	0.5	0.6
Leather Prod.	0.2	0.2	1.8	1.4
Prim. Textiles	0.3	0.5	0.7	0.7
Textile Prod.	0.3	0.4	0.7	1.1
Clothing	0.7	0.7	4.7	5.0
Wood	1.1	1.0	1.2	1.1
Furniture & Fix.	0.1	0.6	0.2	0.5
Paper & Allied Prod.	21.2	15.8	3.4	0.7
Printing & Pub.	1.2	0.8	0.3	0.4
Prim. Metals	14.0	11.8	8.6	3.8
Fab. Metal Prod.	4.8	3.9	3.7	3.6
Machinery Ind.	3.4	2.5	3.1	2.5
Trans. Equip. Ind.	29.8	33.3	13.2	27.8
Electric & Electron.	5.3	10.4	40.1	34.6
Non-Metallic Min.	1.6	1.1	3.2	2.6
Refined Petroleum	2.6	5.0	1.2	1.5
Chemical & Chem Prod	5.6	4.2	4.5	3.5
Other Manufacturing	2.1	2.0	4.4	4.8
TOTAL	100.0	100.0	100.0	100.0

CANADIAN CONCENTRATION RATIOS BY INDUSTRY
AVERAGE 1989-91

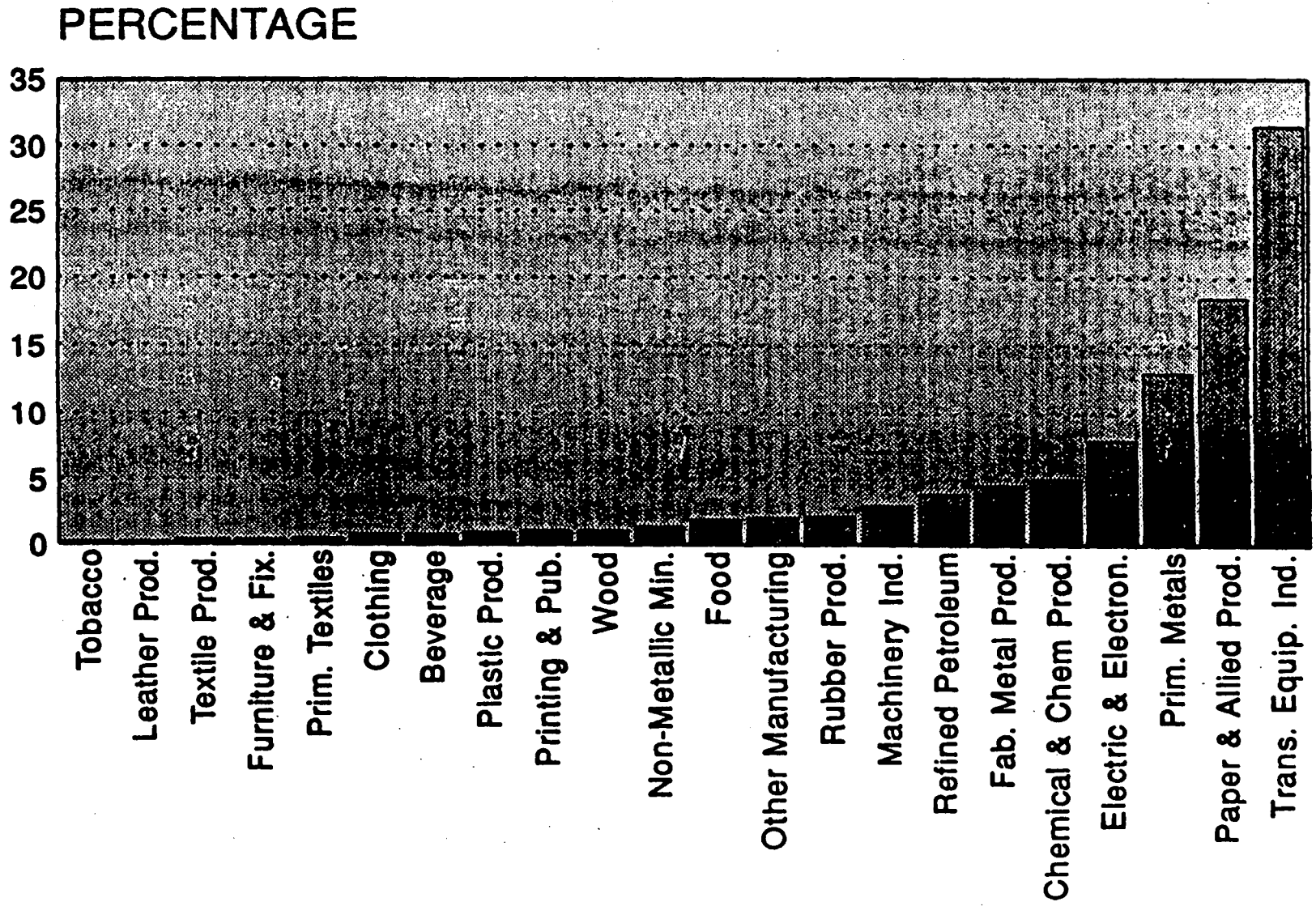


CONCENTRATION RATIOS BY INDUSTRY, MEXICO
AVERAGE 1989-91



SHARE OF TOTAL INDUSTRIES IN COMPETITION

CANADA, AVERAGE 1989-91



CONCENTRATION RATIOS BY INDUSTRY, 1989-91
CANADA AND MEXICO COMPARED

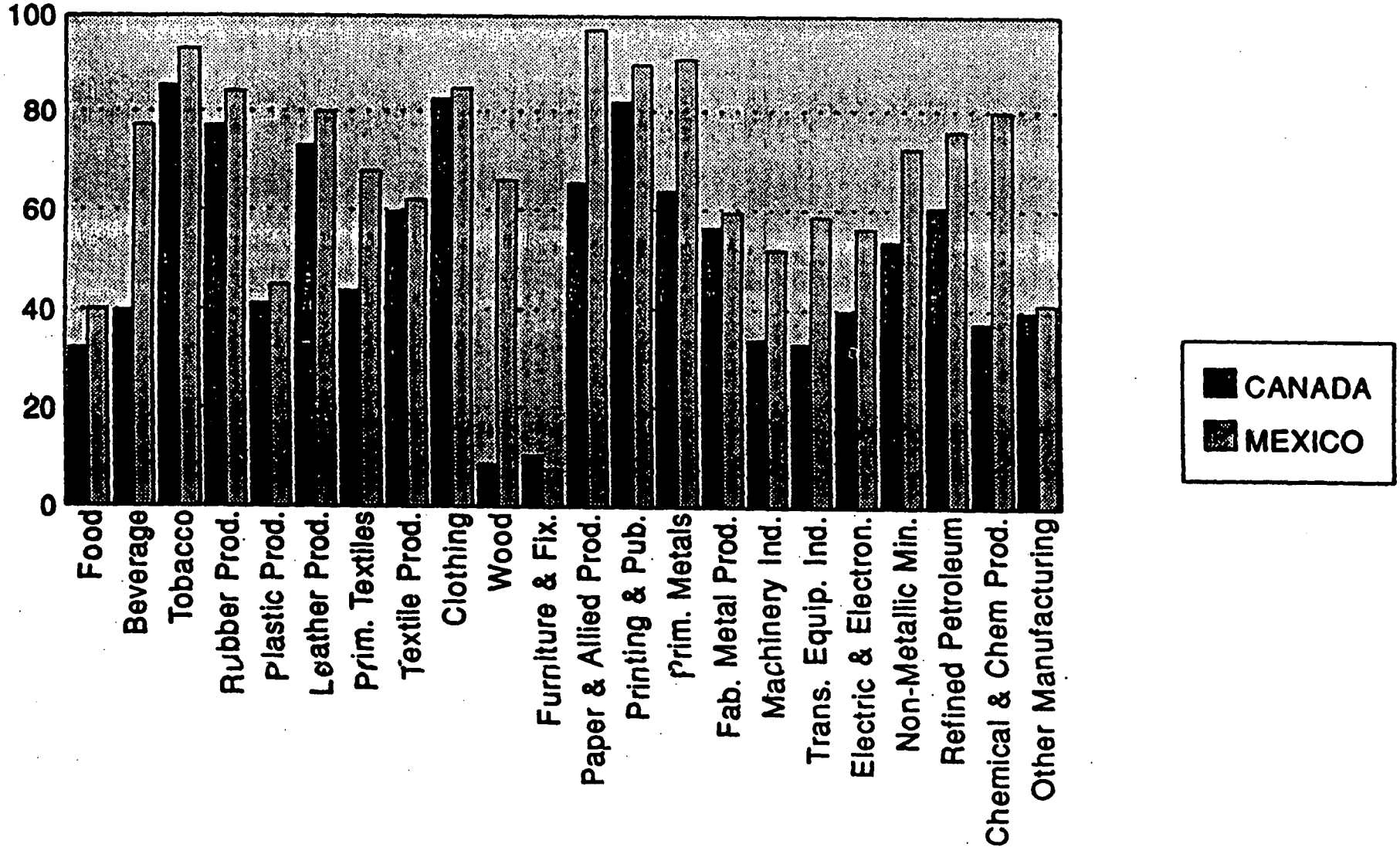


TABLE 3

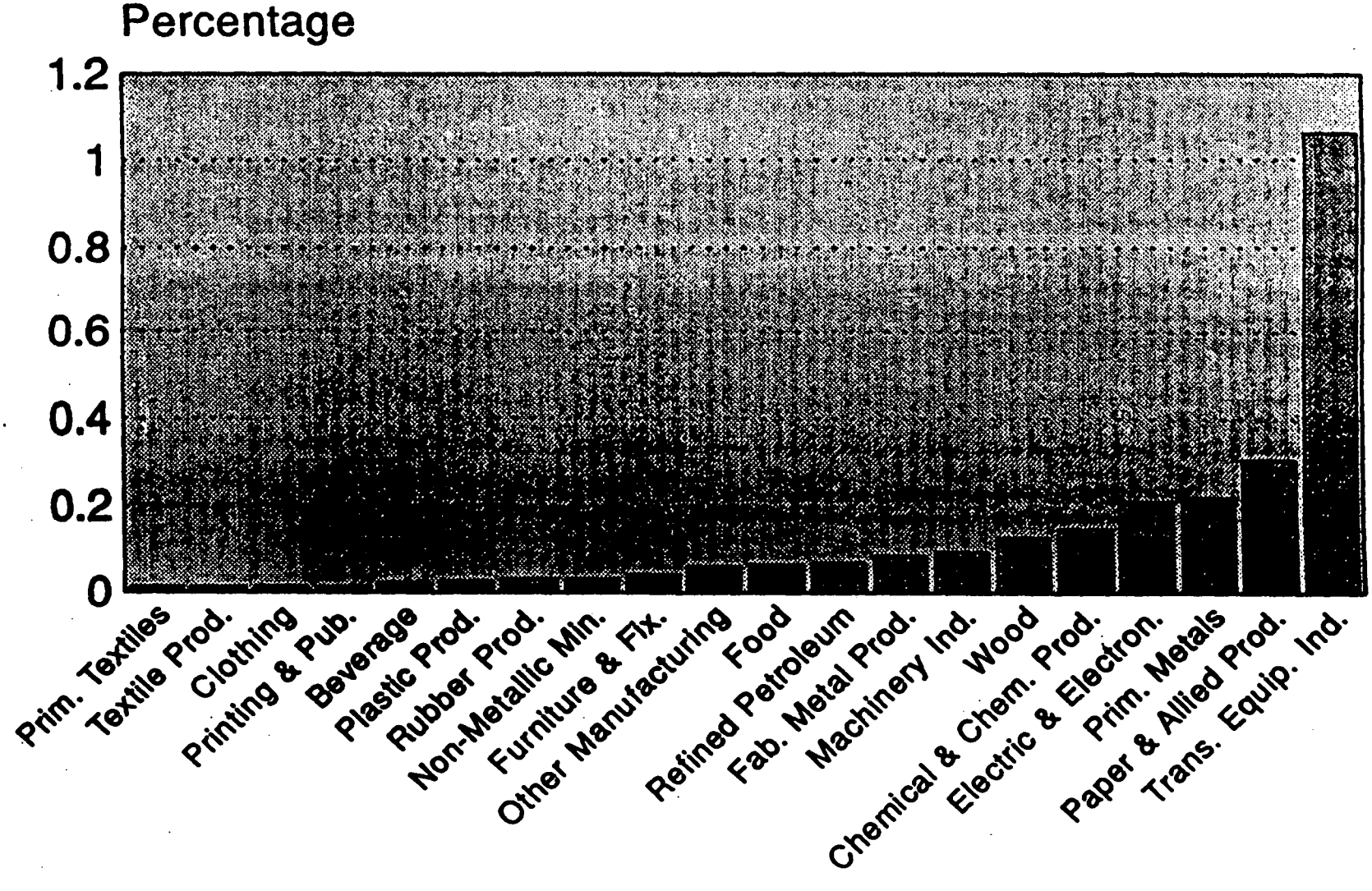
PERFORMANCE INDICATORS FOR CANADIAN INDUSTRIES

INDUSTRY	MARKET SHARE		IMPORT MARKET SHARE		GROWTH RATE
	1989 (%)	1991 (%)	1989 (%)	1991 (%)	1989 - 1991 (%)
Food	0.06	0.07	12.57	12.38	24.21
Beverage	0.02	0.02	13.85	13.54	7.28
Tobacco	0	0	28.36	31.32	330.05
Rubber Prod.	0.03	0.03	18.84	20.26	13.52
Plastic Prod.	0.02	0.03	19.24	19.61	13.53
Leather Prod.	0	0	0.8	0.81	-14.48
Prim. Textiles	0.01	0.01	5.58	6.89	65.64
Textile Prod.	0.01	0.01	5.4	5.56	17.35
Clothing	0.01	0.01	0.94	0.86	22.54
Wood	0.14	0.12	66.14	64.24	-10.06
Furniture & Fix.	0.04	0.04	22.38	22.71	-8.45
Paper & Allied Prod.	0.32	0.3	74.4	76.1	-8.63
Printing & Pub.	0.01	0.01	21.44	17.07	-14.32
Prim. Metals	0.24	0.21	31.17	28.3	-12.74
Fab. Metal Prod.	0.09	0.08	15.45	15	-7.05
Machinery Ind.	0.1	0.09	10.77	10.56	-8.27
Trans. Equip. Ind.	1.06	1.07	32.3	32.4	-0.23
Electric & Electron.	0.18	0.25	6.4	7.7	38.32
Non-Metallic Min.	0.03	0.03	13.93	13.73	-6.26
Refined Petroleum	0.06	0.08	13.34	15.02	24.33
Chemical & Chem. Prod.	0.15	0.15	19.23	18.68	3.10
Other Manufacturing	0.06	0.06	3.88	3.86	9.73
Total Manufacturing	2.61	2.67	18.1	18	1.19

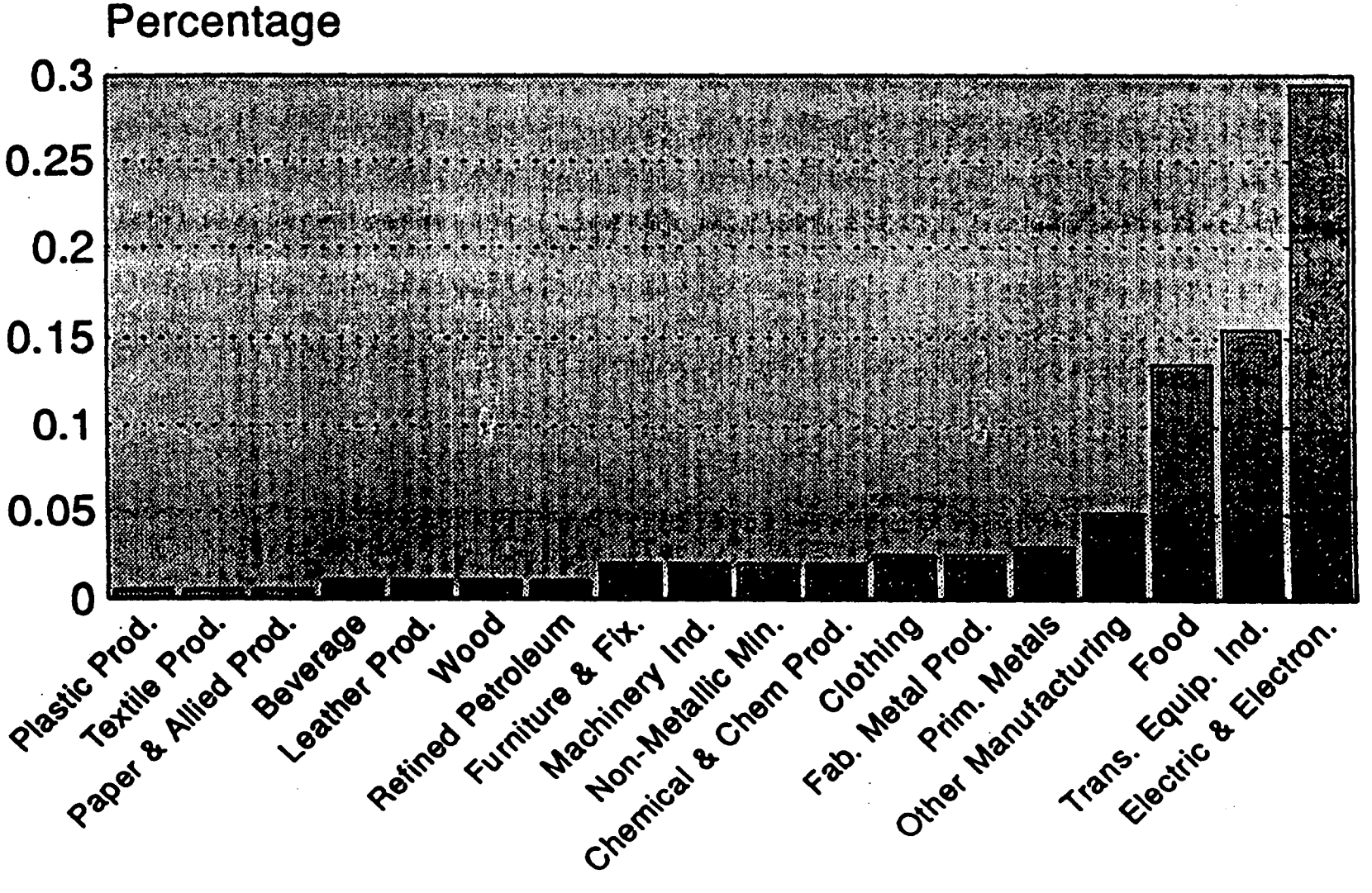
PERFORMANCE INDICATORS FOR MEXICAN INDUSTRIES

INDUSTRY	MARKET SHARE		IMPORT MARKET SHARE		GROWTH RATE
	1989 (%)	1991 (%)	1989 (%)	1991 (%)	1989-91 (%)
Food	0.25	0.02	3.88	4.63	31.0
Beverage	0.01	0.01	6.05	6.32	4.0
Tobacco	0.00	0.00	4.37	1.73	-21.9
Rubber Prod.	0.00	0.00	2.78	2.36	-21.9
Plastic Prod.	0.00	0.01	4.14	5.22	36.6
Leather Prod.	0.01	0.01	2.11	1.89	-0.9
Prim. Textiles	0.00	0.00	2.94	3.09	20.2
Textile Prod.	0.00	0.01	4.52	6.66	65.6
Clothing	0.02	0.03	2.27	3.28	53.4
Wood	0.01	0.01	3.42	4.32	15.6
Furniture & Fix.	0.02	0.02	9.76	12.05	23.5
Paper & Allied Prod.	0.01	0.00	3.00	0.98	-70.9
Printing & Pub.	0.00	0.00	1.88	3.40	88.0
Prim. Metals	0.04	0.02	4.65	3.29	-39.3
Fab. Metal Prod.	0.02	0.03	4.45	5.12	12.9
Machinery Ind.	0.02	0.02	2.52	2.82	1.1
Trans. Equip. Ind.	0.12	0.19	3.77	5.66	49.4
Electric & Electron.	0.27	0.32	9.57	9.94	13.7
Non-Metallic Min.	0.02	0.02	8.87	9.19	-1.5
Refined Petroleum	0.01	0.01	1.64	2.01	13.9
Chemical & Chem Prod.	0.02	0.02	2.69	2.88	21.7
Other Manufacturing	0.04	0.06	3.12	3.65	27.7
Total Manufacturing	0.68	0.83	4.70	5.42	18.2

CANADIAN SHARE OF US MARKET
1989-1991 AVG



MEXICAN SHARE OF US MARKET
1989-1991 AVG



MAIN AREAS OF EXPORT ACTITIVY WITHIN TRANSPORTATION EQUIPMENT INDUSTRIES GROUP

INDUSTRY	1989 (%)		1991 (%)	
	CANADA	MEXICO	CANADA	MEXICO
Motor Vehicles	64.7	9.8	80.1	67.2
Motor Vehcle Engine & Parts	27.9	58.8	16.4	17.8
Motor Vehicle Fabric Accessor	0.8	24.7	0.4	12.1
TOTAL INDUSTRIES	100	100	100	100

MAIN AREAS OF EXPORT ACTITIVY WITH THE PAPER AND ALLIED PRODUCTS

INDUSTRY	1989 (%)		1991 (%)	
	CANADA	MEXICO	CANADA	MEXICO
Newsprint	94.0	35.5	92.8	46.8
Coated and Treated Paper	1.4	1.0	2.7	6.3
Paper Consumer Products	0.6	59.7	0.8	32.4
TOTAL INDUSTRIES	100	100	100	100

PRICE COMPETITIVENESS
TRANSPORTATION EQUIPMENT INDUSTRIES
CANADA AND MEXICO, 1989

MAIN EXPORT COMMODITIES	AVG. PRICE PER UNIT US$		VALUE OF COMM.	% TOTAL
CANADA 1989	CANADA	MEXICO	EXP. US$MILL.	CDN COMMOD.
Motor Vehicles for goods transport not exceeding 2.5 metric tons	13,119.6	12,403.8	3,543	24.81
Motor Vehicles for goods transport not exceeding 5 tons	8,597.6	5,017.4	1,123	7.86
Other spark ignition reciprocating or rotary internal combust. engines	1,607.8	928.7	663	4.64
Other reciprocating piston engines	1,479.8	732.9	594	4.16
Parts for marine propulsion engines	2.1	4.5	385	2.69
TOTAL COMMODITIES	....	.....	14,283	100

MAIN EXPORT COMMODITIES	AVERAGE PRICE		VALUE OF COMM.	% TOTAL
MEXICO 1989	CANADA	MEXICO	EXPORT	MEX. COMMOD.
Other spark ignition reciprocating or rotary internal combust. engines	1,607.8	928.7	628.6	35.67
Motor Vehicles for goods transport between 5-20 metric tons	7.5	8.4	345.8	19.62
Parts for marine propulsion engines	2.1	4.5	58.2	3.30
TOTAL EXPORTS	..	...	1,762.5	100

CANADA AND MEXICO, 1991

MAIN EXPORT COMMODITIES	AVG. PRICE PER UNIT US$		VALUE OF COMM.	% TOTAL
CANADA 1991	CANADA	MEXICO	EXP. US$MILL.	CDN COMMOD.
Motor vehicles for goods transport between 2.5 and 5 metric tons	14,985.0	13,269.8	4,331	24.63
Motor vehicles for person transport with an interior volume betw. 2.8m-3.4m	9,189.3	11,157.6	884	5.03
Other spark ignition reciprocating or rotary internal combust. engines	1,365.3	1,062.5	820	4.66
Motor vehicles for person transport with an interior volume less than 3.4m	11,720.9	14,763.4	764	4.34
TOTAL COMMODITIES	...	...	17,585.3	100

MAIN EXPORT COMMODITIES	AVERAGE PRICE US$		VALUE OF COMM.	% TOTAL
MEXICO 1991	MEXICO	CANADA	EXPORT US$mil	MEX. COMMOD.
Motor vehicles for person transport with an interior volume betw. 2.8m-3.4m	11,157.6	9,189.3	978.9	22.97
Other spark ignition reciprocating or rotary internal combust. engines	1,062.5	1,365.3	518.9	12.18
Safety seat belts	8.9	8.6	503.0	11.80
Motor vehicles for person transport with an interior volume betw. 3.1m-3.4m	10,957.3	49,310.5	404.6	9.49
TOTAL EXPORTS	...	...	4,261.3	100