Series of Market Penetration
by Foreign Products, Brazil 1986-1998

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This report describes the construction of series of foreign market penetration for Brazil between 1986 and 1998. The discussed series are available as file `imp-penetrat.csv` at URL `http://econ.ucsd.edu/muendler/brazil`.

Two co-author couples of Brazilian researchers have undertaken to construct such series for Brazil. Ramos and Zonenschain (2000) have built-up penetration series at the level of *nível 80* using import and export data from the Brazilian national accounts in the period 1990-1998, and for 1980 and 1985 (a precursor paper was Ramos 1999). Mesquita Moreira and Correa (1997) have assembled data from various sources, ranging from the national accounts to the Brazilian secretary of commerce (*SECEX*), and derived penetration series at more aggregate levels between 1989 and 1995. Mesquita Moreira's (2000) follow-up paper extends the series to 1999. Both teams arrive at somewhat different figures. They can be compared using the present file.

The report is organized in four sections: (1) Definitions of Foreign Market Penetration, (2) Penetration Series by Ramos and Zonenschain, (3) Penetration Series by Moreira and Correa, (4) File Contents.

1 Definitions of Foreign Market Penetration

Foreign market penetration can be measured by mainly two variables: either as the fraction of imports to domestic production in a given sector, or as the fraction of imports to domestic absorption in a given sector. Call sector i's gross domestic output Y_i, and exports and imports of that sector's goods EX_i and IM_i, respectively. The domestic consumption of these goods (by households or government) and the use of these goods for capital formation (by households or government) are often written as $C_i + I_i + G_i \equiv A_i$, and this total is called domestic *absorption*.

The two most frequently used measures of market penetration by foreign goods are defined as

$$\frac{IM_i}{Y_i} \tag{1}$$

and

$$\frac{IM_i}{A_i} = \frac{1}{\frac{Y_i - (EX_i - IM_i)}{IM_i}} = \frac{1}{1 + \frac{1 - \frac{EX_i}{Y_i}}{\frac{IM_i}{Y_i}}}. \tag{2}$$

The slightly more elaborate latter measure is adapted in the current series. For the division of a firm that sells to the domestic market, it reflects the relevant competition more closely. Domestic firms find the "absorption market" (corresponding to A_i) the relevant environment in which they compete. Mesquita Moreira and Correa (1997) use this definition in their series, and, applying (2), the import penetration and export share series of Ramos and Zonenschain (2000) can be converted to this definition.

2 Penetration Series by Ramos and Zonenschain

Ramos (1999) and Ramos and Zonenschain (2000) derive series of import and export shares, $\frac{IM_i}{Y_i}$ and $\frac{EX_i}{Y_i}$, from national accounts information.

2.1 Use

The advantage of their series is that all data are based on daily import and export information as they are reported to the national accounts by the secretary of commerce, and on monthly national accounts information on produc-

tion. These data are collected systematically at the Brazilian census bureau *Fundação Instituto Brasileiro de Geografia e Estatística* (*IBGE*) for the sectors of industry at *nível 80* (see appendix A for sectoral definitions). Imports and exports were thus valued at the daily exchange rate and transformed to Brazilian currency with daily accuracy.

2.2 Period Covered

The market penetration series cover the period 1986 through 1998.

2.3 Data Sources

Data are extracted from the tables and data appendices in Ramos (1999) and Ramos and Zonenschain (2000). Data points are 1980, 1985, and every year between 1990 and 1998.

2.4 Construction

Import and export shares between 1986 and 1989 are missing. They can be inserted through linear interpolation, an approach taken for the series in `imp-penetrat.csv`. Calling an observation in 1985 σ_i^{85} and an according observation in the 1990 σ_i^{90}, the intermediate entries for the years $t = 86, 87, 88, 89$ become

$$\sigma_i^t = \sigma_i^{85} + (t - 85) \cdot \frac{\sigma_i^{90} - \sigma_i^{85}}{5}.$$

The resulting observations split the total change in import and export shares over the five-year period into five equal pieces.

Using (2), an effective penetration series was calculated from these import and export shares.

3 Penetration Series by Moreira and Correa

Mesquita Moreira and Correa (1997) (with a precursor in Mesquita Moreira and Correa 1997 and a successor in Mesquita Moreira 2000) assemble series of indicators for trade liberalization. The authors provide series of annual imports, exports, and domestic production in US dollars, and a series of market penetration figures calculated according to (2).

3.1 Use

Mesquita Moreira and Correa's (1997) penetration series draws on various sources, among them national accounts data and export and import series from the department of the treasury and the secretary of commerce (*SECEX*). Due to this multiplicity of sources, the data may be partly less consistent than the series in section 2. For this reason, they are reported here in a more aggregate manner (see appendix A for the aggregate manufacturing sector definitions). The use of the US dollar as currency unit may contribute to differences between this series and the series in section 2. Taken together, both series provide a more comprehensive picture of market penetration with foreign products.

3.2 Data Sources

Data are extracted from the tables and data appendices in Mesquita Moreira and Correa (1997) and Mesquita Moreira (2000). Data points are all years from 1989 through 1998.

4 File Contents

The file `imp-penetrat.csv` contains the annual series of foreign market penetration inferred from calculations of both Ramos and Zonenschain (2000) and Mesquita Moreira and Correa (1997) (together with Mesquita Moreira (2000)). The series span the period from 1986 until 1998 in the first case, and the period 1989 through 1998 in the latter case.

imp-penetrat.csv (676 obs.)

	Variable	Description
1.	`niv80`	Sector at *Nível 80*[a]
2.	`indtype`	Type of Industry[b]
3.	`year`	Calendar Year
4.	`rimppen`	Ramos: Imp. Penetr. of Sector[c]
5.	`rexpsh`	Ramos: Export Share in Sector
6.	`reffpen`	Ramos: Eff. Penetr. of Sector[d]
7.	`meffpen`	Mesq: Eff. Penetr. of Industry[d]
8.	`mprod`	Mesq: Ind. Level Prod. (US$)
9.	`mimp`	Mesq: Ind. Level Imports (US$)
10.	`mexp`	Mesq: Ind. Level Exports (US$)

[a]Observations are: 52 industrial sectors at *nível 80*. See appendix A

[b]Observations are: 6 aggregate manufacturing categories. See appendix A

[c]Corresponds to measure (1)

[d]Corresponds to measure (2)

Appendix: Sectors of Industry

The definition of sectors of industry according to *nível 80* would roughly correspond to a three-digit *SIC* level in the US. The national accounting system uses this classification system since 1990. The first two digits of *nível 80* (usually called *atividade 80*, *atividade 100*, or *nível 50*) are identical to the first two digits of *nível 100*, a commonly used classification system for firm or plant level data.

A   English Descriptions of Sectors at *Nível 80*

A list of *IBGE*'s English descriptions of sectors at *nível 80* follows below. The according more aggregate classification due to Mesquita Moreira (2000) is reported alongside. The abbreviations stand for

- *bi*: processed intermediate goods (*bens intermediários*),

- *bine*: non-processed intermediate goods (*bens intermediários não elaborados*),

- *bk*: capital goods (*bens de capital*),

- *bket*: vehicles for commercial use (*bens de capital: equipamentos de transporte*),

- *bc*: non-durable consumer goods (*bens de consumo*), and

- *bcd*: durable consumer goods (*bens de consumo duráveis*).

Nív.80	Nív.50	Mesq. 2000	English Description of Sector
201	2	.	Iron ore mining
202	2	.	Mining of other metals
301	3	.	Oil and gas production
302	3	.	Coal and other mining
401	4	*bine*	Non-metallic mineral products
501	5	*bi*	Basic metallic products
502	5	*bi*	Rolled steel

Nív.80	Nív.50	Mor. 2000	English Description of Sector
601	6	*bi*	Non-ferrous metallic products
701	7	*bine*	Other metallic products
801	8	*bk*	Manufacturing and maintenance
			of machinery and equipment
802	8	*bk*	Tractors and embankment machinery
1001	10	*bcd*	Electrical equipment
1101	11	*bcd*	Electronic equipment
1201	12	*bket*	Automobiles, trucks, and buses
1301	13	*bcd*	Other vehicles and parts
1401	14	*bcd*	Wood and furniture
1501	15	*bine*	Paper, pulp, and cardboard
1601	16	*bi*	Rubber products
1701	17	*bi*	Non-petrochemical chemical elements
1702	17	*bi*	Alcohol
1801	18	*bi*	Motor gasoline
1802	18	*bi*	Fuel oil
1803	18	*bi*	Other refinery products
1804	18	*bi*	Basic petrochemical products
1805	18	*bi*	Resins and fibers
1806	18	*bi*	Alcoholic fuel
1901	19	*bi*	Chemical fertilizers
1902	19	*bi*	Paints, varnishes, and lacquers
1903	19	*bi*	Other chemical products
2001	20	*bc*	Pharmaceutical and perfumery products
2101	21	*bi*	Plastics
2201	22	*bi*	Natural textile fibers
2202	22	*bi*	Natural textiles
2203	22	*bi*	Artificial textile fibers
2204	22	*bi*	Artificial textiles
2205	22	*bc*	Other textile products
2301	23	*bc*	Apparel
2401	24	*bine*	Leather products and footwear
2501	25	*bc*	Coffee products
2601	26	*bc*	Processed rice
2602	26	*bine*	Wheat flour
2603	26	*bc*	Other processed edible products

Nív.80	Nív.50	Mesq. 2000	English Description of Sector
2701	27	bc	Meat
2702	27	bc	Poultry
2801	28	bc	Processed milk
2802	28	bc	Other dairy products
2901	29	bc	Sugar
3001	30	bine	Raw vegetable oil
3002	30	bi	Processed vegetable oil
3101	31	bi	Animal food and other food products
3102	31	bc	Beverages
3201	32		Miscellaneous

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