

THREE HYPOTHESES ON THE BRAZILIAN SERVICE SECTOR

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Three hypotheses on services, the Gershuny effect, the externalisation of producers services and the macroeconomic equation for the services share in employment, are tested with Brazilian data. The first two show trends similar to those in the developed economies, but, in the last one, findings are affected by consideration of the underground economy. The results suggest a dual character for Brazilian services: an informal, labour intensive group of sectors, present in the large metropolitan areas, coexists with a formal, less labour intensive one, where producers' services are probably predominant. These groups will respond differently to a greater trade liberalisation.

I. INTRODUCTION

In spite of the attention given to services during the past ten years, knowledge of the structure and dynamics of the sector is still relatively scarce. With perhaps the exception of the U.S., developed countries have produced few general studies as Inman (1985), Ochel and Wegner (1987) or Petit (1988), which are a first approach to the problem, broadly comparable to Gajecki's and Kasiewicz' (1987) attempt for Poland. That even less is found for developing countries has been one of the obstacles to the Uruguay Round negotiations on services. The lack of basic information and of insight on the main trends makes for subjective arguments, costly to all parties involved.

This paper is a partial attempt to fill this gap for the Brazilian economy. Three hypotheses, out of the many raised by previous studies, are tested with Brazilian data. The Gershuny effect (Gershuny, 1978; Gershuny and Miles, 1983) is tested in Section 3; the externalisation in the provision of services is evaluated in Section 4, and Section 5 analyses a macroeconomic equation for explaining the services share in employment along the lines of Leveson (1985). The discussion of the three hypotheses is preceded by a rather general overview of the sector, which has no intention of providing a complete picture. It should be taken as a minimum preparatory stage to the ensuing arguments. Due to the amount of data and classificatory problems concerned with the services sector (Postner, 1982;

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Stern and Hoekman, 1988; Flôres, 1990), some comments on the statistics used in the paper are made in an Appendix.

A final section tries to weave a common thread out of the hypotheses that could indicate a main trend. The results reveal a distinctive, dual structure of the sector in Brazil, which may have important consequences in policy-setting. As an example, a brief consideration of possible impacts of a trade liberalisation is made.

2. THE BRAZILIAN SERVICE SECTOR

2.1. *Some Methodological Preliminaries*

Lack of adequate data on services in Brazil is huge. Omissions and incompatibilities add to the theoretical shortcomings of the existing series and leave analysts at a loss.

In this work, data has been restricted to the official sources. A description of them, together with more specific methodological points, is found in the Appendix. Some decisions and adjustments were necessary to evaluate special proxies—as those in Section 4—or to compare data from different enquiries or years. Similar to other studies such as GATT (1989), the figures obtained should be taken as a first measurement, in which insight on patterns and trends—with a minimum of reliability—has been preferred to the strict accuracy of the numbers.

Original classifications have in principle been kept. The most disaggregate one includes nearly all the categories in the International Standard Industrial Classification (ISIC) usually considered to belong to services, plus construction and engineering. However, minor attention has been given to the less tradeable sectors such as real estate, government services and wholesale and retail. The latter was indeed excluded from the tests in Sections 3 and 5.¹

Coverage problems are also especially serious, due to the weight of the black economy in domestic output.² Most underground economic activities are related to service occupations in large metropolitan areas, where more than one-third of the population is concentrated. Brazil may have its total output underestimated by 20 to 30 percent, which surely distorts many analyses of the service sector, and specially market size or labour force estimates for less formal subsectors such as personal services, construction engineering, etc.³ The attempt in Section 5 to incorporate the effects of the black economy shows how crucial this issue can be and casts a serious doubt on evaluations that do not take it into account.

2.2. *A Global Overview*

The services shares in GDP and employment, from 1980 to 1987, are shown in Table 1. In the case of real and nominal GDP shares, the table confirms, to a

¹There is no point in testing externalisation (Section 4) for the wholesale & retail sector (see also Note 14 below).

²The terms black, underground or hidden economy are used as synonyms in this paper. See the Appendix for a brief explanation.

³The most serious measurement seems to be the one in Lima (1985), which provides evidence that the underestimation is surely higher than 20 percent. Informal estimates and the press sometimes raise the figure to 30 percent.

certain extent, international evidence that the relative growth in the nominal share is partially due to a price effect combined with lower productivity growth rates. The total nominal values, with a maximum of 47.8 per cent in 1987, are considerably lower than those for developed countries; the same applies to the employment shares. Though no evident change in the latter is noticeable in the services group, a slight upward trend is present by adding the services and wholesale and retail figures. The short length of the series and the atypical character of the decade, troubled by manifold economic plans, do not allow further conclusions.

TABLE I
BRAZIL: SERVICES SHARE IN GDP (FACTORS COSTS*) AND
EMPLOYMENT (%)

	1980	1981	1983	1985	1987
Services**					
Nominal	33.5	35.7	35.9	35.4	39.4
Real	33.5	33.1	35.0	34.7	35.8
Employment	32.4	32.6	35.0	32.0	33.9
Wholesale & retail					
Nominal	11.0	10.3	9.8	9.3	8.4
Real	11.0	10.8	10.7	10.5	10.4
Employment	9.4	10.3	10.6	10.9	11.7
Total					
Nominal	44.5	46.0	45.7	44.7	47.8
Real	44.5	43.9	45.7	45.2	46.2
Employment	41.8	42.9	45.6	42.9	45.6

Source: Brazilian National Accounts and PNAD, IBGE.

Key: Real participation starting from the 1980 nominal shares.

* Including (imputed) financial intermediation.

** Excluding public administration and social services, but including public utilities.

Sectoral disaggregation can be obtained from the National Accounts and, for 1975, 1980 and 1985, a somewhat better one can be produced with the aid of Census data. For these years, the (nominal) sectoral shares, resulting from the combination of both sources, are shown in Table 2. With a few exceptions, they have not varied much during the decade. The only significant trends are the decrease in the construction and government shares and the increase in the financial services participation. The last column shows the accumulated real growth during the period, for those sectors compatible with the National Accounts. Comparison, for each sector, of the growth figure with the nominal shares may give an insight on how differently sector prices have evolved during the period. The most striking case is communications which, while keeping to a modest 2 percent share, has experienced a spectacular growth. Evidence that prices in this (state controlled) sector were perhaps kept too low can be found in Werneck (1987), who showed that a clear downward trend is present in the monthly series of the real value of an average telephone account, from January 1979 to December 1984; the last value being 60 per cent inferior to the one in January 1979.

In the bottom of the table, total market size is shown in current and 1975 US\$ values. The 1975 based figures show a contraction in 1985, reflecting the Brazilian recession in the 1980s. Even so, a yearly growth of half-billion dollars

TABLE 2
SECTORAL SHARES (%) IN TOTAL SERVICES OUTPUT

Sectors†	Shares			1975/85 Growth (%)
	1975	1980	1985	
Transportation	7.6	8.2	7.3	67.3
Air	0.6	0.3	0.6	91.1
Railway	1.0	0.9	0.9	72.8
Road	5.4	6.5	5.4	68.0
Maritime	0.6	0.2	0.4	26.9
Communications	1.9	2.0	1.9	461.7
Financial services ⁶⁾	18.8	20.0	22.4	NA
Construction	14.6	14.4	10.7	22.2
Engineering and business services	4.6	5.5	6.8	NA
Renting and leasing [#]	15.7	14.6	16.5	NA
Auxiliary services*	7.4	9.9	9.0	NA
Lodging and catering	5.5	5.9	6.1	NA
Entertainment	1.0	1.0	1.4	NA
Health and personal services	0.6	0.8	0.7	NA
Public utilities	4.7	3.9	4.1	161.3
Government	17.6	13.8	13.1	NA
All sectors	100.0	100.0	100.0	
Total output (in US\$bn)				
Current values	52.3	107.2	117.9	
1975 values**	52.3	69.8	57.8	

Source: Brazilian National Accounts and 1975, 1980, 1985 Economic Censuses, IBGE.

†Does not include the distributive trade.

⁶⁾Including imputed financial intermediation (SNA methodology) and insurance & investment services.

[#]Non real estate.

*To other economic activities (transportation, trade, agriculture, etc), including repair & maintenance and real estate buying & selling, administration, cleaning and conservation.

**Calculated by the U.S. consumers' price index variation in the period.

is obtained by a linear fit. Given the characteristics of the period under consideration, this value may stand as a pessimistic rate of growth for the sector. To put it in perspective, Brazilian service exports, from 1980 to 1985, averaged US\$ 1.9bn.

The previous analysis should be combined with information in the next table, on the structure and growth of sectoral demand, as taken from input-output data. This table provides a rough characterisation of the producers' and consumers' services, depending whether the bulk of demand is intermediate or final. Also, in five sectors, exports account for at least 50 percent of final demand. The figures in part B give an idea of the main structural changes, pointing towards a general rise in the intermediate demand for most of the services displayed.⁴

For the sectors covered by the five years censuses, performance measures can be calculated. Table 4 shows the aggregate mark-up, profit margin and productivity estimates for Census sectors where comparison is possible. Mark-ups and profit margins are in general quite high, signalling a low degree of competitiveness in almost all sectors.⁵ In fact, though but for health and repair and maintenance,

⁴For an explanation on how they were obtained see the Appendix, Section A.3.

⁵The odd values for the insurance and investment sector in 1980, to which no explanation has been found, are not being considered.

TABLE 3
BRAZIL—STRUCTURE AND GROWTH OF SERVICES DEMAND

	Demand		
	Intermediate	Total	Final Exports
A. 1980 Structure (as % of total sector output).			
Services†			
Metallurgical services	100.0	0.0	0.0
Maintenance and Repair (industrial):	96.2	3.8	1.9
Machines	96.0	4.0	2.0
Naval industry	98.8	1.2	1.2
Trains	100.0	0.0	0.0
Printing services in general	99.3	0.7	0.2
Other industrial services	82.1	17.9	0.0
Water and sewage	25.7	74.3	0.0
Construction and engineering	13.8	86.2	0.4
Transportation	51.8	48.2	13.4
Road	57.2	42.8	2.1
Railway	65.0	35.0	22.3
Maritime	35.6	64.4	56.5
Aerial	35.2	64.8	10.7
Telecommunications	66.6	33.4	0.4
Insurance	59.1	40.9	5.3
Financial services	96.8	3.2	0.1
Advertising	99.9	0.1	0.1
Management	100.0	0.0	0.0
Leasing and renting (non real estate)	99.9	0.1	0.1
Other business services	75.3	24.7	2.8
Lodging, restaurants and catering	14.7	85.3	0.0
Education and health services	2.8	97.2	0.0
Maintenance and repair (non-industrial)	37.8	62.2	0.0
Services to households	23.0	77.0	0.0
Other private, non-market services	0.0	100.0	0.0
Totals			
All services	51.0	49.0	2.1
Less construction and engineering	64.2	35.8	2.7
Increase			
	Intermediate Demand	Final Demand	Total Output
B. 1975/80 Sectoral Increases*			
Services†			
Metallurgical services	3.4	0.0	2.8
Maintenance and repair (industrial):			
Machines	1.9	15.0	2.0
Naval industry	3.0	—	3.0
Trains*	4.2	—	3.5
Printing services in general	6.7	0.1	1.7
Other industrial services	3.8	1.8	3.2
Water and sewage	12.7	1.4	1.7
Transportation:			
Road & air	12.6	2.4	4.8
Railway	4.0	1.7	2.7
Maritime	1.2	3.9	2.1
Telecommunications	12.7	1.4	1.5
Insurance and financial services*	3.5	—	3.7
Advertising	43.2	0.1	29.5
Leasing and renting (non real estate)*	4.8	—	4.8
Lodging, restaurants and catering	6.2	3.2	3.4
Maintenance and repair (non-industrial)	4.4	8.4	5.1
Services to households*	—	12.4	14.9

Source: Brazilian input-output tables for 1975 and 1980, IBGE.

†Does not include the distributive trade.

*For sectors where compatibility between the 1975 and 1980 classifications was possible. A dash (—) means that, for one of the years, the value is zero (0) or non-existent, so that total growth may differ from the one in intermediate or final demand (see text and the Appendix for further explanations).

the numbers have decreased in 1985, oligopolies backed by government intervention are not hard to be found. Moreover, taking into account the dollar inflation during the period covered, productivity has not increased for most of the sectors considered; which adds an extra support to the view of a situation of unchallenged market power.

TABLE 4
AGGREGATE PERFORMANCE MEASURES FOR SELECTED SERVICE SECTORS

Sectors	Mark Up*		Profit Margin*		Productivity**	
	80	85	80	85	80	85
Insurance and investment†	591	75	86	43	82.7	19.4
Lodging	22	13	18	12	6.9	7.1
Catering	—	20	—	17	7.1	12.8
Entertainment*	74	13	42	12	15.1	12.7
Engineering services	37	30	27	23	16.7	13.0
Other business services	46	26	32	21	10.1	6.3
Auxiliary services						
in transportation	131	26	57	21	21.7	14.0
Health services	27	33	21	25	7.6	5.4
Personal services	42	23	30	19	4.2	3.1
Repair and maintenance	17	41	14	29	5.4	4.2
Aggregate total	41	30	29	23	10.2	6.7

Source: Economic Censuses, Services, 1980 and 1985, IBGE.

*(in %): Mark up is defined as [revenues—total cost]/total cost, and the profit margin as [revenues—total cost]/revenues; salaries are comprised in the total cost.

**Measured as revenues (in US\$ 1,000, current values) per employee.

†See the comment on this sector in the text.

The above considerations give grounds for concern about the overall maturity and technological advance of the Brazilian service sector. In spite of some global trends in Tables 1 to 3, conformable to international evidences, businesses in the sector may be living in an artificially non-competitive market, where innovation is not a must for survival.

3. THE GERSHUNY HYPOTHESIS

The Gershuny effect refers to a gradual replacement of purchased services in consumers' demand, by self-service activities and services embodied in durables. A first hint to this effect can be found in part B of Table 3, where the growth of intermediate demand is usually higher than total sectoral growth. Indeed, in Gershuny's view, the above effect is usually followed by an increase in the utilisation of producers' services, together, most of the times, with a greater degree of externalisation of the latter (see the next Section).

The Brazilian situation may be better illustrated with the aid of the 1975 and 1980 input-output (IO) tables. Driver (1984), also used such data for the U.K., obtaining the aggregate change in the technical coefficients by adding row and then columnwise the differences between the tables. As the Brazilian tables of these years do not match precisely, the reverse order was followed, with the aggregate coefficients for each year obtained first. Table 5, part A, shows the

TABLE 5
EVIDENCE ON THE GERSHUNY HYPOTHESIS FOR BRAZIL, 1975-80

	Technical coefficients			
	Manufactures		Services	
	1975	1980	1975	1980
A. Estimates				
Services	0.033	0.040	0.065	0.191
Final demand (share)	1975	1980		
Services	0.289	0.300		
Manufacturers	0.352	0.404		
	Technical coefficients			
	Manufactures		Services	
	Difference	Max. error	Difference	Max. error
B. Tests				
Services	0.007	0.0019	0.126	0.0347
Final demand	Difference	Max. error		
Services	0.011	0.0030		
Manufactures	0.052	0.0143		

Source: IBGE, 1975 and 1980 input-output tables.

aggregate coefficients. Apparently, what increased was not only the services content of intermediate consumption, but also the share of manufactures in final demand.

These figures raise some questions, which call for checking their interpretation as positive evidence of the hypothesis. First, as the matrices are based on value data, relative price effects may act for and against the hypothesis, masking the true evolution.⁶ Second, since IO coefficients and statistics are subject to a variety of errors, the apparent changes should be submitted to some statistical verification.

Stochastic testing of IO coefficients and derived statistics was pioneered by Quandt (1958), but—in spite of its importance—up to now there is no definite methodology for handling all the aspects of the problem.⁷ An indirect way is to assume a very simple model in which each IO entry, in each year, has a normal distribution whose mean is unbiasedly estimated by the table value. Supposing that same entries for different years are independent and have the same absolute error (standard deviation), it is possible to compute the maximum value this error can attain for rejecting at 1 percent the null hypothesis of equality against a two tailed alternative.⁸

The results are shown in part B, Table 5. As the original technical coefficients are presented at a five digits precision, an absolute error of around 0.005 was assumed for the aggregations performed. This makes two of the trends significant:

⁶However, the macro evidences in Section 2 are favourable to the hypothesis.

⁷To the extent of our knowledge, of course. Further references are Simonovits (1975), Gerking (1976), and Wibe (1982).

⁸This leaves open the direction of change (an increase or decrease) and produces stricter figures.

the participations of services in services' output and of manufactures in final demand. Evidence is less convincing for the other two.

5. THE EXTERNALISATION HYPOTHESIS

Originally raised by Stigler (1951), in the context of the extension of markets for industrial products, externalisation or unbundling roughly refers to the portion of intermediate demand for services which is supplied by service firms, rather than in the production unit itself. It is related to the ideas of "vertical disintegration" and "increasing specialization" which, as Stigler pointed out, can be traced back to Adam Smith.

Explanations as to why externalisation takes place view it in a dynamic way, in which activities move out of the production unit, at a particular stage of development. They differ fundamentally in the suggested explanations of the changes (Stigler, 1956; Chandler, 1977; Stanback *et al.* 1981) and consequently of their place in an evolutionary model of the sector. Moreover, the externalisation process can itself cycle, in a direction opposite to the business cycle, and can assume different intensities, depending on the oligopoly degree of the corresponding production sector.

Notwithstanding these questions, the concept can be used as a sign of the rise in importance of the particular service, and of the passage from informal to formal status, a key characteristic of services evolution (Petit, 1988, Chapter 1). In this view, the overall maturity of the services sector can also be evaluated by the degree of externalisation in the provision of services for intermediate demand.⁹

Estimates of externalisation are sometimes obtained by combining output data with employment figures, but can also be derived from data at the establishment level. This presents considerable shortcomings (Postner, 1990) and tends to overestimate unbundling. As the employment data by occupation and sector of activity available did not allow the former approach, Table 6 shows rough estimates for producers services obtained from the 1980 input-output tables.¹⁰

Aggregate numbers were computed for increasing sets of producer related services; given the methodology, the first two partial sums, for groups *A* and *A + B*, probably give the best measurements. For producers services in the restricted sense it amounts to 43.8 per cent. That this is an overestimate is seen by comparison with the value of 27.3 per cent for the Federal Republic of Germany using 1982 employment figures (Ochel and Wegner, 1987). The gap between the figures is so large that it is very likely that Brazil, in the early 1980s, had a higher degree of externalisation than Germany.¹¹

Using a stricter definition that considers only the sales by private service firms, the same approach can be used, coupled with additional information on ownership. This amounts to change figures for maintenance/trains and telecommunications, in the first two groups. The new partial totals for *A* and *A + B*

⁹Though for some specific services, as the case of in-house employment in the U.S. during the period 1977-86 (Kutscher, 1988) evidence can be inconclusive.

¹⁰See the Appendix, Section A.2.

¹¹It is known, however, that Germany has a low externalisation degree. We looked for estimates for other Latin American economies, but could not find a reliable figure.

TABLE 6
EXTERNALISATION OF PRODUCER RELATED SERVICES: SOME ESTIMATES FOR 1980

Services	Externalisation (%)	Output (US\$m)
A. Producers services, restricted sense	43.8	37,061
A.1 Industrial services	42.2	9,478
Metallurgical services	81.7	757
Maintenance and repair (industrial)	53.8	4,667
Machines	50.7	4,354
Naval industry	97.6	172
Trains	98.1	141
Printing services in general	85.7	995
Other industrial services	0.5	3,059
A.2 Business services	44.4	27,583
Advertising	100.0	2,193
Management	0.0	14,441
Leasing and renting (non real estate)	98.2	1,376
Other business services	90.8	9,573
B. Telecommunications	99.9	2,506
Partial total A + B	47.4	39,567
C. Transportation	99.5	17,598
Road	99.4	13,179
Railway	100.0	1,094
Maritime	99.9	3,325
Partial total A + B + C	63.4	57,165
D. Insurance and financial services	100.0	23,123
Insurance	100.0	1,669
Financial services	100.0	21,454
Final total A + B + C + D	73.9	80,288

Source: 1980 input-output tables, IBGE.

become 43.5 and 40.7 percent, respectively. Reliable estimates of the government's participation in the group *D* services was impossible with the available information.

5. THE EMPLOYMENT EQUATION

The macroeconomic relationship between services employment shares and per capita income—or, more generally, the economic cycle—has attracted many analysts since the works by Baumol (1967) and Fuchs (1968). In all studies for the developed economies, a direct, positive relationship was clearly found. Working with U.S. data, Leveson (1985) fitted the following model to explain the services share in total employment in non-agricultural activities:

$$(I) \quad S_t = a + b_1 X_{1t} + b_2 X_{2t} + e_t,$$

where S_t is total employment in services divided by total employment in non-agricultural activities; X_{1t} is per capita output, and X_{2t} is real output divided by potential output.

As in other studies, an extremely good fit was obtained, showing how service employment can be simply explained, in macro terms, by the economic cycle.

To test the model for Brazil, a preliminary estimate of potential output is needed. In the Brazilian GDP series for 1970–88, a clear turning point is evident in 1980, when the accelerated growth of the 1970s ceased. A piecewise continuous linear equation was used for the potential output, with a trend break in 1980.¹² Perhaps because of its turning point status, 1980 behaved as an outlier in all the regressions tried, and was removed. The final result is similar to but not as good as Levenson's:

$$Y_t = 0.091 + 0.0014X_{1t} - 0.2973X_{2t}$$

$$(0.0412) (0.0003) (0.0377)$$

$$R^2 = 88.7\% \quad n = 12.$$

Nevertheless, the importance of the black economy, in the Brazilian case, suggests a further question. Indeed, the share of black activities in the service sector may change countercyclically, affecting the coefficient of X_{1t} , in particular. In order to evaluate this, an extension of model (1) was devised.

Let Y stand for output in a given year, which can be decomposed as $Y = Y^w + Y^b$, where Y^w and Y^b , stand for the portions of output which are due, respectively, to the official ("white") and black economies, and assume that the ratio of the black to the official economy follows a linear relation on the (official) output value:

$$Y^b/Y^w = \alpha + \beta Y^w, \quad \beta < 0.$$

This means that the true per capita output X_1 will be equal to:

$$X_1 = X_1^w(1 + \alpha + \beta Y^w),$$

where X_1^w stands for the observed, "white" value. Equation (1) then becomes:

$$(2) \quad S_t = a + b_1(1 + \alpha)X_{1t}^w + b_2X_{2t} + b_1\beta X_{1t}^w Y_t^w + e_t$$

showing that a third term is in principle mandatory, if one works with official data.

The above regression was tried with all the observations and also without the 1980 point. The latter was, once again, the best result:

$$S_t = 1.0637 - 0.0022X_{1t}^w - 0.2074X_{2t} + 0.8550 \times 10^{-7} X_{1t}^w Y_t^w$$

$$(0.0504) (0.0010) (0.0349) (0.2356 \times 10^{-7})$$

$$R^2 = 95.7\% \quad n = 12.$$

The fit now is very good, the significance of the last, product term, giving further evidence of the role of the black economy. It is also important to notice the change in sign of the coefficient of the first explanatory variable, showing that employment in services, in Brazil, is so highly connected with the black economy that it moves contrary to rises in the official per capita output.¹³

¹²Estimation was carried out for the two sub-periods separately, by means of ordinary least squares. The two regressions were then translated upwards, so that the ratio of real to potential output was equated to 1 in 1980.

¹³The coefficient is significant, at 5 percent, in the one-sided test $H_0: b_1(1 + \alpha) = 0$ against $H_1: b_1(1 + \alpha) < 0$.

6. IN SEARCH OF A SYNTHESIS

What is the common thread between the three hypotheses studied? To begin with, Brazil can not yet be fully considered as a service economy. Global services shares in GNP and employment though high are not at the levels of the developed economies. Moreover, all sectors have experienced a slow growth during the 1980s, with price movements differing wildly between them. Even so, two basic trends follow the path of developed economies: the move of services to intermediate demand (Gershuny effect) and a progressive externalisation in their provision. Both point to an increasing complexity and diversification of the production process. However, the impact of these changes on performance—specially that of the service sector itself—is not yet evident. In addition, this “modernizing” trend must be judged in the light of the long-run evolution of the hidden economy. Our simple extension of the Leveson equation has showed that, now contrary to the other two hypotheses, results for Brazil may be very different from those for developed countries. The econometric findings actually suggest an opposite movement in the employment share against per capita (formal) output. This bears out the conclusion that a large mass of service activities lies outside the formal system, and qualifies the previous results, as this “black side” is very likely not restricted to consumers services. A clearer view of its interaction with intermediate demand requires further study.

It is plausible to assume that two groups of services coexist in the country: one informal, labour intensive, present in the large metropolitan areas, and another formal, less labour intensive, presumably more concentrated in the producers’ services sectors.

From a trade in services viewpoint, there is a sizeable market in the second group, where local know how and the technological expertise of developed countries firms may lead to profitable interchange. For the other group, a kind of a 0–1 situation is more likely for the various subsectors. Either trade liberalisation will not change the market—because of its impenetrable character explained by its multiple linkages with the economy as a whole—or, on the contrary, the technological gap between foreign and local providers will account for a very easy penetration of the former, destroying the local industry, and causing serious unemployment.

APPENDIX: A FEW POINTS ON METHODOLOGY

A.1. *Data Sources*

Four main official sources, all of them produced by IBGE, the Brazilian Statistical office, were used in this work: Economic Censuses (microdata at establishment level), PNAD (the annual household survey), input–output (IO) matrices (built from the Census data) and the National Accounts.

PNAD provided employment figures (Table 1 and section 5).

The fact that IO matrices for different years are not exactly compatible poses many problems. As an example, in Table 3.B, resort to additional sources was needed in order to harmonise the disaggregate information available. Moreover, for some sectors, allocation of output between intermediate and final demand has

changed from 1975 to 1980; that is why the dash (—) can either mean a truly negligible demand in the category or should be credited to methodological differences between the two IO tables.

National Accounts also rely on Census landmarks. Whenever they appear together with Census data (Table 2), the latter were matched to a National Accounts entry, providing a deeper disaggregation.

A.2. Definitions

Services are broadly understood as comprising all sectors not considered as manufacturing, mineral or vegetal extraction and agriculture. However, as the paper concentrates on “tradeable” sectors, the distributive trade (wholesale and retail) is not given consideration, apart from its appearance in Table 1. Actually, in Brazil (as in many countries), it is the object of a specific Census and data collection methodology, being usually studied separately.¹⁴

The *black, underground or hidden economy* is understood as the whole part of the economy which is outside the fiscal system. It must be said that though the Censuses and the household survey capture a certain part of it, annual National Accounts estimates fail to take it properly into account.

Externalisation has been evaluated in Table 6 through a proxy obtained from the 1980 input–output tables. Contrary to what happens in other countries, the methodology adopted in Brazil allows the computation of such a proxy from the so-called *market share* matrix, actually a sectors \times products matrix of the set of input–output tables. It gives, for each product/service, its output by every sector in the economy. The proxy is computed by dividing the output of the sector more closely associated to the particular service by the total output of the service in the economy.

A.3. The Brazilian Inflation

Inflation poses a major problem for making intertemporal comparisons of Brazilian data. Following a common practice, it was decided to present some figures in nominal US\$ values, obtained by applying an average exchange rate for the corresponding year (Tables 2 and 6). This was also used for expressing the productivity measures in Table 4 and, in Table 3.B, for computing the growth (in nominal US\$ values) of each category of demand. The growth figures were obtained by transforming the nominal cruzeiros to U.S. dollars and dividing, for each sector and demand category, the corresponding 1980 and 1975 results. Care in the interpretation of Table 3.B last column is required, not only because of the dollar inflation in the period, but also in view of the methodological differences between the input–output tables referred to above.

Far from being a perfect way of dealing with the problems posed by high inflation, this should be viewed as a simple device for framing the results into a more international perspective.

¹⁴We are aware that sectors like health and government services may also be considered less tradeable, as there is no general agreement on this point. However, these sectors pose no methodological problems as the distributive trade which, for instance, undergoes a special treatment in the Brazilian IO tables.

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