

ESTIMATING THE BENEFITS OF THE REHABILITATION OF SAO PAULO DOWNTOWN¹

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I - Introduction

One of the projects developed by the recently elected municipality of Sao Paulo is an urban rehabilitation project for the center of the city, for which a US\$ 100 million loan of the IADB is under consideration. The issues has been discussed and studied for many years, and a number of institutions have been created to solve it. Yet, not much has been done, and it is not clear that a consensus has been reached on what could or should be done. It has been suggested that developing and appraising various scenarios for the rehabilitation of the center could be useful. This paper is a modest contribution to this task.

Let us note at the outset that the concept of "Sao Paulo center" is not unambiguous. It is used in at least three meanings.

One is politico-administrative, and refers to the sub-municipality (*sub-prefeitura*) called center. It consists of 10 districts³¹ comprising in 2,000 about

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³ The municipality of Sao Paulo is divided into 96 districts for statistical and administrative puroposes.

415,000 inhabitants. It is important because of an ongoing decentralization process aiming at transferring more powers from the municipality to the sub-municipalities, also called "regions". The sub-municipality center, called AR-Sé is the area in which a program called *pro-centro* operates.

A second meaning is operational, and relates to perimeter of Operation Urban Center (*Operação Centro Urbano*), as defined by a 1997 Law. The center thus defined does not consist of a finite number of districts. It includes two districts and part of another one, and regroups about 80,000 persons.

The third is functional and defined as the two districts of Se and Republica. It could be called the hyper-center, or the old historic center of Sao Paulo. It houses about 70,000 people in 2,000. This is the area considered in principle for the rehabilitation project, and the IADB loan. In this paper, the words "Sao Paulo center" or "Sao Paulo downtown" will refer to this area only. It does not follow that the municipality is not interested in the areas adjacent to the center thus defined, many of which are also in need of rehabilitation. The opposite is true, as shown by the Strategic Plan just adopted by the municipal council that includes specific rules and measures for a central area much larger than our "center". Obviously, the future of this center cannot be analyzed, discussed, planned and conducted in isolation, and its relations with the rest of the municipality, and indeed of the metropolitan region, must always be kept in mind. Nevertheless, the focus of this paper –and of the IADB loan– will be on this center.

Table I-1 – Three Definitions of Sao Paulo Center

| | I | II | III |
|---------------------|-------------------------|------------------------|-------------|
| Nature | Politico-administrative | Operational | Functional |
| Definition | 10 districts | Specific | 2 districts |
| Area (ha) | 3,260 | 615 | 440 |
| Population in 2,000 | 413,900 | 80,400 | 67,800 |
| Projects & programs | Procentro | Operation urban center | IADB loan |

The Sao Paulo center represents a mere 0.3% of the Sao Paulo municipality (MSP) in terms of area, and only about 0.6% in terms of population in 2,000. However, if one considers the built-up area (in terms of m² of floor

¹ The sub-municipality center regroups the districts of Se, Republica, Bom Retiro, Santa Cecilia, Pari, Bras, Cambuci, Libertade, Bela Vista and Consolação.

constructed) in 2,000, the center accounts for nearly 3% of the municipality. In terms of employment, it represents nearly 7% of the MSP total and not far from 5% of the metropolitan region total. If one considers the industrial and commercial floor-space constructed –also an indicator of the economic importance of the area– the center in 2,000 accounts for more than 8% of the municipality total¹. In terms of public buildings (for which we found no data), the relative importance of the center is most likely much larger. And, of course, the center is the locus of many historic, cultural, artistic, patrimonial artefacts that play a key role in the image of the city and in the self-esteem of its inhabitants.

The center and its problems have to be seen in the wider context of the municipality and the metropolitan region . The center is not an island, but is part of the Sao Paulo agglomeration. Over the past decade, this agglomeration has suffered a major economic shock and an equally important spatial change. The basic numbers are presented in Table I-2.

Table I-2 – Employment an Population in Sao Paulo Metropolitan Region, 1990–2000

| | Município | Rest of RMSP | (in 1,000) RMSP |
|---------------------------|-----------|--------------|--------------------|
| Industrial employment | | | |
| 1990 | 910 | 606 | 1,516 |
| 2000 | 482 | 454 | 936 |
| Non-industrial employment | | | |
| 1990 | 2,592 | 584 | 3,176 |
| 2000 | 2,730 | 965 | 3,695 |
| Total employment | | | |
| 1990 | 3,502 | 1,190 | 4,692 |
| 2000 | 3,212 | 1,419 | 4,631 |
| Population | | | |
| 1991 | 9,839 | 5,540 | 15,369 |
| 2000 | 10,434 | 7,445 | 17,879 |

The economic shock can be summarized in one sentence: in the 1990–2000 period, the Sao Paulo metropolitan region lost more than 600,000 jobs. In the course of one decade nearly half industrial jobs disappeared². This is in net

¹ These numbers are calculated from PMSP 2000a

² The causes are many. Some of these jobs went elsewhere in Brazil. Other went to other, more cost-effective, developing countries. Some were caused by productivity increases associated with a constant or growing output. Other were caused by the decline in the output of certain goods or services. Some are even the result of a statistical illusion : when an industrial enterprise hires another enterprise to perform tasks (such as maintenance) that used to be performed in-house, workers previously counted in the industry sector are now counted in the service sector.

terms. Since some industrial jobs must have been created in certain sectors, the number of jobs that actually disappeared is necessarily much higher. If one considers 1989, the year in which industrial employment was highest, the decline is even more impressive: more than 800,000 industrial jobs disappeared in eleven years. Many countries or regions, particularly in the developed world and in the former communist countries, have experienced de-industrialization. But few, if any, have faced a de-industrialization shock of a similar magnitude and speed¹.

To a large extent, this drastic decline in industrial employment has been compensated by an increase in non-industrial employment. In the 1990-2000 decade, about 450,000 jobs were added in the service sector, 150,000 in commerce, and nearly 200,000 in "public administration". Over the entire decade, employment in the metropolitan region remained about constant (it declined by 1.3% over the entire period)².

In the meantime, population in the metropolitan region increased at a rate of about 1.7% per year. This is less than in the past, and less than in the rest of Brazil. This lower-than-elsewhere rate of population growth reflects in part the inability of the metropolitan region to increase employment. It implies an end of the secular movement of in-migration into Sao Paulo. Yet, +1.7% % is still much higher than -1.3% (the decline in total number of jobs), and it means that the number of formal jobs per person declined in the metropolitan region, by nearly 3% per year —an extraordinarily high number. This implies growing unemployment (official or disguised), more informal employment, and a downward pressure on per capita income. The official unemployment rate in Sao Paulo, at 9.3% in 2002, is higher than ever, and higher than in any other metropolitan region in the country. Data on value-added, coming from tax sources, is neither complete nor trustworthy; nevertheless, there are no obvious reasons to expect it to be biased over time for a given area. According to this data, value-added in

¹ In France, or more precisely in the most industrialized regions of France, the decline of industrial employment in the 1970ies and 1980ies was about half as fast (Gaudemar et Prud'homme 1991, p. 121 ; the same can be said of industrial employment decline in the regions most affected in the United Kingdom and in Germany.

² Numbers do not quite add up, because of 260,000 « other and not specified » jobs in 1990. To be fair, one should add that these numbers, produced by the ministry of labor, relate to formal employment, and that other sources, such as the origin-destination transport surveys, depicts a less bleak picture. According to these surveys, total employment between 19887 and 1997 increased by 1,300,000, at a rate of 2.3% per year.

constant reasis in the metropolitan region declined by as much as 24% over the 1993-2000 period. The macro-economic context therefore appears very serious indeed.

The second major development is that the municipality of Sao Paulo (MSP) has fared worst –much worst– than the metropolitan region. This is true for every available indicator. Total employment declined by more than 8%, as opposed to 1% for the metropolitan region. This is in spite of the fact that the MSP was specialized in the fastest growing sectors at the beginning of the period. Not only was de-industrialization more rapid (-47% for the municipality v. -39% for the metropolitan region), but tertiarization was slower (+5% v. +16%). When the comparison is made with the rest of the metropolitan region, the contrast is even much more pronounced. This is equally true for population (+6% v. +16% for the 1991-2000 period). The available data on value-added also suggests a faster decline in MSP over he 1993-2000 period (-29% v. -24%). In the past decade, then, the MSP has lost its relative attractiveness in the metropolitan region. People and enterprises have left the central municipality for the peripheral municipalities.

These two basic trends are not unrelated. The economic changes may have facilitated or accelerated the spatial changes. More likely, the spatial change, that is the sprawl of Sao Paulo, affects the economic efficiency and productivity of the entire area, thus reducing the attractiveness of the metropolitan region, and precipitating its relative economic decline. If this is true –and this paper will argue it is– decisions about the center of Sao Paulo, that will affect the spatial structure of the area, can contribute to the much needed economic revitalization of the metropolitan region. This is a major challenge.

II – Four Scenarios for Sao Paulo Center.

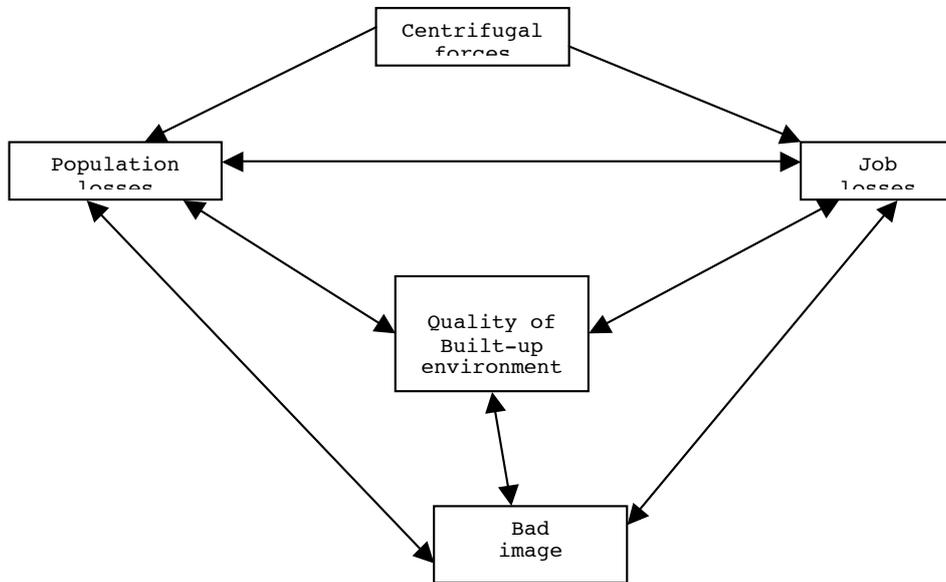
A –The Reference Scenario

The first question is : how would the Sao Paulo center look like in 2010 in the absence of strong policy measures ? There is a general consensus that the center would continue to lose ground relative to the rest of the metropolitan area, that its attractiveness would continue to decline, that both population and employment would continue to diminish, that housing and office space markets could continue to be characterized by high vacancy rates and low prices, and that the already degraded

quality of private and public buildings and open spaces would continue to decline or at best remain at its present levels. Obviously, all these elements are interrelated and form a system, as suggested in Figure II-1. The center is caught in a vicious circle of degradation.

It is useful, although difficult to go beyond this literary and qualitative approach, and to provide a more quantitative picture of the future of the Sao Paulo in the absence of strong policy measures. It will rest on eight indicators for which data is available for 1991 and 2000 and can be projected for 2010: number of households, population, income of residents, residential built-up area, commercial built-up area, vacancy rates for housing, and employment. In addition, secondary indicators, such as the number of persons per households, or residential area per person, can be produced by combining these primary indicators.

Figure II-1 – The Vicious circle of Downtown Degradation



Population – In the 1991-2000 period, the population of the center declined by about 2.5% per year, from 85,000 to 68,000 people. This decline was caused by both a decline in the number of households (-1.5% per year) and a decline in the average size of households (-1% per year). There are powerful forces working in the direction of a continued strong decline, and not so powerful forces working in the opposite direction.

The pro-decline force is the general movement out of city centers towards city suburbs. This movement has been very strong in the Sao Paulo metropolitan region in the 1990ies. It is not limited to our center *stricto sensu*, but has characterized much of the municipality: the 53 most central districts have all lost population in this period. The population of the municipality as a whole only increased (by a moderate 0.6% per year, lower than the natural rate of growth) because of the population increases that took place in the peripheral districts. People who can afford it prefer low-density areas to high-density areas, individual houses to flats, and automobile transport to public transport. This centrifugal movement is even apparent in the fairly well-off semi-central districts of the municipality, which are not very dense, offer individual houses, and easy car access. It is bound to be more pronounced in the center that does not have such characteristics, is more degraded, and suffers from a bad image.

There are, however, three counter forces. One is the housing market. Housing vacancy rates in the center are high (32% in 2000, twice as high as in the municipality at large), which suggests that present housing prices are too high (to balance the market). The reluctance of owners to decrease prices will diminish over the course of time. Lower prices in the center should attract some people back in the center. A second force is related to the size of households in the center. It has declined to 2.38 persons—much below the 3.75 of the municipality as a whole. This means that a substantial share of households presently living in the center consists of singles, or married couples without children. Such people are known not to be very sensitive to the appeal of suburban life. A third force is the importance of rented housing in the center. Rented homes account for 50% of total homes in the center, as opposed to less than 21% in the municipality. Rented housing, particularly of a medium to high quality, is scarce in Sao Paulo, partly as a result of pro-tenant policies. Yet there is a demand for this kind of housing. The center is well placed to respond to this demand. For all these reasons, a mere extrapolation of past trends is unlikely to be realistic.

All things considered, it seems reasonable to project, for the 2000-2010 period, a decline of both the number of households and of households size, but a decline less pronounced than in the 1991-2000 period: -1.3% per year for the number of households (as opposed to -1.5%) and -0.8% per year for households size (as opposed to -

1%). This produces a population decline of -2.1% per year (as opposed to -2.5%).

The number of workers residing in the center (and working in the center or elsewhere) in 2000 can be estimated to be around 33,000¹. This number can be expected to decline like the number of households, by about 1.3% per year. This would mean 30,000 workers in 2010.

Residential built-up area in the center, according to the available data, increased by nearly 1.2% per year between 1991 and 2000. Taking into account the high, and increasing, vacancy rate, and the projected decline in the number of households, a 0% increase in residential built-up area is projected. It implies a significant increase in the amount of residential floor per households or per person.

Employment – Surprising as it might be, the number of jobs in the center of Sao Paulo is hard to know, as explained in Annex A. Our estimates, mostly based on the origin-destination transport survey of 1997, put it at 258,000 jobs in 2000, declining at a rate of 2.2% per year. In the absence of strong policies to revitalize the center, this decline should be expected to continue. There is one reason to project a lower rate of decline, and it is the present low rental (or sales) price of offices in the center. As shown in Table II-1, offices in the center cost about one-fifth of similar offices in the main other business areas of the municipality. This should induce at least some businesses to come back or not to leave the center. A 1.5% rate of decline per year can therefore be projected. This puts employment in the center at 222,000 in 2010.

Table II-1 – Office Space Characteristics, by Area, 2002

| | Center | Paulista | F. Lima | Berrini |
|---------------------|--------|----------|---------|---------|
| Stock (1,000 m2) | 300 | 896 | 569 | 1,524 |
| Vacancy rate | 7% | 9% | 9% | 12% |
| Rental price (R/m2) | 14 | 50 | 70 | 12 |
| Sales price (R/m2) | 900 | 4,100 | 5,800 | 4,800 |
| Rate of return | 19% | 15% | 14% | 14% |

Source : CB Ellis, 1rst term 2002

Commercial built up area remained constant in the preceding decade, which implied an increase in floor space

¹ This number is obtained by applying the rate of decline of the number of households in 1991-2000, that is 1.5% per year, to the number of workers in 1997 according to the OD transport survey, that is 34,871 ; it yields 33,320 workers.

per job of about 2.2% per year. A constant amount of floor space is projected.

Table II-2 summarizes this analysis. It depicts the decline of the center, and it defines the reference scenario.

Table II-2 – Sao Paulo Center Reference Scenario for 2010

| | 1991 | Δ/year | 2000 | Δ/year | 2010 |
|----------------------------|--------------------|--------|---------|--------|---------|
| <i>People :</i> | | | | | |
| Households | 32,650 | -1.50% | 28,486 | -1.3% | 24,992 |
| Persons/households | 2.60 | -1.00% | 2.38 | -0.8% | 2.20 |
| Population | 84,983 | -2.47% | 67,833 | -2.08 | 54,982 |
| Workers | | | 33,000 | -1.3% | 30,000 |
| Income | 1,433 | -0.71% | 1,343 | | |
| Vacancy rates ^a | 27.5% ^b | +1.66 | 31.9% | 0,0% | 31.9% |
| Residential area (Km2) | 2,274 | +1.16% | 2,523 | 0,0% | 2,523 |
| <i>Jobs :</i> | | | | | |
| Employment | 315,000 | -2.2% | 258,000 | 1.5% | 222,000 |
| Commercial area (Km2) | 7,383 | -0,00% | 7,381 | -0,00% | 7,381 |

Sources : For 1991 and 2000 : PMSP 2000a for built up area ; PMSPb for households, income and housing vacancy rates ; transport survey 1997 for workers and employment. For 2000-2010 rates of change, informed judgment justified in the text

Notes : ^aNon-occupied homes (fechadas, uso ocasional, vagos) relative to total homes (domicilios particulares) ; ^bThis is the number for the 1991 district of Sé that may not have the same borders as the 2000 district of Se, but would be a meaningful proxy.

B – Three Alternative Scenarios

Policies can, in principle, change the likely course of events. The future of the Sao Paulo center need not be the one described above. Alternative scenarios can be imagined. Three are briefly outlined below. They are defined relative to the reference scenario. The policy measures that would be required to achieve them are briefly described. Their cost is, nearly by definition, about equal to the amount of the IADB loan, plus the local counterpart, i.e. about US\$ 200 million. Each scenario attempts to be "coherent", in its various parts, and in relation to the policy measures behind it. Our three scenarios are voluntarily "contrasted", and each represents a possible future, with its benefits and its costs. They might appear not very realistic, but are presented as a tool to stimulate discussion and choice.

Housing scenario – In a first scenario, the emphasis is put on housing, particularly low income housing. Public expenditures are allocated to the maintenance and rehabilitation of public spaces, to make them more attractive, but above all to housing rehabilitation and construction. Tax incentives are also granted to

residential property owners to maintain their buildings, particularly if they accept to rent them at low prices.

As a result, the number of households living in the center is expected to increase by 25% —relative to the reference scenario. A similar increase is projected for the number of persons per household, because families attracted by low income housing are likely to be somewhat larger than in the reference scenario. Consequently, the population of the center increases by 56%, to about 86,000 persons.

Because many of the newcomers have relatively low income (to qualify for low income housing), the average income is expected to decrease, by about 20%. The number of workers increases more slowly than the number of households, because unemployment is usually negatively related to income; a rate of increase of 20% can be hypothesized, which produces a number of 36,000 workers. Vacancy rates decline sharply, by 30%, and residential built-up area increases, by about 20%.

This scenario is not very favorable to employment. Although an increase in the number of households may lead to some job creation in proximity employment (in groceries, for instance), this effect will be limited by the relatively lower income of these households. Above all, low income housing will somewhat decrease the attractiveness of the center for sectors like banking, insurance, law, advertisement, computing, fashion. A 10% decrease —always relative to the reference scenario— seems a safe bet. A similar decline is projected for built up commercial area.

Cultural scenario — A second scenario focuses on the cultural, historic, artistic, patrimonial functions of the center. The bulk of the money goes to the creation of cultural centers and events (theaters, concert halls, museums, libraries, gardens, parks, etc.). As many as possible public administrations are brought back to the center, either in renovated historic buildings or in newly erected buildings, possibly designed by world-known architects. In this scenario, particular attention —and funding— is given to the conservation of the many existing buildings of historic or architectural interest.

Such a scenario is not likely to attract many people or jobs. This is not its purpose, which is to serve the entire municipal area. A cultural city center is more a place to visit and enjoy than a place to reside or to work in. A decline of 20% in the number of households can be

projected, together with a decline of 10% in the number of persons per households. In this case, total population would decline to about 35,000 people. The number of workers residing in the center (and working in the center or elsewhere) would decline like the number of households, by 20%. The income of these people might be relatively high, perhaps 20% higher than in the reference scenario. There is no reason why vacancy rates would change. A modest 5% increase of built-up residential area is projected.

The conservation constraints associated with the cultural scenario, and the competition from cultural buildings, would make it more difficult for business to prosper, particularly for large businesses in the banking or insurance sectors. A 20% decline can be projected, leaving the center with less than 180,000 jobs.

Business scenario – In a third scenario, policies are designed to attract enterprises and employment. They include generous tax incentives to incoming enterprises, and also probably existing enterprises (to encourage them not to leave). They include massive transport investments, particularly but not only in roads and parking space. A more liberal approach to conservation is also required, that would make it easier to tear down some obsolete office buildings to replace them by modern buildings, or at the very least to upgrade them substantially. Land use regulation that prohibits or makes very costly the construction of high rise office buildings in other parts of the city would also help. A functional improvement of the built-up environment in the center (smooth pavements, clean streets, refurbished public buildings, etc.) would also be necessary to induce enterprises to settle in the center. The regrouping in Se and Republica of the main political and administrative centers of decision, with which businessmen often interact, would also contribute to this scenario.

The dominant feature of this scenario is an increase in the number of jobs in the center. A 30% increase is projected, producing a number of about 290,000 jobs in the center in 2010. A higher increase (40%) in commercial built-up area is associated with this scenario.

In terms of people, this scenario should be relatively neutral. There is no strong reason why the number of households, or of persons per households would change. On the one hand, the development of office space might exert some pressure on residential space, thereby pushing prices up (always relative to the reference

scenario), and reducing the number of households. On the other hand, the increased economic activity in the center would in itself attract some people who wish to live near it. Only average income is projected to increase (by 20%), together with residential built-up area (by 5%).

Table II-3 presents, for each of the three alternative scenarios, the changes relative to the reference scenario, and the absolute numbers associated with these changes.

Table II-3 – Sao Paulo Center: Four Scenarios for 2010

| | Reference | | Housing | | Cultural | | Business |
|-----------------|-----------|--------|---------|--------|----------|------|----------|
| <i>People :</i> | | | | | | | |
| Households | 25,000 | +25% | 31,250 | -20% | 20,000 | +0% | 25,000 |
| Pers/households | 2.20 | +25% | 2,75 | -10 | 1.76 | +0% | 2.20 |
| Population | 55,000 | (+56%) | 85,940 | (-36%) | 35,200 | (0%) | 55,000 |
| Workers | 30,000 | +20% | 36,000 | -20% | 24,000 | +0% | 30,000 |
| Income | 1,280 | -20% | 1,024 | +20% | 1,536 | +20% | 1,536 |
| Vacancy rates | 32% | -30% | 22% | -10% | 29% | 0% | 32% |
| Resid. area | 2,500 | +20% | 3,000 | -20% | 2,000 | +5% | 2,600 |
| <i>Jobs :</i> | | | | | | | |
| Employment | 222,000 | -10% | 200,000 | -20% | 178,000 | +30% | 289,000 |
| Comm. area | 7,400 | -10% | 6,700 | -20% | 5,900 | +30% | 10,400 |

Sources and notes : Table II-2 for the reference scenario ; for each of the other scenarios, the variation relative to the reference scenario is an informed judgment justified in the text, and the absolute number is calculated from this variation.

The three alternative scenarios appear quite contrasted. In terms of people, the population associated with the housing scenario is more than twice as high as that associated with the cultural scenario. In terms of jobs, the business scenario implies 50% more employment than the housing scenario. Each of these scenarios has its merits and its desirable features, as well as its drawbacks, and the choice between them is of a political nature. This choice, however, can perhaps be facilitated by estimates of the economic benefits associated with these scenarios.

III – The Benefits Associated with the Scenarios

It is not easy to assess the economic benefits associated with the scenarios for the rehabilitation of Sao Paulo center. Obviously, the notion only makes sense for the three policy scenarios. Each of them implies a policy cost (of US\$ 200 million) –relative to the reference, or no-policy, scenario. Each of them also implies a policy benefit –again, relative to the reference

scenario. It is proposed here to estimate these benefits by means of the impacts of each scenario on the effective size of the Sao Paulo labor market and its likely consequences on the economic efficiency of the agglomeration.

A – Intra-urban Location, Labor-Market Size, and the Efficiency of Cities

Within a given country, the economic efficiency of a city, measured as output per worker, is a function of the size of the city. It could be argued that this relationship reflect the fact that larger cities are more than smaller cities specialized in high-productivity sectors. But in fact the relationship holds true even when one eliminates the effect of industry-mix. The relationship between size and productivity has been observed and measured for many countries, and holds for Brazil, as shown in Annex B.

An explanation of this relationship is proposed by Prud'homme and Lee (1999). They argue that what matters is not merely the size of the city, or the total number of jobs in the city, but the *effective* size of the city labor market.

The effective size of the labor market is defined from the viewpoint of workers or of enterprises. From the viewpoint of workers, it is the average number of jobs that can be accessed in less than n minutes, with n=60 for instance¹. From the viewpoint of enterprises, it is the average number of workers who can come to work in less than n minutes. It is obvious that the effective size of the labor market in a city like Sao Paulo is lower, perhaps much lower, than the total number of workers or jobs. In 2000, there are about 5,800,000 jobs or workers in the metropolitan region². However, none of these workers has in practice (i.e. at a reasonable time and money cost) access to all these jobs, and some, particularly those situated in the periphery have in reality access to a much smaller number of jobs. Similarly, none of the enterprises has access to all these workers.

¹ The city is divided in m zones. For a given zone i, one identifies all the zones j for which the commuting time from i to j is less than n minutes, and adds the number of jobs offered in these zones : this is the effective size of the labor market for zone i. The same is done for all zones. The effective size of the labor market for the city is the weighted average of all these values, with the number of workers in each zone used as weights.

² According the the origin-destination transport survey undertaken in 1997.

It is easy to see why a larger effective size of the labor market leads to a higher output per worker. It enlarges the choice of jobs and of workers. The larger this size, the greater the likelihood that each worker will find the job that suits him/her best, in which he/she will most effectively. In a very small labor market, for instance, a highly specialized person will probably not find the highly specialized job that would maximize his/her output, and accept a less qualified, less-paying, job. Symetrically, for enterprises, the larger the effective size of the labor market, the greater the probability to find exactly the type of workers needed. In short, effective size improves the "matching" function of labor markets.

This theory is supported by empirical analysis. In a recent paper, Manning (2002) shows that wages are (all other things equal) a function of commuting distances. Going further, that is enlarging one's choice of jobs, means finding a better job and obtaining higher wages. Prud'homme and Lee (1999) found a good correlation between the effective size of the labor market and the productivity of cities on a (very small) sample of Korean cities, and on a sample of French cities. They estimated the elasticity of productivity to effective size of the labor market to be around 0.18. This means that a 10% increase in the effective size of the labor market produces a 1.8% increase in the productivity of the city.

What determines the effective size of the labor market in a city? Three factors. One is obviously the size of the city. A second is sprawl, defined as the average distance of all jobs to all workers. The third is speed, the speed at which workers commute to their jobs. The higher the speed, all other things equal, the larger the labor market size. The higher the sprawl, all other things equal, the smaller the labor market size. These rather obvious statements are borne out by the regression analysis conducted on 23 French cities by Prud'homme and Lee (1999), that produced estimates of the elasticity of the effective size of the labor market to city size (+1.0), to sprawl (-1.3) and to speed (+1.6). The very efficient city is therefore a very large city, which is very compact, and in which commuting is very rapid. In a low income country, a fourth factor could also play a key role: income and income distribution. Money, not only time, could limit the effective size of the labor market. Fortunately, in the case of Brazilian cities, the *vale transport*, that subsidizes costly trips for low wage earners, makes it possible to ignore this fourth factor.

This analysis can be utilized to estimate the economic impact of the various scenarios for the Sao Paulo center. These scenarios modify the spatial allocation of jobs and workers—in other words: the degree of sprawl—in the metropolitan region. They therefore modify the effective size of the labor market of the Sao Paulo region, and consequently the output per worker of the entire area. Admittedly, the impact upon the effective size of the labor market will be small, and the impact upon productivity even smaller. But even a very small impact upon productivity, that is output, in an area that produces around 100 billion dollars, can represent a large amount of income.

B – Impact of Various Scenarios for the Rehabilitation of the Center on the Size of Sao Paulo Labor Market

The starting point of the analysis the impact of the scenarios on the effective size of the Sao Paulo labor market is the origin destination transport survey undertaken in 1997 by the Sao Paulo subway enterprise¹. This survey considers the entire metropolitan region, which is the relevant area for transportation analysis and for labor market analysis. The area is divided into 389 zones. The center itself (as defined in this paper) consists of six origin-destination zones, zones 1 to 6. The number of workers, and of jobs, in each of these 389 zones are estimated. We therefore have a vector of jobs $[J_i]$ and a vector of workers at their place of residence $[W_i]$. We also have a 389×389 matrix of transport times from zone i to zone j $[T_{ij}]$.

From scenarios to vectors – The first task is to translate the scenarios into the language of this analysis, i.e. to associate a vector of jobs and a vector of workers to each of the scenarios. To do this, a few of assumptions are made.

One is that the total numbers of jobs ($J = \sum_i J_i$) and of workers ($W = \sum_i W_i$) are assumed to be constant, and equal to the numbers observed in 1997². This assumption is based on the fact that total employment remained practically constant over the past decade. A similar trend for the coming decade is not unreasonable. Anyway, this assumption probably does not matter much for our purpose because we are not interested in the change over time of the size of the labor market. We are interested in comparing the

¹ Similar surveys were undertaken in 1987 and 1977, although with a different zoning.

² $J=5,809,198$ and $W=5,841,214$

impact upon labor market size of various scenarios for one part of the area. The error made, if any, will be of a second order and can be assumed to be negligible. This is a case of weighting correctly with incorrect scales.

A second assumption is that the spatial allocation of these jobs and workers will remain basically unchanged, except of course for the changes under study in the center. This assumption is certainly questionable. The general patterns of spatial dispersion observed in the past are likely to prevail in the future (and were hypothesized to do so in the building of the reference scenario). However, the "second order" argument presented above remains true here. The error made because of this assumption will be made for each of the scenario, and will in practice not affect the differences between scenarios that are of interest to us.

A third assumption is that the share of each of the six origin-destination zones in the total number of workers or jobs in the center remains constant. Our scenarios include numbers of jobs and workers for the entire center. These numbers are allocated to the six zones pro rata the importance of each zone in 1997. Not only is this assumption reasonable, but it does not influence the results very much, because these six zones are small, next to each other, and at very similar time distances from all other zones. Finally, for all the other zones, the remaining number of jobs and workers are allocated pro rata the number of jobs and workers in each zone in 1997. Annex C presents the procedure utilized in a more formal way.

From vectors and O-D times matrix to effective labor market sizes – The second step is to calculate the effective size of the labor market associated with each of the scenarios for 2010. The origin-destination times matrix needed to do that is assumed to be the one that was produced in the 1997 transport study. In other words, the times it takes to go from zone *i* to zone *j* in 2010 is assumed to be what it was in 1997. This assumption is of course questionable. For certain links, transport improvements will hopefully reduce these transport times; for other links, the lack of transport investments might unfortunately increase them. Yet, the errors that will be made on this account probably do not matter much for our purpose, which is to compare scenarios. These errors will be similar for every scenario, and differences between scenarios will remain meaningful.

More worrying is the fact that we were unable to obtain the full 1997 O-D transport time matrix¹. We only obtained a partial matrix. The full matrix would have about 151,000 cells (389 zones * 389 zones). The partial matrix available has trip times for only about 31,000 cells. The vectors of jobs and workers are also incomplete: the number of jobs is given for 361 zones (instead of 389), and the number of workers for 372 zones (instead of 389). Table III-3 gives the estimates of the effective size of the Sao Paulo labor market produced with this data.

The meaning of these numbers is the following. On average, a worker located anywhere in the Sao Paulo metropolitan region has access to about 1 million jobs in less than 60 minutes, and 1,4 million jobs in less than 90 minutes. An enterprise located anywhere in the region has on average access to about as many workers.

Table III-1 – Effective Sizes of Sao Paulo Labor Market in 1977 and in Various Scenarios for 2010

| | 1977 | 2010 Reference | 2010 Housing | 2010 Cultural | 2010 Business |
|--------------------------|-----------|-------------------|-----------------|------------------|------------------|
| For workers | | | | | |
| at 60 min. | 985,460 | 976,071 | 974,103 | 967,944 | 986,327 |
| at 90 min. | 1,394,997 | 1,377,728 | 1,372,857 | 1,363,047 | 1,397,580 |
| For enterprises | | | | | |
| at 60 min. | 989,037 | 979,711 | 977,789 | 971,632 | 989,874 |
| at 90 min. | 1,401,237 | 1,384,231 | 1,379,515 | 1,369,755 | 1,103,719 |
| Source : Own calculation | | | | | |

The data utilized, however, leads to an underestimation of the effective size of the Sao Paulo labor market. When we calculate the size of the labor market at 60 minutes for a given zone i from the viewpoint of workers for instance, we add the number of jobs in the zones j which can be reached in less than 60 minutes from i. Not having the trip time for all the zones j, we miss some of them, and ignore the jobs that the missed zones offer.

It is not possible to know the magnitude of this underestimation. It might not be as important as one could fear because the 31,000 cells for which we have information are not randomly selected. They are probably those for which transport flows are more numerous, and those for which the trip times are smaller, ie most likely to be under 60 or 90 minutes. Moreover, and this is what

¹ The 1997 O-D survey, and the full matrix that was developed on the basis of this survey, belong to the Sao Paulo metro, that did not want to communicate it.

matters for our purpose, this unknown estimation bias is likely to be the same for all scenarios. Relative differences in effective labor market sizes between our scenarios should therefore be meaningful. The numbers reported in Table III-2, about these differences, are therefore much more trustworthy than the numbers in Table III-1 above.

Table III-2 –Changes in the Effective Size of Sao Paulo Labor Market in 2010, Relative to the Reference Scenario, for Three Policy Scenarios

| | Housing scenario | Cultural scenario | Business scenario |
|-------------------------|------------------|-------------------|-------------------|
| For workers | | | |
| At 60 minutes (in %) | -0,20 | -0,83 | +1,25 |
| At 90 minutes (in %) | -0,35 | -1,07 | +1,80 |
| For enterprises | | | |
| at 60 minutes (in %) | -0,20 | -0,82 | +1,24 |
| at 90 minutes (in %) | -0,34 | -1,05 | +1,75 |
| Summary estimate (in %) | -0.25 | -1.00 | +1.50 |

Source : Table III-1

The meaning of these numbers is the following. Relative to the reference scenario, the housing scenario implies a reduction of 0,20% of the effective size of the labor market at 60 minutes for the entire metropolitan region. The numbers do not differ much between the viewpoint of workers and of enterprises. They are higher, however, for the 90 minutes measure than for the 60 minutes measure. A summary estimate, to be used later, is provided.

The story told by Tables III-1 and 2 is quite clear, and important. First, the 2010 reference scenario for the center, that is the likely trends in the absence of specific rehabilitation policies, will (all other things constant) lead to a decline of about 1% in the effective size of the labor market of Sao Paulo metropolitan region relative to the 1997 situation. Let us repeat that this is true all other things constant. Changes in locational patterns outside the center, or changes in the transportation system, would also have an impact –positive or negative– on the labor market size, but such changes are not considered in this study which is focussed on the implications of city center scenarios.

Second, relative to this reference scenario, two of the policy scenarios for the center (the housing and cultural ones) lead to a decline in the effective labor market size of the metropolitan region (of about 0,25% and 1% respectively). Only the third policy scenario, the

business scenario, that manages to increase the number of jobs in the center and to keep constant the number of people and workers, achieves an increase in the size of the labor market of about 1.5%.

All of these changes might appear trivial. In reality, they are not. Because of the relationship between the effective size of the labor market and the average productivity of the area, and because of the absolute size of the Sao Paulo area, these small changes in labor market size mean large changes in the output of the region. It goes without saying that, with the number of workers constant, a n% increase in productivity means a n% increase in output. These increases are estimated below.

C – Impacts of the Various Scenarios upon the Output of Sao Paulo

To translate these changes in the effective size of the labor market into changes in output, two parameters are required. One is the elasticity of productivity to effective labor market size, the other is the output of the Sao Paulo metropolitan region.

Table III-1 presents three estimates of the elasticity of productivity to the effective labor market size. This is not a large sample, and not a very good one to produce a number for Sao Paulo metropolitan region. The study on French cities, or rather agglomerations, is based on a meaningfully large number of cities, but many of them are rather small when compared to Sao Paulo, and we do not know whether what is true for France can be extrapolated to Brazil. Korean cities would be much more like Brazilian cities in terms of size and structure. But data was available for only three of them. The analysis performed on Brazilian metropolitan regions does not use the effective size of the labor market as explanatory variable (which is not available), but total employment. This is likely to produce an elasticity which is lower than the elasticity of productivity to the effective size of the labor market. The reason is that differences in total employment in Brazilian cities are most probably larger than differences in effective size of labor market. The number produced, 0.15, is therefore a lower bound for the elasticity wanted. All things considered, it seems reasonable to use 0.20 as our basic estimate for Sao Paulo, with 0.15 and 0.25 as alternative numbers.

Table III-3 – Estimates of Elasticities of Productivity with Respect to Effective Labor Market Size

| Case | Elasticity | Explanatory variable |
|---------------------------|------------|----------------------|
| 23 French cities | 0.13-0.15 | ESLM at 30 min. |
| 3 Korean cities | 0.24 | ESLM at 60 min. |
| 9 Brazilian metro regions | 0.15 | Total employment |

Note : ESLM = effective Size of the Labor Market
Source : Prud'homme & Lee 1999 for French and Korean cities, Annex B for Brazil

The output of the Sao Paulo metropolitan region is hard to find. For 1997, the GDP of the metropolitan region was estimated to represent 18.3% of the GDP of Brazil. This number must have declined in the subsequent years. Let us assume that it was 18% in 2000. Since the GDP of Brazil was equal to 588 billion dollars in 2000, this would put the GDP of Sao Paulo metropolitan region at 106 billion US\$.

It is then easy to figure out the output change induced by a particular scenario, relative to the reference scenario. This is done in table III-4.

Table III-4 – Changes in Sao Paulo Region GDP Generated by Various Scenarios for the Center

| | (In million US\$/year) | | |
|-------------------------------|------------------------|--------|--------|
| | e=0.15 | e=0.20 | e=0.25 |
| Housing sc. / reference sc. | -40 | -53 | -66 |
| Cultural sc. / reference sc. | -159 | -212 | -265 |
| Business sc / reference sc. | +238 | +318 | +397 |
| Reference sc / 1997 situation | -159 | -212 | -265 |

Source : Own calculation

Consider for instance the housing scenario. We established that it induces a 0.25% decline in the effective size of the labor market of the metropolitan region. With an elasticity of output to labor market size of 0.20, this means that output will decline by 0.25×0.2 , or 0.05%. This is not much, but applied to an output of 106 billion US\$, it means a decline of 53 million US\$. Table III-4 indicates the output changes associated with the three policy scenarios and three alternative elasticities. It also indicates the output change implied in the reference scenario relative to the 1997 situation.

It is important not to misunderstand the meaning of these numbers. They are not forecasts, and do not take into account the likely changes in productivity –and therefore in output– that technical change, or industry-mix changes, will bring about. Neither do they take into account changes in the location of employment and labor

force outside the city center, although such changes will certainly occur, and have an impact upon productivity. They also ignore changes in transportation times that are also likely to occur, and modify productivity. The numbers of Table III-4 assume all these productivity factors constant, and estimate the impact upon output of the spatial changes in the center associated with three policy scenarios. The increase or decrease in output caused by these scenarios relate to the entire metropolitan region, not merely the Sao Paulo municipality, although about two-thirds of these changes will probably take place in the municipality.

Several important conclusions emerge from these results. The first one is probably the magnitude of the output changes, which are measured in hundreds of million US\$ per year. What happens in the center matters very much. A 20% decrease or increase in the number of jobs in the center or in the number of workers living in the center, has a significant impact upon the effective size of the metropolitan labor market, and this in turn has a sizable impact upon the productivity of the area, and hence upon its output. The magnitude of yearly increases or decreases is comparable with the amount of the investment which is considered for the rehabilitation of the center. As mentioned above, these potential benefits or disbenefits are for the metropolitan region as a whole; we do not know exactly what share accrue to the municipality area, but this share is likely to be substantial, probably close to the share of the municipality in the metro area, around 70%.

A second conclusion is that the likely continuation of the degradation of the center, embodied in the reference scenario, implies serious output losses, relative to the 1997 situation. If nothing is done, the productivity of Sao Paulo will diminish by 0.2% because of jobs and workers leaving the center. This does not sound much, but it means about 200 million US\$ forgone every year. Trying to stop or reverse this trend is or should be a major policy objective.

A third conclusion, however, is that not all policies for the "rehabilitation" of the center will be good for productivity and output. The housing scenario, and even more so the cultural scenario, contribute to decrease output further. They make matters worse. By failing to keep jobs and workers in the center, or even by contributing to kick them out (relative to the no-policy reference scenario), they reduce the effective size of the

labor market for the entire area, thereby reducing productivity and output.

The fourth conclusion is that the business scenario has a major pay-off. Relative to the no-policy reference scenario, it increases output by about 300 million US\$ every year. If it could be implemented, it would indeed reverse the declining trend. The main feature of this business scenario is a 30% increase in the number of jobs in the center relative to the reference scenario). Much should be done to achieve this goal.

IV – Conclusions

Several points emerge from this study. The Sao Paulo metropolitan region, for long the engine of Brazilian economic development, is in trouble. It still is the most productive region of the country, but its comparative advantage is rapidly declining. The area, which has the highest rate of unemployment of all metropolitan regions, is no longer attracting people from the rest of Brazil. An obvious explanation is the magnitude of the de-industrialization shock suffered by Sao Paulo, one of the most brutal ever experienced worldwide. Another explanation is likely to be the spatial development patterns –in short the sprawl– experienced by the region.

In terms of jobs and people, the municipality of Sao Paulo is doing much worst than the metropolitan region. Within the municipality, the central districts are doing much worst than the peripheral districts. And within the central districts, the center of the city is doing worst.

As a result, the effective size of the labor market is shrinking. The number of jobs that workers in the region can access in a given amount of time (say one hour), or the number of workers that enterprises in the region can have access to, are most probably diminishing. The increasing average distance of all jobs to all workers is not compensated by increasing transport speeds. This shrinking of the effective size of the labor market affects the productivity of the metropolitan region. It also makes the much needed structural adjustment more difficult and more slow.

The rehabilitation of the Sao Paulo center has to be seen in this context. If it succeeds in keeping jobs and workers in the center of the city, it will (all other things constant) increase the effective size of the metropolitan labor market, and therefore the productivity

and the output of the region. This will be a major economic benefit of the rehabilitation.

The study has attempted to put numbers on these concepts. It has constructed four scenarios for 2010 for the center. One is a no-policy reference scenario, that describes what is most likely to happen in the absence of strong specific policies. The three policy scenarios each cost about 200 million US\$. They are: a *housing* scenario, that puts the emphasis on housing, particularly low income housing; a *cultural* scenario, that focuses on conservation, beautification, culture; a *business* scenario, that aims at retaining and attracting enterprises and jobs in the center. The effective size of the regional labor market associated with each of these scenarios for the center (all other things constant) is then estimated. Differences are then translated into productivity and output differences. This is done with the help of elasticities of productivity with respect to effective size of the labor market which have been estimated elsewhere (and also of the elasticity of productivity with respect to total employment estimated on the case of nine Brazilian metropolitan regions). The results are summarized in the following Table IV-1.

Table IV-1 – Main Characteristics, Costs and Benefits of Three Policy Scenarios for the Rehabilitation of Sao Paulo Center

| | Housing | Cultural | Business |
|-------------------------|---------|----------|----------|
| Jobs in the center | -10% | -20% | +30% |
| Workers in the center | +20% | -20% | +0% |
| Costs (Million US\$) | 200 | 200 | 200 |
| Benefits (Million US\$) | -50 | -210 | +320 |

Note : All numbers in this table describe differences between a policy scenario and the no-policy reference scenario

These numbers show that the rehabilitation of the center –or more precisely its nature– and the allocation patterns of jobs and workers it brings in the metropolitan area, *can* make a major impact on the economic health of the region. Space matters. The yearly benefits associated with the rehabilitation of the center appear to be of the same order of magnitude as the investment costs of this rehabilitation.

The numbers also show that some scenarios can do more harm than good. Both the housing and cultural scenarios bring negative benefits. They might bring social or cultural benefits, but they do so at a significant economic cost, not only in the form of the initial investment of 200 million US\$, but more significantly in the form of decreased productivity and output.

The rate of return of one scenario, namely the business scenario, on the other hand, appears extremely high. The increased output associated with keeping and increasing employment in the center is estimated to be more than 300 million US\$ per year in 2010 and obviously also in subsequent years. If this can be achieved with an investment of only 200 million US\$, it is a bargain indeed.

These numbers must of course be taken with a grain of salt. They are no better than the data available and utilized. In particular, there are some uncertainties on the relationship between effective size of the labor market and productivity. The elasticities utilized are based on two or three studies only, and remain fragile. The computation of the effective size of the labor market in Sao Paulo has been done with an incomplete and questionable matrix of origin-destination transport times. But all the parameters used appear plausible and reasonable. There are no obvious reasons why the numbers produced would be biased upwards or downwards. Different and better data would produce different and better estimates of benefits. But it is unlikely that they would significantly alter the order of magnitude and the main conclusions.

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Annex A – Employment in the Center

Surprising as it might be, it is hard to know how many people work in the center, and how this number evolved over time. The population census, widely utilized for population and housing, do not contain information about employment. The only two sources available seem to be the origin-destination transport surveys of 1987 and 1997, on the one hand, and data collected by the Ministry of Work from the cadaster of establishments (cadastro de empreendimentos empregadores), the so called RAIS data, on the other hand.

The RAIS data is available at the district level only for 2000. According to this source, there were 210,000 jobs in the center in 2000. This number understates the true number of jobs in the center, because it ignores employment in very small establishments and informal employment.

The same source offers similar data for the municipality (3,166,000 jobs) and the metropolitan region (4,594,000 jobs) for 2000. For preceding years, until 1992, the RAIS data takes a sample of establishments, and asks them how many employees they had each year. According to this source, there were 196,000 jobs in the center in 1992. This sample survey also yields data for the same date the municipality (2,728,000 jobs) and the metropolitan region (3,663,000 jobs).

This would suggest an increase in employment in the center between 1992 and 2000. But the number for 1992 suffers from an obvious downward bias. The sample surveys ignores enterprises that have disappeared, or changed name, in the 1992-2000 period. This bias must therefore be corrected. Fortunately, we know from the same source, the “exact” number of jobs in 1992 for the municipality (3,441,000 jobs) and for the metropolitan region (4,584,000 jobs). Relating these numbers to the sample survey numbers for the same area gives us an estimate of the bias: +27% for the municipality, and +25% for the metropolitan region. Assuming that the bias for the center is similar to the bias for the municipality, we can estimate employment in the center in 1992 by multiplying the sample survey number by 1.25. It yields 249,000 jobs. Far from increasing, employment in the center declined by about 16% in the 1992-2000 period.

Table N- 1 – Employment in the Center, Various Years, Various Sources

| | 1987 | 1992 | 1997 | 2000 | Change/yr |
|--------------------------|------|------|------|------|-----------|
| RAIS (in 1,000) | | 249 | | 209 | -2.2% |
| O-D Transport (in 1,000) | | | 277 | | |

Annex B – Exploring the relationship between city size and city productivity in Brazil

For nine metropolitan regions, the IBGE produces data on GDP and on employment. The data used relates to 1996. Data on employment is broken down into 13 categories (agriculture, transformation industries, etc.). For Brazil as a whole, there is data on both employment and GDP broken down into the 13 same categories. The data appears not to be very consistent. For the country as a whole, for instance, there is a sector called "social" that accounts for 16% of employment and for 1% of GDP, next to a "public administration" sector that accounts for 15% of employment and for 9% of GDP. For the calculation of sectoral productivity, we regrouped these two sectors. The data for Belem, which shows an exceptionally high productivity (much higher than for any other metropolitan region, including Sao Paulo) is not plausible, and Belem was dropped from the sample. Two analysis were conducted. Both are based on a postulated relationship between the productivity P of an area and the labor market size of the area W:

$$P = a W^b$$

$$\text{Log } P = \text{Log } a + b \cdot \text{Log } W$$

The first analysis regresses the GDP per worker, or apparent productivity (AP), against the number of workers (W) for eight metropolitan regions. It yields:

$$\text{Log AP} = 3.38 + 0.167 \text{ Log } W \quad (R^2=0.25 \quad F=2.025 \\ 50.709) \quad (0.117)$$

This regression suggests an elasticity of about 1.7 of productivity to size. When the size of a metropolitan region increases by 10%, the output per worker in that metropolitan region increases by 1.7%.

Part of the higher productivity of certain areas may come from the fact that they are relatively more specialized in high productivity sectors. We can eliminate this potential "bias", and capture true productivity differentials. To do this, we first calculate the expected output (EY) of each city, by multiplying the number of workers in each sector by the average Brazilian productivity of each sector. The expected output (CY) is what the city would have produced if in each of the ten sectors considered, it had produced at the average country sectoral productivity. We then compare this expected output with the actual output to get an idea of the "true", or corrected for differences in industry-mix, productivity. The difference is a measure of the additional output due to a greater than average productivity. The ratio (CP) is an indicator of relative productivity:

$$CP = Y/CY$$

CP is then regressed against the number of workers in each city. It yields:

$$\text{Log CP} = -0.729 + 0.147 \text{ Log W} \quad r^2=0.20 \quad F=1.54$$

$$(0.718) \quad (0.119)$$

This regression suggests a elasticity of productivity to city size of about 1.5, meaning that a 10% increase in the number of jobs in a city leads to a 1.5% increase in the production, and the output, of that city.

These regressions should be taken with prudence. The R2 are not very high. The T-values are low. The sample is limited. The data is not very trustworthy. Nevertheless, these regressions provide orders of magnitude that (i) are not very different from each other, and (i) not very different from the numbers produced by other studies.

The data utilized is summarized in the table below.

Table A-1 – Output, Workers, Productivity, 9 Metropolitan Regions, 1996

| | W | Y | AP | EY | CP |
|--------------|---------|-------------|--------------|----------|--------------|
| | Workers | GDP | Apparent | Expected | Relative |
| | (1,000) | (G US\$ 98) | productivity | GDP | productivity |
| | | | (\$/worker) | (G US\$) | EY/Y |
| Belem | 209 | 8.90 | 42,527 | 3.32 | 2.67 |
| Fortaleza | 590 | 9.28 | 15,730 | 10.02 | 0.93 |
| Recife | 705 | 12.53 | 17,769 | 11.83 | 1.06 |
| Salvador | 662 | 17,02 | 25,725 | 10.86 | 1.57 |
| Belo Horiz | 1,069 | 32,97 | 30,842 | 18,92 | 1.74 |
| Rio | 2,788 | 67.39 | 24,175 | 48.75 | 1.38 |
| Sao Paulo | 4,857 | 158.63 | 32,656 | 83.79 | 1.89 |
| Curitiba | 634 | 17.93 | 28,294 | 10.67 | 1.68 |
| Porto Alegre | 939 | 25.27 | 26,913 | 15.35 | 1.65 |

Source : mostly form the IBGE web site

Annex C – Allocation to the 389 Zones of the O-D Transport Survey of Jobs and Workers Associated with the Four Scenarios for the Rehabilitation of the Center

Let :

J_i = Number of jobs in zone i in the 1997 O-D survey ;

J = Total number of jobs ($J = \sum_i J_i$) ;

J_{Ri} = Number of jobs in zone i in 2010 in the reference scenario ;

J_{Hi} = Number of jobs in zone i in 2010 in the housing scenario ;

J_{Ci} = Number of jobs in zone i in 2010 in the cultural scenario ;

J_{Bi} = Number of jobs in zone i in 2010 in the business scenario ;

J_c = Number of jobs in the center (zones 1 to 6) in 1997 ;

J_{Rc} = Number of jobs in the center (zones 1 to 6) in 2010 in the reference scenario ;

J_{Hc} = Number of jobs in the center (zones 1 to 6) in 2010 in the housing scenario ;

J_{Cc} = Number of jobs in the center (zones 1 to 6) in 2010 in the cultural scenario ;

J_{Bc} = Number of jobs in the center (zones 1 to 6) in 2010 in the business scenario ;

We have, for zones 1 to 6 :

$$J_{Ri} = J_i * J_{Rc} / J_c$$

$$J_{Hi} = J_i * J_{Hc} / J_c$$

$$J_{Ci} = J_i * J_{Cc} / J_c$$

$$J_{Bi} = J_i * J_{Bc} / J_c$$

And, for zones 7 to 389 :

$$J_{Ri} = J_i + (J_{Rc} - J_c) * J_i / (J - J_c)$$

$$JH_i = J_i + (JH_c - J_c) * J_i / (J - J_c)$$

$$JH_i = J_i + (JH_c - J_c) * J_i / (J - J_c)$$

$$JC_i = J_i + (JC_c - J_c) * J_i / (J - J_c)$$

$$JB_i = J_i + (JB_c - J_c) * J_i / (J - J_c)$$

Annex D – Tax Incentives for Downtown Sao Paulo : A Menu of Options

There is a consensus on the idea of a tax incentive system to contribute to the rehabilitation of the center. It would serve two purposes : (i) send a clear signal of the political will to « do something » for the center, and (ii) make it more profitable to operate and/or live in the center. A preliminary paper, subsequently called the « proposal », has been prepared to that effect before October 2002. This annex, a first draft of which was prepared for a meeting with the Secretary of Finance in October 2002, discusses the choices that have to be made in five interrelated areas in designing a tax incentive system.

IPTU and/or ISS ? – A first issue is whether the tax incentive system should target both the IPTU (a property tax) and the ISS (a services tax), or only one of these taxes, and in that case, which one. The proposal considers both taxes (and also ITBI, a minor tax). The business community is particularly interested in tax rebates on the ISS. Yet, from a « signal » viewpoint, one tax is probably enough. It can perhaps even be better, in that it is easier to memorize and to publicize. And one tax is either less costly, or more efficient, than two. If only one tax were to be retained, the IPTU would probably be the best. It is the most « spatialized », that is attached to location, of the two. The ISS might create problems with enterprises that have establishments in the center and in other parts of the municipality : they might be tempted to cheat and to « locate » in the center some of the activity that actually takes place outside. Our own view is that a tax rebate on IPTU only is preferable.

2) *For businesses and/or home-owners ?* – A second issue is whether tax incentives should target both businesses and home-owners, or just one of these groups, and which one ? The ISS is paid by enterprises only, but the IPTU is paid by enterprises and home-owners. The present proposal is limited to businesses. Yet, encouraging people to come to, or to stay, in the center is also a major objective of the rehabilitation project. The amount of IPTU paid on residential property in the center is small relative to IPTU paid by business property : less than 10% according to our rough estimates. This means that extending the benefit of tax rebates to home-owners would not increase much the cost of the measure. Our own view is that the tax rebate should target both businesses and home-owners. Obviously, the benefit of such a tax rebate should be limited to *utilized* residential property, which would induce owners of vacant properties to rent them.

3) *For incoming and/or existing tax payers ?* – A third issue is whether tax incentives should target existing taxpayers or only incoming tax payers. The present proposal is aimed at incoming taxpayers only, that is at new investments made, in order to encourage such investments. Yet it can be argued that preventing businesses and people to leave the center is as important or more important than attracting businesses and people. This can only be done by granting tax rebates to all businesses and people. True, this gives a windfall benefit to taxpayers who would have stayed in the center in any case. But it saves on the difficult administrative task of deciding which investments in existing businesses qualify for tax rebates. It also sends a simpler, therefore more powerful, message: being in the center

is fiscally aided. Our own view is that tax rebate should apply to all enterprises and home-owners located in the center.

4) *For specific or general taxpayers ?* – A fourth question is whether tax incentives should benefit all enterprises (and people) or only some specific, deserving, enterprises (and people) ? The present proposal limits the benefits of tax incentives to particular enterprises and to “atividades econômicas estrategicamente necessarias ao desenvolvimento da area central” (art 1). It also treats differentially enterprises of different sizes, giving more to “microenterprises”, then to small enterprises, then to others (art. 5). It can also be argued that this is not justified or desirable. The decline of the center is such that the creation or development of any enterprise, not just “high tech” enterprises, is welcome. An enterprise that succeeds in the yogurt industry is better than an enterprise that fails in the 3rd generation telephone industry. In addition, high tech is in processes as much as in products, and is to be found in the most traditional sectors (in yogurt, for instance) as much as in the most “modern” ones. Our own view is that tax rebates should benefit all taxpayers and not hard-to-define “good” taxpayers.

5) *Conditional or unconditional tax incentives ?* – In the present proposal, tax rebates only benefit enterprises that increase employment, preserve the buildings where they are, and increase their tax base. It can be argued that such conditions are (i) hard to monitor, and (ii) unduly restrictive. The monitoring will be difficult. What happens, for instance, if the jobs created in year 1 disappear in year 3 ? Who will do the monitoring ? Will there be any sanctions ? How will the ISS tax base be measured over time in case of inflation ? Then, the conditions are so restrictive that it must be feared that they will be met in too few cases. In terms of visibility and image, the impact of such a tax incentive scheme will be affected. How generous and attractive will appear a system that tells businessmen: “we decrease your tax rate only if you increase your tax base” ?

The tax incentive system we would suggest is therefore the following. It would be limited to the IPTU. It would apply to residential properties (to those that are utilized) as well as to businesses. It would apply to all sectors equally, irrespective of their size or sector (subject to the constraints imposed by the progressive system being introduced). No conditions would be imposed. The amount of the tax rebate should be decided on the basis of easy-to-make simulations. Let us say it is 50%. The system would then be: *all properties located in the center benefit from a 50% rebate for 5 years on the IPTU they have to pay.* Such a system would have four advantages:

- it would be simple and easy to understand, and would send a clear signal;
- it would be easy to administer;
- it would be neutral relative to users;
- it would prevent people and businesses from moving out as well as encouraging people and businesses to move in.

The cost of such a system is easy to predict. It would be equal to 50% of the IPTU presently collected in the center –unknown to us

but certainly available. A very rough estimate, based on the information at hand, puts the cost of the proposed tax incentive scheme in 2002 at 35 MR\$.