

Productivity of Cities and Decentralization¹

Rémy Prud'homme²

July 2007

By now, more than half of the world population lives in cities, and more than two-thirds of the world output is produced in cities. The numbers for Europe and Latin America are much higher. The productivity of any given nation, and its output, and its growth, are therefore largely driven by the productivity of its cities. This makes it important to try and understand what drives the productivity of cities. Does it depend upon national, or regional, or merely local, factors ? To the extent that productivity and growth depends upon local factors, can productivity and growth be increased by appropriate local policies? And can such policies be improved by decentralization, and how ?

Drivers of productivity and development

For long, economic development –that is, the growth of output– was seen as a national phenomenon. I was measured for the nation as a whole: GDP is an indicator of the output of a country. It was thought to be influenced or determined by economic and social policies conducted at the *national* level. Nowadays, economic development is usually presented, somewhat paradoxically, as a *global* and at the same time *local* phenomenon. What sense can we make of these changing and conflicting views, and what does it mean for local governments and local policies?

Economic development is basically the result of what gets done in and by enterprises. Be they large or small, formal or informal, public or private, some enterprises manage to produce goods and services that are wanted at an input cost lower than the sales price of these goods and services. Such enterprises "add value". The sum of the value added by all the enterprises of a nation is nothing but the GDP of that nation. The sum of the value added by

¹ Paper prepared for the workshop on Decentralization and the Strengthening of Cities in Chile organized by the Chilean government and the IADB, Santiago, July 2007. The views expressed are those of the author and do not commit these institutions.

² Professor emeritus, University Paris XII (prudhomme@univ-paris12.fr)

all the enterprises of a city is the GDP of that city. To understand, and to promote, economic development, one must think of enterprises, and find out why some succeed and other fail.

The important point here is that location matters. For a given enterprise *i*, the probability of success is greater in location A than in location B. Fortunately, for a different enterprise *j*, the probability of success will be greater in B than in A.

We can go one step further by asking ourselves what are the determinants of the successful operation of an enterprise. There are at least eight such determinants:

- capital,
- labor,
- land (and more generally the physical environment),
- knowledge,
- markets,
- institutions,
- public goods,
- macro-policies.

When these inputs are available in sufficient quantity and quality, enterprises can and do develop. Modern economic analysis focused for long on only two of these determinants: labor and capital, and on how they combined in "production functions". In recent years, however, attention has been drawn to the importance of the other inputs mentioned above. This, by the way, is but a rediscovery of what had already been clearly stated two centuries ago by classical economists like Adam Smith.

These eight extended production function determinants are in turn provided, in various proportions, by different geographical entities: by the world at large, by the nation, and by the city where the enterprise is located. One can therefore produce an 8x3 matrix indicating, for each of these eight determinants the relative importance of the world, of the nation, and of the city, *for enterprises*. This matrix is presented in Table 1. The order in which the various determinants appear has no special meaning. The relative importance, as indicated by

stars, is judgmental, and an attempt is made below to justify this assessment.

Table 1 - Extended Production Function Determinants, by Source

	World	Nation	City
Capital	**	**	**
Labor	*	*	***
Land	-	-	***
Knowledge	***	*	-
Markets	**	*	**
Institutions	-	***	-
Public goods	-	*	**
Macro policies	-	***	-

Enterprises need *capital* to function and prosper. It is usually considered that capital is the most mobile of all production factors. This is in part true. For large direct investments, many international investors consider the entire world. Similarly, equity and bond markets are increasingly global. Many therefore would be tempted to say that the main source of capital is the world. This would be a gross exaggeration. Many small and even medium enterprises, not to mention informal enterprises, have no access to international capital. Most of the enterprises which are created are created by individuals with their own savings, at the place where they happen to live. Much of the growth of enterprises is financed out of their own profits, without recourse to international or even national financial markets. In other words, much of the capital that is used to produce economic development is purely local. Some is also national, because financial institutions remain predominantly national in many countries, and because information about investment opportunities and risks in a given country is still concentrated in that country.

Labor, the other determinant of neo-classical production functions, remains basically a local input. It is true that for some highly specialized skills, in finance, management or winecraft for instance, there is a world labor market. But this concerns a very limited, although critical and growing, number of workers. A given enterprise can also, to a limited extent, buy labor on the national market, and attract the people it needs. But most of the labor force utilized by an enterprise is local. What matters here is the depth and the quality of the labor market.

Land, and more generally the *physical environment*, is also a crucial determinant of the success or failure of many enterprises. This is obvious for agricultural or

mining enterprises. But it is also true for many services or industrial enterprises. Tourism enterprises, for instance, are dependent upon environmental quality. And many industrial enterprises are constrained by water availability and quality. One could argue that environmental policies conducted at the world or national levels have some impact upon such production factors. But this would be the tree that hides the forest. In reality, land and the physical environment is mostly a locally provided input.

Technology, know-how, and more generally *knowledge*, have become key ingredients of the development of most enterprises. Enterprises that are successful are enterprises that have access to modern technology. The importance of technology is not limited to firms engaged in the production of "high tech" goods and services; it is equally important for firms engaged in the production of "ordinary" goods and services. This is because technical progress concerns processes as much as products. Knowledge is provided at the world level. In some cases, it is for sale (there are patented products, and to a lesser extent patented processes); in many other cases it is for free, for whoever is capable of finding and utilizing the appropriate information. Some may be provided at the national level, which is usually in charge of higher education and research. Knowledge is not provided at the local level, except perhaps in the form of proximity to centers of learning.

The existence of *markets* for the goods and services produced by an enterprise is also a prerequisite to the success of that enterprise. For tradable goods, that is goods that can be moved, markets are national and, increasingly so, international. Transport costs are by now so low, and trade barriers have been so much lowered, that minerals and industrial goods and (to a somewhat lesser extent) agricultural goods are traded worldwide. The market of many enterprises is now the entire world. But there are also a number of non-tradable goods or services that have a local market. Hair cuts, taxi rides, or housing services are not exported out of the place where they are produced.

Modern analysis has emphasized the role of *institutions* in the process of economic development. In order to invest and take risks —and create value-added—enterprises need to know the rules of the game, to trust the law, to face a clear and stable set of incentives, to count on reasonable tax systems or labor market rules. This cannot be provided by the world at large to any

significant extent. It is not either provided locally, except for land use rules. It is therefore provided at the national level, by the national government.

No serious economist claim that all goods and services can or should be provided by the market; on the contrary, economists have identified particular goods that cannot, for various reasons, be provided by market forces alone and require some form of government intervention. These goods, often referred to as *public goods*, include pure public goods (that cannot be appropriated and privately consumed, such as national defense), goods with externalities, and goods leading to natural monopolies. The provision of these goods can and in many cases should be contracted out to the private sector, but the basic decisions must be taken by some form of government. Enterprises (as well as individuals) need public goods. Public goods, particularly infrastructures, are a determinant of their success or failure. It turns out that most (not all) of these public goods are local in nature, and must be provided by local governments. Some are national. Very few, for the time being, are international.

The last determinant of our extended production function of enterprises consists of *sound macro-economic policies*. To develop and prosper, enterprises need a good macro-economic environment: a low rate of inflation, a low rate of interest, a low tax pressure, countercyclical fiscal policies, etc. This can only be provided at the national level, or at the Economic Union level in the case of an Economic and Monetary Union, such as the one that now prevails in Europe.

Table 1 helps answer the question: is productivity and economic development driven by international, national or local forces ? The answer is that development is simultaneously a worldwide, national and local process. Some of the ingredients that explain the success or the failure of enterprises are international, others are national, yet others are local. Ranking these sources, by counting the stars in table 1 for instance, would be a futile exercise, because we cannot at this stage measure the relative importance of each of the determinants in the extended production function. In any case, this importance, as well as the relative importance of each source for each determinant, would differ from enterprise to enterprise. Nevertheless, a glance at Table 1 suggests that the three sources are important. The international level is getting more and more important. The national level has not lost its significance. But the local level,

which is in practice the urban level, is probably equally important.

Potential Role of Local Governments

What does it mean for local *governments*? Table 1 shows that five determinants of enterprises efficiency are provided at the local *level*, in part or in whole: capital, labor, land, markets and public goods. It follows that local governments, if they want to promote economic development in their own jurisdictions (and therefore in their country), should primarily try to improve the provision of these five ingredients.

This is relatively easy and obvious for *local public goods*, which are, nearly by definition, in their hands. Safety, cleanliness, water treatment and provision, sanitation, transportation infrastructure, can only be provided as a result of local governments initiatives (which does not mean they cannot and should be contracted out to the private sector, much to the contrary). Taking such initiatives is essential for economic development.

Improving the provision of *local capital* is a more difficult task for local governments. The availability of local capital results primarily from local savings and profits. There is not much that local governments can do about it, except from keeping local taxes reasonably low, and taking a friendly attitude towards business. Very much the same can be said about *land and the physical environment*. Local governments cannot increase the fertility of agricultural land (except in certain cases by irrigation schemes) or the beauty of natural landscapes (except by environmental protection measures).

The availability of *local labor*, by contrast, can be influenced by local governments, both directly and indirectly. Directly, in terms of quality, by improving the quality of education and vocational training, which is usually controlled, at least in part, by local governments. Indirectly, by improving the efficiency and the size of local labor markets.

Can local governments do something to improve the *markets* of the enterprises located in their jurisdiction? Much more than is commonly thought, particularly in developed countries. A distinction must be made between export markets (for goods and services purchased by households and enterprises located outside the city borders, often called "basic" markets) and domestic markets (for goods and services purchased by households

located within the city, also called "non-basic" markets). Local governments cannot do much to expand export markets. They can publicise the products of their city, gather and disseminate information about rest of the world markets, and help enterprises in their efforts to explore new markets. But not too much should be expected from such efforts. Finding and developing export markets is basically the business of enterprises.

Local governments, by contrast, can contribute to increase domestic markets. Domestic (or non-basic) activities are not a mere consequence of export (or basic) activities, contrary to what is assumed by the base theory. An often large –and increasing– number of the residents of many areas are "footlose". They are people whose sources of income are independent of their location and who chose to live in the area. This is the case of retired people, of people who have a secondary home in the area, of rentiers. One could add to the ranks of such people the tourists who visit the area, and the central government employees. The expenditures of all these people in the area –and therefore their contribution to the domestic market of the area– can be as important or more important than the expenditures generated by earnings associated with export activities, as shown extensively by my colleague Laurent Davezies on the case of the France. These "mobile residents", so to say, are attracted to a particular area by God-given features (such as climate) but also by man-made characteristics (such as safety) that can be produced by local government policies.

Empirical Analysis of Urban Productivity

An empirical study, conducted on 23 French cities, helps give a more concrete –and above all quantitative– content to these theoretical and abstract considerations¹. For the 23 largest French urban areas (excluding the Paris agglomeration which is so much more productive than the rest of France that it is an outliers in regression analysis), we considered productivity, defined as output per worker. Differences were significant. In part, they were explained by the industry-mix: cities specialized by chance or history in high productivity sectors had a higher average productivity. We eliminated this industry-mix component (by shift-share analysis techniques), to obtain industry mix-adjusted or pure productivity values for each agglomeration. Differentials decreased, but remained significant. How could they be explained?

¹ Prud'homme, Rémy & Lee, Chang-Woon. 1999. "Size, Speed, Sprawl and the Efficicncy of Cities", *Urban Studies*, Vol. 36, No 11, pp. 1849-58.

The size of the city appeared as a strong explanatory variable. The larger the agglomeration, the higher the productivity. This was not a surprise. The relationship between city size and economic efficiency has often been noted. The relationship, however, was not perfect, and suggested that other variables associated with urban management were also playing a role. The concept of *effective size of the labor market* proved effective to assess that role.

The effective size of the labor market is defined as the number of jobs that can be accessed in less than n minutes (let us say 30 minutes, for instance) by the workers, or, alternatively, the number of workers that can access jobs in less than n minutes. It is first calculated for a given sector of the agglomeration, then averaged for all sectors to provide a number for the entire agglomeration. This effective size of the labor market explains very well the average productivity (output per worker) of the city, controlling for the industry mix of each city. The larger the effective size of the labor market, the higher the productivity of the city. The elasticity of productivity to effective size of the labor market is about 0.18. When the effective size increases by 10%, productivity increases by nearly 2%.

The logic behind this relationship is easy to understand. A larger (effective) labor market improves the matching of labor supply and labor demand. It makes it possible for workers to have a larger choice of jobs and therefore to find more easily the job that best matches their abilities, and for enterprises to better find the kind of workers they need. Every worker is thus employed to his/her fullest potential, and therefore more productive.

Now, what determines the effective size of the labor market (L) in a given agglomeration? Logic, and econometric analysis, suggests three factors. One is obvious, and it is the city size (P) or rather the total number of jobs: the effective size of the labor market is influenced by the total potential size of the labor market. The second is the compactness (or inversely the degree of sprawl) of the city, defined as the average distance of all jobs to all enterprises (C). The smaller this distance, i.e. the smaller the degree of sprawl, the larger the effective size of the labor market, all other things equal. The third is the speed at which workers travel to work in the city (T). The faster they travel, the larger the effective size of the labor market.

$$L = f(P, C, T)$$

The econometric analysis fully supports this simple theory. All coefficients are highly significant. Figure 1 summarizes the results of this study. The numbers that appear are the elasticities of the relationship, as econometrically estimated.

Figure 1 – Efficiency of Cities



Figure 1 suggests that improving the speed at which people travel (by improving transport infrastructure, for instance) by 10% will increase (all other things equal) the effective size of the labor market by 16%. This in turn will increase the productivity of the city by nearly 3%. Similarly, reducing sprawl by 10% would increase (all other things equal) productivity by nearly 2%. These numbers, estimated on the case of French cities, cannot easily be generalized, and must be taken with care. But the message is probably quite robust: transport policies, and land use policies –which are largely in the hands of

local governments— can contribute significantly to economic development.

We used this analysis to appraise (for the IADB) various scenarios discussed for the rehabilitation of the center of Sao Paulo. In addition to a no-policy scenario, four policy scenarios were developed, that differed by the number of workers and of jobs in the Center. The total number of workers and of jobs in the agglomeration was unchanged. Speeds were assumed to remain unchanged. For each scenario, the effective size of the labor market was estimated. Table 2 presents the main features of the scenarios and the man numbers produced.

Table 2 – Effective Sizes of Sao Paulo Labor Market in 1977 and in Various Scenarios for 2010

	2010 Reference	2010 Housing	2010 Cultural	2010 Business
Scenarios :				
Jobs	222,000	200,000	178,000	289,000
Workers	25,000	31,250	20,000	25,000
Effective size of labor market :				
For workers				
at 60 min.	976,071	974,103	967,944	986,327
at 90 min.	1,377,728	1,372,857	1,363,047	1,397,580
For enterprises				
at 60 min.	979,711	977,789	971,632	989,874
at 90 min.	1,384,231	1,379,515	1,369,755	1,103,719

Source : Own calculations done for the IADB

Relative to the no-policy or reference scenario, the scenarios considered did not imply massive changes: from minus 24,000 jobs to plus 67,000 jobs, and from minus 5,000 workers to plus 6,000 workers. These changes imply changes in the effective size of the labor market that appear small at first: from minus 6,000 to plus 10,000 (in the 60 minutes case). In relative terms, these changes range from about -1% (in the "cultural" scenario) to about +1.5% (in the "business" scenario), relative to the no-policy scenario. Yet, in productivity and output terms, this is enough to produce major economic impacts. With an elasticity of 0.2 of productivity to effective size of the labor market, the -1% change implied by the cultural scenario implies a -0.2% change in productivity: applied to the 106 billion US \$ output per year of Sao Paulo agglomeration, this represents a decline of 212 million US \$ per year. Similarly, the business scenarios implies an output increase of about 320 million US \$ per year.

These numbers must be taken with caution. They are based on questionable hypothesis, and the extrapolation to

Sao Paulo of an elasticity calculated on 23 French cities is obviously heroic. But the general message is quite clear and reasonably robust. It is: (i) that the productivity of a city can be influenced by local policies, (ii) that land use policies and transport policies appear to be key, and (iii) that the impacts of these policies can be massive in terms of economic outputs, in the hundreds millions of dollars range per year in the case of city like Sao Paulo.

Decentralization and Productivity

It is therefore quite clear that the productivity of cities can be influenced by local policies. Local policies matter for the adequate provision of capital, labor, land, markets and public goods, five factors that contribute to the efficiency of the enterprises located in the city. An empirical analysis that focused on the labor market, and found that its efficiency could be increased by adequate land use and transport (one key public good) policies brings support –and numbers– to this view. The issue to be examined now is whether decentralization is likely to be associated with improved local economic policies or not. Decentralization is defined as a transfer of power and decision-making from nationally elected politicians (and the bureaucracy they control) to locally-elected politicians (and the bureaucracies they control). Three points can be made.

Information advantage – A first point is that decentralization offers an information advantage. Local politicians and bureaucrats know better than national politicians and bureaucrats what can be done in their own city in terms of capital, labor, land, markets, and public goods provision. In preparing plans and projects, they can feature in the specificities of their own town. Centralized provision of local attributes will necessarily be of the ready-made type (although deconcentration can go some way to accommodate local particularities). Decentralized provision will be of the made-to-measure type. Just as a made-to-measure suit usually fits a consumer better than a ready-made suit, decentralized provision is usually better targeted than centralized provision. In principle therefore, there is a presumption that a decentralized system will more effectively contribute to take the decisions that will favor the productivity of cities. This, however, is not the end of the story.

Questionable incentive advantage – A second point is that decentralization does not always offers an incentive

advantage. In theory, locally-elected politicians are keen to promote the development of their city and the welfare of its inhabitants because they are keen to be re-elected. In theory also, decentralization introduces some competition between cities, and this competition puts pressure on local leaders to provide the inputs required by enterprises. In practice, however, matters might be different.

In many countries, particularly in Latin America, local leaders cannot be re-elected, or can be re-elected only once —which obviously affects the incentive to do well in order to be re-elected. If the tailor knows he will not be hired again, his incentive to produce a suit that will fit well his customer will be blunted.

Then, people vote and enterprises do not. The traditional incentive mechanism pushes local leaders to do what people want, which is not necessarily what enterprises want. Yet, what matters for the promotion of productivity is mostly to do what enterprises need. For sure, in the long run, and indirectly, the inhabitants of a city will benefit from the success of its enterprises. But this is not always true in the short run, and/or in terms of perception. And elections are won or lost in the short run, and in terms of perception. We see many local leaders working hard to improve the quality of life as opposed to the business environment. The pressure of many or most NGOs, urban planners and thinkers operate in that direction.

This is what could be called the Venice syndrome. Venice is the city of beauty, of quietness, of feasts, of cultural events, of environmental quality (the no-car city). Venice is the often implicit but dominant model of a city, the goal or the dream of many urban and civic leaders. Venice is indeed a wonderful place to go to or to live¹, but it is an economically and socially dying city. It is a city with a very low productivity, where no enterprise want to settle and develop.

Local decision-makers are thus subject to ideological and political pressures to produce a city that is a place to live rather than a place to work. They have an incentive to make their city highly enjoyable rather than highly productive. To follow the fashion metaphor introduced above, it is as if the made-to-measure suit was designed not to please the real customer (the enterprises) but someone else.

¹ This author was fortunate enough to spend a sabbatical year in Venice

Technical disadvantage – Decentralized entities may know better than centralized ministries what to do, they may not know as well how to do it. A made-to-measure suit fits better than a ready-made suit only if the tailor is sufficiently good and experienced. This point relates more to bureaucracies than to politicians. But decentralization concerns bureaucracies as much as politicians. There are reasons to fear that decentralized bureaucracies are not as efficient as centralized ones: they offer less attractive carriers, in many countries they are more affected by political patronage (at the expense of merit), they cannot afford the same level of training, etc. The situation varies greatly from country to country, from sector to sector (there are sectors where technical knowledge matters less), and from city to city. In this respect, large municipalities are much better off than smaller ones. This technical disadvantage of decentralization in the provision of business-related services should not be exaggerated. Central bureaucracies also have difficulties reaching far-away small localities. And it can be remedied: by training programs, technical assistance, or recourse to private sector provision (although local governments unable to provide a service are often also unable to contract it out to a private enterprise). But this potential disadvantage should not be ignored or underestimated.

Size disadvantage – A final, but important, point relates to a frequent mismatch in large agglomerations between socio-economic realities and politico-administrative realities. The socio-economic realities that matter for the productivity of cities are largely metropolitan. This is obvious for the labor market, for most services (particularly transportation but also water and sewerage), for land use regulations, etc. Yet, the politico-administrative realities are municipal. An agglomeration usually consists of many independent municipalities.

In a centralized system, the problems can be handled more easily at the proper geographical level by the central government, even though this proper level is metropolitan and not national. This is usually what happens, particularly for the capital city or agglomeration. Not all countries go as far the British government did for many years, when it had a cabinet member in charge of London. But many central governments devote attention and resources to the planning and management of the main economic center.

What decentralization does is to strengthen municipalities. This might make it more difficult to develop agglomeration-wide policies. Each municipality develops its own land or transport policy without regard to what adjacent municipalities do. Indeed in many cases, these various municipalities engage in wild competition to attract people or enterprises or tax resources, and they do so at the expense of the overall efficiency of the agglomeration. The stronger they are, the greater the damage.

This potential negative of decentralization on productivity of agglomerations has often been noted, but not much addressed, particularly in Latin America. Most decentralization reforms ignore it. One could go as far as saying that these reforms often aim at the wrong targets: municipalities which are too small, and regions which are too large —that is too small and too large from an economic viewpoint. The remedies are not easy, but not impossible, to find. One can create, with or without the help of the central government, metropolitan institutions either global or sectoral (transport, water, education, health, etc). A more radical reform would consist in redefining the borders of the municipalities, although it is obvious that such consolidations, which imply the disappearance of many municipalities, are usually a political impossibility.

Conclusion

We have seen that some cities are more productive than others, and tried to identify the urban components of productivity. They appear to be related to five inputs, which are essential for enterprises to be efficient and to develop: capital, labor, land, markets and public services. Of particular importance are land and transport facilities that contribute to increase the size of a given labor market, and to promote productivity. All these inputs can and should be provided by policies.

Does decentralization by itself facilitate the provision of these inputs, and therefore increase the productivity of cities ? The question calls for a prudent, but largely negative, answer. In principle, it could, because it brings with it an information advantage. But this is counterbalanced by several disadvantages, in terms of incentives, of technology, and of size. The policy conclusion is that, when decentralization is politically irresistible, great efforts must be made to identify, analyze and mitigate these potential disadvantages in

order to protect if not to increase the productivity of cities.