DIALOGUE

DIAL newsletter

Editorial

From 1st January 2004, the Economic Interest Grouping (EIG) DIAL will replace the Scientific Interest Grouping of the same name, created in 1990. The two members of the EIG are the IRD (the French Institute for Research on Development), which was one of DIAL's founding members, and a new partner in the Grouping, the AFD (the French Development Agency).

This change of status is a major event for DIAL, as a mark of confidence in the quality of our work from our members and the administrations that support us (INSEE, the French Institute for Statistics and Economic Studies and MAE/DGCID, the French Ministry of Foreign Affairs General Directorate for International Cooperation and Development). By providing us with a durable organization with an independent management structure, the new status creates a suitable framework for us to develop and internationalise our research activities in the future, and to continue to multiply our partnerships in the South and in the North. The arrival of the AFD, which plays a pivotal role in official French development aid, will also strengthen our links with other players in development.

This issue of Dialogue is devoted to spatial poverty traps. The subject is a good example of the general focus of our research, which studies the current major problems in development. Similarly to the results obtained by Martin Ravaillon in the case of China, the panel data study carried out in Peru by Philippe De Vreyer, Javier Herrera and Sandrine Mesplé-Somps, found that several geographical variables had a significant impact on growth in consumption. By going one step further than research that analyses income dynamics purely in terms of individual characteristics, these studies justify the geographical targeting of poverty reduction policies.

The international conference on the theme of "Employment and Poverty", organised in Lima on 16-17 October in partnership with several Peruvian research centres, was a great success. Ten DIAL/CIPRE researchers took part. Apart from its comparative approach (Latin America – Africa), another original aspect of the seminar was that it established the link between employment and poverty - two themes that are usually treated separately - from an analytical standpoint and in terms of economic policy. The conference programme and all the papers presented can be viewed on our internet site.

Finally, two DIAL doctoral students presented their theses this autumn. The first, presented by Charlotte Guénard at the IEP, Paris, and directed by Didier Blanchet and Denis Cogneau, analyses the determining factors in evolutions of inequalities in the world in general and in sub-Saharan Africa in particular. It aims to identify the macroeconomic, but also the institutional, political and demographical reasons why this continent is the poorest and perhaps the most inegalitarian in the world. The second, presented by Mohamed Ali Marouani at the Montpellier 1 University and directed by Jean-Marie Boisson and Laurence Tubiana, looks at the links between the opening of commercial markets and employment in an imperfect labour market. The thesis presents a dynamic computable general equilibrium model of the EU-Tunisia association agreement.

SPATIAL POVERTY TRAPS

Introduction

There are very few countries without great inequalities in living standards from one region of the national territory to another, and where there is the same level of economic growth throughout the country. The most striking example of these disparities is China. The economic boom since the 1980s is the result of development in the coastal regions and has done nothing, as yet, to help the populations living in the country's inland areas to escape from poverty and under-development. Brazil is most probably just as relevant, particularly with its Nordeste region, where development comes close to levels seen in the poorest countries, compared with the rest of the country, which is characteristic of an emerging economy. Spatial poverty traps are defined as areas with high concentrations of poor people who fail to experience sufficiently strong or lasting periods of growth to put an end to their state of poverty.

By combining two factors - a high level of poverty and its persistence over time – this definition particularly poses the question of the convergence in growth rates in the different regions and the determining of the conditions required for this convergence; all spatial inequalities do not necessarily correspond to poverty traps if the regions can be seen to be "catching up". Nonetheless, it is very difficult to determine whether or not the growth paths have diverged. First of all, we must be able to understand why there are zones where poor populations are concentrated and what are the factors that prevent them or, on the contrary, allow them to escape their situation. This requires statistical data that is rarely available, and rigorous econometric methods.

In this short note, we would like to present the theoretical and methodological problems that arise when trying to identify the factors that explain spatial poverty traps. We start with a quick look at the theoretical models proposed by economic literature on the subject and then go on to describe various methodological issues. We have illustrated our presentation with the results of a study of spatial poverty traps which we carried out in Peru.

How do spatial poverty traps appear and persist?

Individualistic or geographic model?

The search for factors to explain such phenomena is not new as it goes back to the pioneers of development research. However, as Ravallion (1998) explains, the neo-classical model of micro-economic, "individualistic" growth has been predominant until recently.

Individuals with limited competencies due to insufficient endowments of private production capital live together and all together have low growth rates for income and/or consumption. Although there are increasing returns to scale on private capital, differences can be observed in growth rates in regions that are well-endowed in private capital in the first place, compared with those which are not. This is the reasoning behind the theories on development poles put forward by Myrdal (1957) and Hirschman (1958). This model has wide-scale implications in terms of public policies. It implies that migration should be favoured from poor regions to developing regions and that investments should be made in zones where there are high productivity gains and not in less-favoured zones. It is true that increases in overall national growth will be higher in this case than those obtained if the opposite is done. The choice of interventionist policies is therefore posited as a "trade-off" between more growth and less regional inequality. The model provides no explanations for the phenomenon of concentrations of poor populations (or rich ones) and above all claims that the households' well-being depends on private endowments alone in cases where there are no restrictions on migration.

This hypothesis on migration is questionable, particularly in the context of developing countries. In such countries, there can be administrative, financial, informational or cultural barriers to migration. There are some political regimes, although admittedly only very few, which prohibit migration or at least control it very strictly, such as the Chinese and Cuban Socialist regimes. Also, non-administrative barriers exist because the people

living in pockets of persistent poverty may live in remote, inaccessible areas with no decent roads and consequently suffer from heavy transport costs. In addition, they have less information on the opportunities that may be available to them in the more prosperous zones. Cultural and language barriers must not be underestimated either, as they can represent an adaptation cost and/or an unfavourable discriminating factor in the place they are immigrating to. Hence, the decision to migrate is not free of costs, particularly for the most disadvantaged households. We will come back later to the problem of migration and its impact on the understanding of the phenomenon of spatial poverty traps and the choice of interventionist public policies.

Furthermore, why exclude the possibility that individuals' well-being may depend on the geographical and social capital surrounding them? In the other case, the marginal individual return on private capital depends on the place where the individual lives. If migration is limited due to the factors mentioned above, then the regional differences will persist. There are a large number of different environmental factors and they act in different ways, but they can be broadly grouped into three categories.

Three categories of geographical factors

The first category concerns strictly geographical factors such as the climate and geological features. The latter can, for example, make farming difficult and give low yields or perhaps favour the spread of infectious or parasitic diseases which weaken people's capacities at work.

Secondly, the access to public goods and public infrastructures has long been recognized in development economics as a key factor for improving well-being and reducing poverty (particularly non-income poverty), as well as being a growth factor. A proper road network gives access to cheaper markets in the surrounding area, where local production can be sold and better inputs purchased. Supply of drinking water and electricity should improve individuals' health and, for a given level of education, enable increased output as more profitable production techniques could be used, for example. Access to public education promotes the dissemination of knowledge and consequently the accumulation of human capital on an individual basis; this mechanism is in line with the individualistic model described above. However, by increasing the average level of education, the provision of schooling can also generate externalities. This brings us to the third category of environmental factors, that is the socio-demographic breakdown of the communities in which the individuals live and work.

The mechanisms for transmitting socio-demographic factors can be complex. The following are just some examples. Densely populated zones, or ones with a high average level of education favour quicker circulation of information and knowledge, together with diversity of preferences and larger markets, leading to so-called pecuniary positive externalities (Krugman, 1991, 1995). On the contrary, the lack of diversity and education in the local population and the emergence of community-based ghettos like the ones observed in the black quarters of American cities can be the source of negative externalities (Borjas, 1995; Bénabou, 1996). These can be explained by the fact that these populations are stigmatised, leading to negative discriminations on the labour market; they also come from phenomena such as imitation and community-based identification, which prevent emancipation by reproducing community references. Some people claim this system of reproduction with pride, but in most cases they are subjected to it against their will. If we take a few examples of developing countries, living in outlying "ethnic" suburbs prevents people from learning the official language properly; new techniques are not adopted in village communities because the inhabitants are too anxious to fit into the community's norms. On the other hand, it was recently shown that communities with a low level of ethnic diversity are better at organising themselves and getting on with each other, meaning that they improve the availability of public goods in their area and manage them better (Miguel and Gugerty, 2002). This demonstrates possible interactions between the different environmental factors that have an impact on the productivity of private production factors.

Finally, we should note that it is possible that the emigration of populations from the disadvantaged areas to areas more favourable to development also causes spatial poverty traps to persist: if the most competent and dynamic elements leave, this can lead to or increase the unfavourable socio-demographic factors that we have just described.

Methodology

The search for the origins of spatial poverty traps is a subject that has recently appeared in literature on applied economics, particularly following work by Ravallion. The aim is to identify the geographical factors that may possibly have an impact on the marginal productivity of production factors. In practice, this consists in regressing the growth rate in household consumption or income on these geographical factors, whilst controlling the effect of other observable factors specific to the household and its members (education, household structure, sector of employment, etc.). Several difficulties make this research somewhat delicate.

Obtaining "good" data

First of all, this research requires a set of data which is rarely available in practice, even in developed countries. Measurements of growth at a disaggregated level are based on data from household budget surveys. These surveys must be panel-based if the analysis is to made at the household level, or if this is not possible, must enable the constitution of pseudo-panels, where the observation unit is the geographical zone in which evolutions in the inhabitants' average consumption is being monitored. The measurement of "geographical capital" should preferably be based on specific surveys carried out in the communities themselves (surveys of local municipalities, for example) or on population censuses. Failing these sources of data, household surveys can be used to build community indicators of available geographical capital, but this information, built up from a limited number of samples, is likely to be flawed by a number of measurement errors. On the other hand, it does have the advantage of being constructed at the same time as the data gathered from the households, whereas community surveys and censuses can sometimes have been made some time before the household surveys. Assuming that we have all the data necessary, it must still be matched, i.e. the information gathered from the households must be compared with that concerning geographical capital. Other difficulties appear at this level. Household surveys usually keep track of the place where the interviewees live, but the measurements of geographical capital made using community surveys or censuses, or even household surveys, are generally attached to administrative units which may represent very diverse geographical entities from the point of view of households' access to public services and infrastructures or of geographical environment.

Eliminating the "undesired" effects

Secondly, once the data base has been built up, the econometrician's work is to imagine a way of making a distinction between what we identified earlier as the individualistic model and the geographical model. This distinction is difficult to make because if there are no restrictions on the households' mobility, it is easy to imagine situations in which an apparent effect of geographical capital in fact results from the grouping together of individuals with special characteristics. For example, if a famous economist decides to set up a research centre in a particularly sunny city renowned for its *cassoulet*, other handpicked economists may be tempted to join him. The city will then be noted for its lively activities in economics research. But is this due to it being a sunny place where they eat wonderful *cassoulet*, or to the quality of the economists who live there?

The problem stems from the endogenous location of households and individuals. There are two ways of dealing with this. The first solution is probably the most satisfactory, but also the most difficult to implement. It consists in specifying and estimating a model for the households' choice of location at the same time as the model for growth in consumption or income. This so-called "structural" approach is satisfactory from an intellectual point of view as it uses all the information available. The problem is that, precisely, the information available may not be sufficient to undertake the task. Econometricians run the risk of exhausting themselves in trying desperately to estimate a model with data that does not allow

this. The second, so-called "semi-structural", solution consists in limiting the econometric estimation to the growth model, but also taking into account unobserved characteristics of the households and communities of residence, which may help simultaneously to determine the geographical capital as it has been measured and the growth rate for consumption or income. If we go back to our example, the migration to the best place in the world for *cassoulet* might be explained by the researchers ability to build original models for industrial economics and, at the same time, by a significant increase in income. As econometricians cannot control the impact of this generally unobserved ability, they run the risk of concluding that the significant increase in income is due to the frequent eating of *cassoulet*. In this approach, we can see that the individuals' unobserved abilities are "undesired parameters" that must be eliminated without delay.

In circumstances such as these, econometric practice is usually to work with "primary differences", if the data enables this of course. The principle is as follows: if a fixed factor, let's say a particularly great ability to do a certain type of work, explains that an individual has a higher growth in income than everybody else, all other things being equal (i.e. that we are comparing individuals of the same gender, age, education, etc.), it can be assumed that this factor does not have an impact on the difference in growth rates between two dates. For example, let's imagine that a group of particularly bright individuals increases its income by 3% every year, whilst other people's grows by 1%. For the two groups of people, the difference in growth rate between two dates is nil. Thus, by regressing the difference of growth rates observed over two distinct periods on the difference in explanatory variables measured on these two dates, we are able to "weed out" the undesired parameter, i.e. the individuals' unobserved abilities. The disadvantage of this method is that if the factors explaining income growth do not vary over time, the establishment of primary differences will indeed result in the elimination of the undesired parameter, but also of the effect of these factors. And yet, a large number of geographical factors are, by nature, invariant over time, such as for example, the altitude or latitude of the place of

residence. Another method of estimation must therefore be found if we wish to assess the impact of geographical factors on growth, whilst controlling the effect of the households' unobserved characteristics. The solution adopted in a certain number of studies consists in assuming that the undesired parameter does not modify the average level of growth rate, but the ability of the individual or the household to react to exogenous shocks suffered by everyone. In this way, the way in which the individuals' unobserved abilities affect growth in their income depends on the nature of the macro-economic shock suffered. As in principle these shocks are not of the same magnitude or the same sign from one period to another, it is therefore possible, using this information, to free the model from undesired parameters whilst still retaining the possibility of identifying the impact of the invariant variables over time.

The example of poverty traps in Peru

Peru is an example of an economy where there are significant differences of living standards and growth depending on the place of residence. Traditionally, the country is subdivided into three distinct zones: the coast, the region covered by the Andes cordillera, called *sierra* and the region covered by the Amazonian forest, called *selva*.

Previous studies show that poverty is mainly concentrated in the sierra and the selva, which present a rate of poverty from two to seven times higher than coastal regions[1]. Over half of those suffering from extreme poverty live in the rural sierra, whereas less than a quarter of the population lives in this region. However, it appears that the large differences in terms of living standards and growth are even stronger inside the regions themselves than between the different regions. There are "small" pockets of poverty next to more prosperous zones and not entire zones that are significantly under-developed.

The question is therefore to identify the factors that explain these differences. We examined

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[1] Depending on whether you consider poverty, defined as having an income that does not enable the satisfaction of basic needs in terms of food, housing, education, health, etc., or extreme poverty, defined as having an income that does not enable individuals to eat to their fill.

this issue in a recent working document (De Vreyer, Herrera and Mesplé-Somps, 2002) which provides some relatively clear-cut conclusions (see table below)[2].

A first significant result is that the geographical factors do have a role to play, therefore challenging the conclusions of studies that analyse living standards dynamics solely in terms of individual characteristics. However, and contrary to what we could have expected in such a rugged country, it is not the "pure" geographical variables, such as altitude for example, which best explain the differences in growth, but rather the socio-economic factors such as population density (with a positive impact), the percentage of individuals working in the informal sector, the unemployment rate or the proportion of old people in the population (three variables with a negative impact)[3]. Similarly, the negative impact of problems with water supplies or connection to sewerage systems seems to be highlighted through the rate of prevalence to digestive illnesses, as households living in places where this rate is high have lower individual productivity rates.

The results also show that communities with the lowest percentage of Christians are also those with the lowest growth rates, all other things being equal. The dominant religion in the community, together with the proportion of inhabitants with Spanish as their mother tongue, have been included in the list of the model's explanatory variables to take into account possible discriminations that may be suffered by the native minorities. The results suggest that such discriminations do take place, even though we expected the mother tongue to be more significant rather than the religion. However, there is another possible explanation, relating to the more or less efficient way in which the different communities are managed, as this can vary depending on the origin of the population in question and the way in which the process of

colonisation took place. The data available did not enable us to explore this possibility, which will be the subject of future research.

Our results are in line with those obtained by Jalan and Ravallion (2002) for China. Their study used an identical estimation method to ours, and highlighted the significant impact of a large number of geographical variables on consumption growth. In particular, living in a mountain area or one with an above-average infantile mortality rate appeared to have a negative effect, whereas the number of doctors per inhabitant, the percentage of the active population working in commercial activities or the number of kilometres of road per inhabitant have a positive effect. On the other hand, the population density and the illiteracy rate for people of 15 and over, do not have a significant impact.

Estimated impact of geographical variables on consumption growth in rural areas in Peru – 1998-2000. (geographical unit = district)	
"Pure" geographical characteristics	
- Altitude (unit = 1000 metres)	0,036
- Altitude > 2000 (indication)	-0,056
- Distance to the equator (unit = 1000 km)	0,113***
- Distance to the provincial capital (unit = 10 km)	-0,005*
Infrastructures	
- Density of road network in district	0,923
- % of paved roads	-0,012
- Number of doctors by inhabitant	0,034
- Percentage of households with access to public water distribution network	-0,010
- Percentage of households with access to public sewerage system	0,211**
- Percentage of households with access to electricity	-0,116**
Socio-economic and demographical characteristics	
- Population density (in thousands of inhabitants per km²)	0,236*
- Percentage of Catholics	0,901***
- Percentage of Protestants	1,322***
- Percentage of population with Spanish mother tongue	0,054
- Percentage of inhabitants over 65	-1,748***
- Percentage of active population working in primary sector	0,000
- Percentage of active population working as individual entrepreneurs	-0,239***
- Unemployment rate	-0,666**
- Percentage of people with higher education	-0,367
- Percentage of people presenting a digestive illness (such as diarrhoea, typhoid)	-0,972***

*,**,*** : significantly different from zero at 10%, 5% and 1% levels respectively

Conclusion

All these results underline the inadequacy of studies that look at income dynamics purely in

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[2] The dependent variable is the rate of growth in consumption. The coefficients are interpreted as follows: an increase of 1 percentage point in the rate of prevalence of digestive diseases has the effect of lowering the growth rate by 0.97 points. The estimation method used is that of generalised moments (4-year non cylindrical panel – 1,162 households from 1997 to 1999 and 492 from 1997 to 2000).

[3] Variables measured using a census made several years before the beginning of the period studied.

terms of individual characteristics, and justify the geographical targeting of poverty reduction policies. However, the way in which geographical capital affects growth is complex. In Peru, the spatial poverty traps are more related to the villages' socio-economic characteristics and to the availability of (certain) public services than to purely geographical factors. With respect to the fight against poverty, this leads us to recommend policies which combine the traditional measures encouraging investment in private and public production capital (especially human capital) and monetary transfers, with aids to intra-regional migration (reduction in transaction costs, better circulation of information, etc.), whether it is temporary or permanent, towards the most densely populated zones. This last point is delicate. On the one hand, the study underlines the positive effects relating to the grouping of households in urban centres (positive impact of density). On the other, we also noted the negative effect of the unemployment rate and the percentage of people working in the informal sector. To put it plainly, this means that permanent migration can only be encouraged if regional urban centres grow sufficiently to offer jobs to all the potential migrants without these jobs being exclusively in the informal sector. Otherwise, it is probably preferable to encourage the households to stay in their villages of origin (which would also prevent the local population from ageing) whilst improving the transport and information networks so that they can benefit from the proximity of dynamic urban markets.

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