

NÚMERO 501

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Urbanization as a Fundamental Cause of Development

FEBRERO 2011



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Abstract

I review the current theoretical and econometric literature on the economic dynamics of urbanization and its relation to economic growth. I then report research results on the short- and long-term impacts of urbanization on human development, using Gray and Purser's 1970-2005 database on human development indicators for 111 countries. The short-term analysis is an innovative fully instrumented clustered error growth regression using both levels and changes of independent variables to predict quinquennial changes in income, health, education and urbanization. The long-term analysis is a fully instrumented quantile estimate of levels on levels of the same variables. Explanatory variables include indicators of trade, FDI, institutions and physical geography. The results show urbanization is a significant cause of growth in the short term, but with a smaller magnitude than trade, institutions and FDI flows. However, in the long-term urbanization is a stronger cause of development than trade, FDI and institutional indicators. Urbanization policies must be a centerpiece of long-term economic development policies.

Keywords: economic growth, human development, transitions, ultimate causes of growth, urbanization.

JEL classification: O11, O20, O47.

Resumen

Revisamos la literatura teórica y econométrica actual sobre la dinámica económica de urbanización y sobre su relación con el crecimiento económico. Reportamos a continuación resultados propios de investigación sobre el impacto de corto y de largo plazos de la urbanización sobre el desarrollo humano. Para ello utilizamos la base de datos de Gray y Purser de indicadores de desarrollo humano para 111 países de 1970 a 2005. El análisis de corto plazo utiliza una regresión de crecimiento innovativa, completamente instrumentada y con errores agrupados, que utiliza tanto niveles de cambios en las variables independientes para predecir cambios quinquenales en ingreso, salud, educación y urbanización. El análisis de largo plazo consiste en una estimación por cuantiles totalmente instrumentada, de los niveles de las mismas variables sobre los niveles de las variables explicativas. Éstas incluyen, además de los indicadores de desarrollo humano, indicadores de comercio, IED, instituciones y geografía física. Los resultados muestran que en el corto plazo la urbanización es una causa importante del crecimiento, aunque de menor magnitud que

comercio, instituciones y flujos de IED. Sin embargo, en el largo plazo la urbanización es, al contrario, una causa más importante que las demás. Las políticas de urbanización deben incluirse como pieza central en la política de desarrollo económico de largo plazo.

Palabras clave: crecimiento económico, desarrollo humano, transiciones, causas primordiales del crecimiento, urbanización.

Clasificación JEL: O11, O20, O47.

Introduction

Urban life has been a central factor of modernization and growth since the origins of civilization (Bairoch, 1988; Jacobs, 1969, 1984). Yet current economic policies for welfare and development mostly ignore urbanization as a policy focus. Since the advent of the neoclassical revolution, research and policy has mostly focused on how the action of markets can result in economic growth. Researchers focusing on market policies have concentrated on the main factors that can strengthen the action of markets, such as trade and institutional frameworks, and have proposed these as the fundamental causes of long-term economic growth (see for example Rodrik and Subramanian, 2003; Rodrik, Subramanian and Trebbi, 2004; Acemoglu, Simon and Robinson, 2005). Other factors such as externalities in economic geography have received less attention, even though Krugman's work on economic geography (e.g. Krugman, 1991) received the Nobel prize. The purpose of this paper is to review current research on the relation between urbanization and economic growth and to present results showing that in the long-term urbanization has a stronger and more consistent impact on economic growth and human development than indicators of the so called fundamental causes such as trade, foreign direct investment (FDI) inflows, constraints on the executive and democracy.

The economics of agglomeration are the result of mechanisms such as externalities, scale effects and public goods (Krugman, 1991). For this reason market action and market policies are inadequate for regulating, much less optimizing, the long-term impact of urbanization on development and welfare. Developed countries have therefore long implemented a series of urban policies in place including land use regulation and public investment in transportation that have been crucial elements of their urban and economic development.

Both the theoretical understanding and the empirical investigation of the economics of agglomeration are complex. In what follows I first give a short review of the theory of urban economics, particularly in relation to economic growth, and then review empirical research on the relation between urbanization and economic growth, particularly at the cross country level. Both of these serve to illustrate the complexity of urban economics as a subject. I then present results comparing the short and long-term impacts of urbanization, trade, FDI inflows, constraints on the executive and democracy on human development indicators income, life expectancy, literacy, and gross enrolment ratio.

1. Economics of urbanization–Theory

I first review studies addressing issues of concentration and dispersion per se. Baldwin *et al.* (2003) summarize a series of models that explain the main centripetal and centrifugal forces in economic geography determining the appearance of development poles and their opposite, industrial vacuums.

One of the first models in economic geography was Fujita *et al.* (2001) “Core-Periphery” model. Firms locate in the largest markets to reduce transportation costs. Market size in turn depends on the number of residents and their income level, which in turn depend on labor demand. Three economic forces interact. Two are centripetal: the market access effect (the tendency of monopolistic firms to locate their production in large markets and export goods to smaller markets), and the cost of living effect (goods are cheaper in regions with more industrial firms because of reduced transportation costs). The third is centrifugal: market congestion (firms prefer to locate where there is less competition). Venables (1996) and Krugman and Venables (1995) study agglomeration forces resulting from vertical linkages. Diego Puga (1999) introduces an additional centrifugal force, decreasing returns to agriculture, in which symmetric stationary states are more stable.

The “Core-Periphery” model is mathematically complex, and has no closed form. Its solution almost always requires numerical simulation. There are variants of this model incorporating additional economic effects that attempt to obtain simpler models.

The Footloose Capital model (Lösch, 1940; Armington, 1969; Helpman, 1990; Krugman, 1980, 1993; Martin and Rogers, 1995; Davis, 1998; Feenstra *et al.*, 1998; Ludema and Wooton, 2000; Head *et al.*, 2002) has the advantage of mathematical tractability, but instead models a smaller set of effects or phenomena, eliminating circular causality, catastrophic agglomeration and localization hysteresis. In this model, capital migrates instead of labor. Because owners do not migrate, capital income is expended in the regions where they live. The model can analyze exogenous asymmetries between regions.

The Footloose Entrepreneur model (Forslid and Ottaviano, 2003) breaks less radically with the Core-Periphery model, modeling its key results in a tractable form. These are: (1) agglomeration through domestic market impacts (magnified by freer trade); (2) linkages through demand and cost effects; (3) endogenous asymmetries; (4) catastrophic agglomeration; (5) localization hysteresis; (6) agglomeration rents following an inverted U pattern; and (7) long-term multiple equilibria. The only cost of this simplification is that the factor that migrates only involves a fraction of the cost of production, thus weakening the centripetal forces that are represented in the model. This model has also been rendered in terms of vertical linkages (Krugman and Venables, 1995). Mori and Turrini (2005)

explore a version of the model including heterogeneity in the ability and productivity of mobile labor. In this model equilibria are never symmetrical, because workers with higher skills will locate in wealthier regions, making them even richer.

Following Krugman's (1991) Core-Periphery model, the elements of the new economic geography models consisted mainly of Dixit-Stiglitz monopolistic competition, CES utility functions, and "iceberg" transportation costs. In their place, Ottaviano *et al.* (2002) developed an alternative model based on linear production functions, which model the same phenomena but are mathematically more tractable.

Baldwin (1999) presents a Core-Periphery type model of "Capital Construction" that is more tractable and also considers that capital is constructed and depreciates but does not flow. It can be interpreted as a neoclassical growth model. Capital construction models can include global and particularly local externalities that contribute to agglomeration and generate economic growth.

Summarizing, the centripetal and centrifugal economic geography forces incorporated in these models include the following.

- A. Market access effect due to proximity. Industry concentration enlarges markets accessible at a low transportation cost and in turn provokes higher concentration.
- B. Economic specialization. Industry concentration makes the fixed costs that specialization requires, therefore increasing both the efficiency of production and agglomeration forces.
- C. Cost of living effect. In regions where industry concentrates, consumer costs reduce. This can also result in lower salaries that attract more firms.
- D. Sunk capital effect. Once capital has accumulated, it can be too costly to move.
- E. Excessive agglomeration effect. This raises competition and increases the incentives for firms to disperse, equilibrating the forces for concentration.
- F. Congestion costs. These limit the benefits of concentration.
- G. Intensity of local externalities that promote technological change in concentrated regions.

Besides issues of concentration and dispersion per se, Henderson (2005) examines a complex set of inter-related questions on systems of cities and

how they evolve, and on how urban growth interacts with national economic growth. Growth is based on knowledge spillovers and knowledge sharing, much of which occurs at the individual city level. Particularly in the early stages economic development is characterized by urbanization, where the population moves through migration from an agricultural, rural based existence to one where production occurs in cities of endogenous numbers and size. How do governance, institutions, and public policy affect city formation and sizes, which in turn affect economic efficiency? Cities require enormous public infrastructure investments which affect urban quality of life, in particular health and safety and commuting and congestion costs. Institutions governing land markets, property rights, local government autonomy, and local financing affect the city formation process and city sizes. And national government policies concerning trade, labor policies and national investment in communications and transport infrastructure affect the shape of the urban system. Understanding this process and formulating the most effective policies for development poses a significant challenge.

2. Empirics of urbanization and economic growth

The theoretical complexity involved in understanding the economics of urbanization is matched by the empirical complexity of estimating the underlying economic relationships.

Some economic studies of urbanization address the fundamental issue of externalities as drivers of urbanization. Glaeser *et al.* (1992) find for the US that local competition and urban variety, but not regional specialization, encourage employment growth in industries. Their evidence suggests that knowledge spillovers occur between rather than within industries. In relation to a different set of industries, Baptista and Swann (1998) find the opposite result, evidence for the UK that knowledge externalities favor the performance of firms located in industrial clusters. Chen (2003) finds that specialization hurts, while competition and city diversity help both employment growth and wage growth. Their results favor Jacobs' (1969, 1984) theory, suggesting that cross-industry externalities and local competition are more important for industry growth than are intra-industry spillovers. In contrast, in a study of Mexican municipalities, Mayer-Foulkes (2006) finds that industrial variety promotes productivity, human capital accumulation and production scale, while competition, measured as the number of firms per industrial branch, reduces these indicators. Ottaviano and Giovanni (2004) show that as it assimilates, cultural diversity favors productivity across US cities. As for developing countries, Duranton (2008) finds strong evidence that productive efficiency is bolstered in cities.

Overall, Puga (2010) notes that while there is wide agreement that firms and workers are substantially more productive in large and dense urban

environments, there is not a deep enough understanding of learning in cities, and work distinguishing between alternative causes of agglomeration is still in its infancy.

The link between urbanization and economic growth is also an important focus of study. Henderson (2003) shows that there is an optimal level of urban concentration, in terms of maximizing productivity growth, that varies with the level of development and country size, and that over- or under-concentration can be very costly in terms of productivity growth: a one standard deviation variation in primacy (the size of the largest city) can cost 1.4% in annual growth. Using a worldwide data set on metropolitan areas with a population larger than 100,000 from 1960 to 2000, Henderson and Wang (2007) find that the degree of democratization and technological advances strongly affect growth in both city numbers and individual city sizes. Technology improvements help bigger cities relative to smaller ones, while increasing democratization helps smaller cities. Bertinelli & Black (2002) focus on cross-country panel data and emphasize the role of human capital, which is solely accumulated in cities, in generating urban externalities. Brülhart and Sbergami (2008) find evidence that agglomeration boosts GDP growth only up to a certain level of economic development of about US \$10,000.

Many issues arise in relation to cities besides the study of their general economic dynamics and their relation to economic growth. These include informal labor markets, education, the demographic transition, health, slums, gender equality, violence, waste disposal, water supply, infrastructure, intercity competition, sustainability, the impact of unmanaged growth, harmonizing capital investment with public objectives, and methodological issues such as measures of agglomeration.

Gundogan and Bicerli (2009) find that rapid urbanization has produced increased informal employment rates, with more than half the workers in developing countries employed in the urban informal sector. Yuki (2007) models this link between urbanization and informality in terms of two types of steady states for cities in the development process. The equal opportunity steady state has features of a typical developed economy and the unequal opportunity steady states have features of a typical stagnant developing economy. If an economy is on a path to the equal opportunity steady state, it experiences urbanization that promotes skill upgrading, the expansion of the formal sector, the shrinkage of the informal sector, and falling inequality. Instead, if it is on a track to an unequal opportunity steady state, it urbanizes without such modernization, and instead the informal sector expands. The critical determinant of the long-run outcome of an economy is the initial fraction of the population who is sufficiently wealthy to obtain education.

Cuberes (2009) finds that the size of a country's urban population plays a crucial role in triggering its demographic transition. More urbanized countries tend to experience an earlier demographic transition. Moreover, countries

that experience an early demographic transition (before 1950) are much richer than latecomers, suggesting that urbanization plays a more important role than income in triggering development.

Sicular *et al.* (2007) study China's a large and somewhat increasing urban-rural income gap. Location of residence remains the most important factor underlying the urban-rural income gap. The only other household characteristic that contributes substantially to the gap is education. Van de Poel, O'Donnell and Van Doorslaer (2009) find important, and robust, negative causal effects of urbanization on health in China. Urbanization increases the probability of reporting poor or fair health by 5 to 15 percentage points, with a greater degree of urbanization having larger health effects. While people in more urbanized areas are, on average, in better health than their rural counterparts, the process of urbanization is damaging to health.

In 2007 the number of urban inhabitants surpassed rural dwellers as a percentage of the total world population. On the occasion of this 2007 tipping point, UNU-WIDER launched a series of studies on development in an urban world.

First, there are issues of measurement and definition of urbanization. Uchida and Nelson (2010) construct an agglomeration index to provide a new, cross-country comparable measure of urban concentration. Bloom *et al.* (2010) also find that differences in the measurement of urban populations across countries and over time are significant. Satterthwaite (2010) also discusses how lack of data limits the accuracy of international comparisons and adequate analysis of issues such as poverty and greenhouse emissions in relation to urbanization.

Then, there are issues that are common to many cities. While rapid pace of urbanization is usually thought of as the major factor explaining the proliferation of slums and squatter settlements in developing countries, Arimah (2010) shows that higher GDP per capita, greater financial depth and increased investment in infrastructure reduce the incidence of slums. Conversely, the external debt burden, inequality in the distribution of income, rapid urban growth and the exclusionary nature of the regulatory framework governing the provision of planned residential land contribute positively to the prevalence of slums and squatter settlements.

Guha-Khasnobis and James (2010) find that women, earning a higher percentage of income in the urban than in the rural context, are more empowered, even in slums. This affects family decision making. Urban women have less children, and both they and their children are much more likely to be literate. Women's increased independence may lead to higher self-esteem and recognition of rights. Rodgers (2010) argues that while violence is often linked to urban contexts, this is not a necessary feature of urban life.

Many cities in Africa, Asia, and Latin America face serious problems managing their solid wastes. Medina (2010) argues that implementing low-

cost, low-tech, labour-intensive methods that promote community participation and involve informal refuse collectors and waste-pickers offers opportunities for reducing pollution, alleviating poverty, improving the urban environment, and lowering greenhouse gas emissions. Spencer (2010) documents the demand for piped water in terms of consumer's perceptions.

Finally, there are many issues that, while being common to many cities, also have their own local specificity. Lall *et al.* (2010) study how improvements in infrastructure raise city competitiveness in India, measured as the city's share of national private investment. Local efforts are compared with inter-regional trunk infrastructure. Proximity to international ports, and highways connecting to large domestic markets have the largest effects. Local infrastructure such as municipal roads, street lighting, water supply, and drainage enhance competitiveness, but with much smaller impacts. A city's ability to raise its own source revenues by means of local taxes and user fees increases infrastructure supply, whereas inter governmental transfers do not have statistically significant effects.

Mukwaya, Sengendo and Lwasa (2010) discuss Nigerias's rapid urban transition, highlighting the difficulties of urban planning in this context, and the unclear relation with poverty reduction.

Webster *et al.* (2010) explore the issues of land use efficiency in urbanizing China, including criteria in agricultural land conservation, energy efficiency, pollution, greenhouse gas emissions and time savings. Their analysis shows that, while the issues are complex, there is plenty of scope for government planning, as well as difficulties to face in the interaction between prices faced by private and government actors –or lack thereof– and efficient government decision making.

Perlman (2010) documents the continual increase in the number and size of *favelas* in Rio de Janeiro during the period 1968 to 2008, despite major contextual changes including political transformations from dictatorship to 'opening' to democracy, from 'miracle' boom to hyperinflation and crisis, and then to relative stability, and major policy changes from removal of *favelas* to their upgrading and integration.

Dayaratne (2010) discusses the steady decent of Colombo to a city plagued with overcrowding, ad hoc development and failing infrastructure. Problems with slums and shanties, derelict buildings, endless traffic congestions and increasing pollution have not been solved by "vertical" development. Decades of this uni-directional urbanization have endowed it with unmanaged growth, spatial chaos and an increasingly poor quality of life, despite a number of planned interventions, enormous amounts of investments and experimentations with progressive housing development.

Freund (2010) discusses the achievements and problems of urban governance in post-apartheid South Africa. Amongst its findings, without disciplining capital investment along lines necessitated by larger public needs,

larger changes are limited by the predilections and established discourses of the business world and the absence of more dynamic and structured public intervention. Naude (2010) shows South African cities are suburbanizing faster than employment opportunities, while residential desegregation has been proceeding slowly.

3. Quantitative comparison of urbanization with other causes of economic development

Having explored the scope and content of studies on the economic dynamics of urbanization and its relation with economic development, I now discuss the place that urbanization has in relation to the study of the fundamental causal channels of development.

As mentioned in the introduction, a series of authors have proposed that the fundamental causes of economic growth are trade, institutions and physical geography. I summarize in this section two sets of econometric estimates carried out in Mayer-Foulkes (2011) comparing these causal channels with urbanization. The first is a short-term quinquennial estimate of these impacts and the second is a long-term causal study.

3.1. Data

On the occasion of the 20th anniversary of the first Human Development Report (1990), UNDP made available a new human development database (Gray and Purser, 2009), containing indicators for 111 countries across the period 1970-2005. The indicators are GDP per capita, life expectancy, literacy and gross enrolment ratio (enrolment for short). Other indicators such as trade, urbanization, constraints on the executive and democracy are available from the World Development Indicators (2008)¹ and Polity IV (2009)². For further discussion and descriptive statistics see Mayer-Foulkes (2010).

The set of explanatory variables included is trade³, FDI inflows, FDI outflows (these variables are indicators of globalization and technological change), executive constraints, democracy (institutional indicators from Polity IV), inflation and risk premium (macroeconomic policy indicators), landlocked, tropical, latitude (physical geography indicators), urban proportion of the population (the only economic geography indicator) and population density (with agricultural land as denominator). Population density and its rate of change account for the impact of endogenous fertility on human capital

¹ See <http://data.worldbank.org/indicator>.

² The Polity IV Project was originated by Will H. Moore and is currently available at the Center for International Development and Conflict Management at the University of Maryland. Special values -66, -77, -88 used to represent various exceptions are replaced here with 0. We use the 2009 update.

³ Trade is the sum of exports and imports as proportions of income. Although these are quite different variables from the technological point of view, they are collinear.

(Galor & Weil, 2000) and for phenomena such as the demographic dividend (Bloom, Canning & Sevilla, 2003a). Because of the devastating impact of AIDS in some very specific regions, a dummy for HIV is included, indicating countries for which more than 10% of the adult population was HIV positive in 2001 according to UNAIDS (2008), lying on a contiguous region in the southern portion of Africa.

Because in economic development there is an intense interaction between the various variables, estimates typically present a high endogeneity problem. Thus, to obtain causal estimates it is necessary to instrument all of the independent variables. The instrument set includes correlates of long-term historical, political, economic, institutional and geographical determinants. These are legal origin (British, French, German or Scandinavian, from Levine, Loayza and Beck, 2000), geographic region (East Asia Pacific, East Europe and Central Asia, Middle East and North Africa, South Asia, Western Europe, North America, Sub Saharan Africa and Latin America and Caribbean), the well known malaria ecology instrument (Sachs, 2003, together with a dummy indicating its availability), ethnic fractionalization in 1960 (from the Easterly and Levine 1997 dataset). To these instruments are added their quadratic interactions. This greatly augments the number of instruments and allows the impacts of institutional and health variables to vary substantially across geographic regions, which themselves have very different histories. In addition, landlocked, tropical and latitude, as well as time period dummies, are used as exogenous controls.

3.2. Short-term study

I examine short-term change by estimating quinquennial growth rate regressions. These measure how quinquennial levels and changes in some of the variables affect other variables. For example, a change in trade policy, a windfall in life expectancy, or increased urban spaces may result in increases in income.

Mayer-Foulkes (2010) shows that the process of development consists of a series of superposed, nonlinear transitions. These are characterized by an initial period of divergence that is followed by a subsequent period of convergence. Linear closed form models in levels cannot be expected to adjust well to the data. One way of dealing with this problem is to include among the independent variables the actual changes that these variables experienced, without trying to predict them. These changes will be endogenous to the dependent variable and must be instrumented. Essentially, I consider a system of N variables Y_{it}^j , $j = 1$ to N , where i represents the country and t the time period, whose rate of change, or rate of growth, depends on the initial levels and contemporary changes of the other variables. That is,

$$\Delta Y_{it}^j = g(Y_{it}^1, \dots, Y_{it}^N, \Delta Y_{it}^1, \dots, \Delta \hat{Y}_{it}^j, \dots, \Delta Y_{it}^N), \quad j = 1, \dots, N.$$

The hat represents the omission of that variable, which appears on the left hand side.

More specifically, I estimate a linear version of this,

$$\Delta Y_{it}^j = \sum_{1 \leq k \leq N} \beta_k Y_{it}^k + \sum_{\substack{1 \leq k \leq N \\ k \neq j}} \gamma_k \Delta Y_{it}^k + \sum_{1 \leq k \leq M} \alpha_k Z_{it}^k + u_{it}^j, \quad j = 1, \dots, 5. \quad (*)$$

Here Z_{it}^j are additional variables, in this case an AIDs dummy, time fixed effects, landlocked, tropical and latitude, all of which are exogenous. This estimate is carried out for the four human development indicators and for urbanization. The set of variables Y_{it}^j also includes trade, executive constraints, democracy, FDI inflows, FDI outflows, population density (with agricultural land as denominator), inflation and risk premium. All variables Y_{it}^j as well as their rates of growth are assumed to be endogenous.

Note that this specification in effect allows including the impact of unexpected improvements in the different variables Y_{it}^j . Even in its linear form, this specification is consistent with nonlinear transitions, with the impacts on dependent variables of improvements or changes in the independent variables estimated linearly.

Recall that all of the independent variables Y_{it}^j are fully instrumented. Also, clustered errors are used, controlling for country-specific correlated errors. Even though the instrument set is large, it does not fail Staiger & Stock's (1997) weak instrument test. First stage regressions all obtain clustered error estimates for the confidence intervals with F statistics of at least 152.

To obtain comparable coefficients, the independent variables that were instrumented (all of them except for the AIDs dummy, landlocked, tropical, latitude and the period dummies) were each divided by the standard deviation of their first stage estimates. Thus, the coefficients show the change in the dependent variable when the estimated independent variable changes by one standard deviation. Three sets of regressions were run in Mayer-Foulkes (2011) for the rates of change of log income per capita, log life expectancy, literacy, enrolment and log urbanization. The three sets of regressions feature both or each of the institutional variables executive constraints and democracy, because these variables turned out to be collinear in this context.

Two tests justify the instrumentation. The first is the Hausman test, which each regression passes in the more appropriate case which uses clustered

errors to estimate significance. This test shows that the instrument set carries significant information. The second is the Sargan test for over-identifying restrictions. In this case the OLS estimates yield the desired insignificant results, except in the case when urbanization is the dependent variable. However, the clustered error regressions yield significant results except in one of the per capita income runs. This implies that the clustered error method detects that the instruments have more causal information than works through our set of independent variables. Hence the causal results have an omitted variable bias. More or better explanatory variables would be desirable. In fact, it is not hard to think of desirable explanatory variables on which the interacted legal origin and regional dummies could give information. A few examples would be quality of urbanization, better agglomeration indices, prevalence of local diseases such as malaria, inequality, and better institutional indicators. Thus, the information content of the explanatory variables used—which include most of the favorite variables in the literature—is not optimal. On the other hand, the Sargan test p value results themselves are highly unstable. Small changes in the set of instruments, in the variables included in the regressions, in the choice of instruments, or in the regression techniques, yield changes in the p value that can range from 0.9 to 0.001. Therefore I take the point of view that the results are indicative but subject to improvement with better explanatory variables (as much of the growth literature itself), and in what follows point out the most consistent results.

Table 1 shows the results when both institutional variables are included as controls. Coefficients which are consistently significant in all three runs are highlighted in bold, bold italics or italics if the minimum significance level is 0.01, 0.05, or 0.1.

It is interesting to observe the convergence terms. Once levels and actual changes in other variables have been taken into account (which could represent channels of convergence) neither income nor life expectancy shows any consistently significant conditional convergence. Literacy and urbanization display consistent significant conditional convergence, while enrolment displays consistent significant conditional divergence. This suggests that at the global level the literacy and urbanization transitions may be in their convergent phases, while enrolment is still in its divergent phase.

We are mainly interested in the impact of other variables on human development. However, human development variables themselves have consistent, significant impacts on each other. Rises in income positively impact enrolment and urbanization and life expectancy, and per capita income levels positively impact enrolment. Rises in life expectancy positively impact income, enrolment and urbanization. However, they reduce literacy, in what may be an economic trade-off. Life expectancy levels increase income but reduce urbanization, indicating that one of the motivations of the rural to

urban migration may be low rural life expectancy. Literacy levels reduce life expectancy, in what would be the other side of the economic trade-off just mentioned. They also reduce the rate of enrolment. This may be tied to a cross-country specialization in skilled and unskilled labor induced by trade; see below. Both literacy levels and rises in literacy increase urbanization, consistently with the idea that the higher-skilled rural population is the one that migrates. Rises in enrolment ratios positively impact all the other human development indicators as well as urbanization, literacy least significantly. On the other hand, enrolment ratios are negatively associated with income per capita levels, perhaps because of their cost as an investment, or in a reversion to the mean, and positively associated with literacy, in a direct causal link.

Rises in urbanization have a positive impact on income and enrolment, and levels of urbanization on life expectancy. Rises in trade have a positive impact on income and life expectancy, and a negative one on urbanization (consistently with the theory of economic geography and trade, see Fujita, Krugman & Venables, 2001). Levels of trade have a positive impact on life expectancy. Trade levels have a negative impact on enrolment, consistently with the specialization effect mentioned above, if most differences in trade levels occur for less developed countries, which is the case. FDI inflow levels have a positive impact on literacy and a negative one on enrolment, suggesting a polarizing effect across countries. Rises in FDI inflows have a negative impact on life expectancy and literacy, and a positive one on enrolment, the last two suggesting reversion to the mean. The differentiated impact of trade and FDI inflows on literacy and enrolment could be related to education traps in underdeveloped countries (see Mayer-Foulkes, 2008). For an explanation of why trade and FDI can contribute to polarization across countries see Mayer-Foulkes (2009).

Executive constraints and democracy levels turned out to be collinear in this context, as can be seen from the results. Here we regard the results as consistently significant if they are significant in both runs the variable appears in. Rises in executive constraints positively impact literacy and enrolment. Rises in democracy negatively impact income and literacy, while higher democracy levels negatively impact life expectancy and literacy. Rises in population density have a positive impact on life expectancy and literacy, and a negative one on enrolment rates, indicating that specialized study may concentrate on a smaller part of the population in more populous countries (*e.g.* India and China). Higher population densities are associated with higher life expectancies.

Table 1. Growth Regressions for Human Development Indicators and Urbanization, 1970-2005

Fully Instrumented, Clustered Errors						
	Growth Rate of Income per Capita	Rate of Change of Life Expectancy	Rate of Change of Literacy	Rate of Change of Enrollment	Rate of Change of Urbanization	
Δ Log GDP per Capita	—	0.243*	0.229**	0.00343***	0.353***	0.273***
Log GDP per Capita	-0.000769**	—	—	0.00338**	0.00352**	—
Δ Log Life Expectancy	0.000867**	0.00115***	-0.464***	0.00926***	0.00910***	0.380***
Log Life Expectancy	0.00360***	0.00390**	0.422**	0.00362**	0.00296**	-0.655***
Δ Literacy	0.000747***	-0.249*	—	—	0.222**	0.147**
Literacy	0.00107*	0.00100*	-0.622***	-0.00449***	0.358***	0.278***
Δ Gross Enrollment Ratio	0.00108***	0.000936***	0.132*	—	0.279***	0.265***
Gross Enrollment Ratio	-0.00232***	-0.00211***	0.235*	0.00359**	0.00345**	0.159*
Δ Log Urbanization	0.000738***	0.000587***	0.171***	0.00150**	0.00180***	—
Log Urbanization	0.366***	0.385***	0.146***	0.00197**	—	—
Δ Log Trade	0.00257***	0.00269***	0.188*	—	-0.546***	-0.570***
Log Trade	0.114*	0.0982*	0.128***	-0.00279***	-0.206**	-0.168**
Δ FDI inflows	0.00206*	-0.608**	-1.110***	0.0132***	0.0130***	—
FDI inflows	-0.281**	-0.378*	0.310***	-0.00270**	-0.00267**	—
Δ Executive Constraints	—	-0.00213**	2.239***	0.00809**	—	-0.760**
Executive Constraints	0.00140*	—	1.316***	—	0.00835***	—
Δ Democracy	-0.00665***	-0.00584***	-2.762***	0.00488*	—	0.789*
Democracy	0.00145***	—	-1.141***	-0.00146**	—	0.106*
Δ Log Pop Dens in Agr Land	—	0.277***	0.548***	-0.00196*	-0.00190*	0.130**
Log Pop Density in Agr Land	0.000310***	0.000219**	0.191***	0.00431***	0.00476***	0.174***
FDI outflows	—	-0.478***	-0.239***	-0.589***	0.00476***	0.170***
Inflation	0.000506*	0.000711**	0.308***	-0.00254**	-0.00235***	-0.197***
Risk Premium	—	-0.341***	-0.105*	0.00174*	0.00176*	-0.0471*
AIDS Dummy	0.00595***	-2.473***	-0.984***	—	—	0.413*
Landlocked	—	-0.336**	-0.200**	0.00193*	—	0.305***
Tropical	—	-0.245*	-0.379***	0.00205**	0.00196**	—
Latitude	—	0.00690***	0.00508***	-8.30e-05***	-9.10e-05***	-0.00207*
Quinquennial dummies not reported	—	—	—	—	—	—
Observations	579	579	579	579	579	579
Chi Squared	152787	23294	27624	122426	660.0	182620
J Statistic	51.33	47.85	52.59	54.23	55.61	47.27
Clustered error p levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1						
Coefficients with p > 0.1 omitted						
Line "-" indicates variable not present in regression						
Robust results (coefficient significant in all runs) marked with bold, bold italics and italics according to minimum significance level 0.01, 0.05, or 0.1						

FDI outflow levels reduce life expectancy and literacy, but increase enrolment and urbanization, consistently with the polarizing effect explained in Mayer-Foulkes (2009). Inflation increases life expectancy, perhaps because the cost of health systems, but risk premium decreases life expectancy. However, both inflation and risk premium retard urbanization. AIDS increases income per capita and reduces life expectancy, both through increased mortality. Landlocked countries have lower life expectancy and literacy, indicating lower development, but higher urbanization (as mentioned before, consistently with the theory of economic geography and trade). Tropical has no consistent impacts. However, latitude positively affects life expectancy and literacy, and negatively affects enrolment, perhaps indicating the presence of nonlinearities or that the remaining explanatory variables are insufficient.

The estimates show that urbanization is as much a short term factor of the evolution of development as the so called ultimate causes of growth, trade, institutions and physical geography. Overall, the short term impact of urbanization is more consistently positive than the impact of trade, executive constraints or democracy, but of a smaller magnitude. In turn, development causes urbanization. In the short term, the magnitude of the impacts of the variables (excluding physical geography) occurs in approximately the following order: FDI inflows and outflows, institutional factors such as democracy, trade, and then urbanization.

3.3. Long-term study

The process of development and underdevelopment has gone on for two centuries, and the shortest span of time for achieving development has been around 30 years. The sample involves countries at all levels of development. It follows that estimating levels in terms of levels investigates the long-term cumulative impact of variables on each other. This is done through the following fully instrumented quantile estimates that allow for different coefficients at different levels of the dependent variable - a free nonlinear form.

$$Y_{it}^j = \sum_{1 \leq k \leq N} \beta_k Y_{it}^k + \sum_{1 \leq k \leq M} \alpha_k Z_{it}^k + u_{it}^j \quad j = 1, \dots, 5. \quad (*)$$

This is evaluated at quantiles 0.1, ..., 0.9. Again, executive constraints and democracy are collinear. Since democracy yields more significant results, we select this variable for presenting the results. The results are shown graphically in Figures 1.1 to 1.5, which plot only coefficients with a higher p value than 0.05. Recall that the variable units are standard deviations, so the

coefficients measure the impact of a change of one standard deviation on the target HDI component.

Figure 1.1 shows the quantile results for income. The variables with most impact are life expectancy and urbanization. Interestingly, life expectancy is not only affecting lower but also higher income levels. This is due to increased divergence in life expectancy in the past 20 years (see the discussion in Mayer-Foulkes, 2010).

In contrast, urbanization affects upper middle income levels more strongly, making it a development tool for a wide range of underdeveloped countries. The AIDS dummy, through diminishing the population, has a well documented impact raising income per capita. Democracy levels have a surprisingly consistent positive impact on income per capita, of a similar magnitude to the positive impact of trade, except at lower levels of income. FDI inflows have a negative impact on income per capita.

Figure 1.2 shows the results for life expectancy. Income, literacy, urbanization and trade have the largest positive impacts, in that order.

Figure 1.3 shows the results for literacy. Enrolment ratio and life expectancy are the main causal correlates. Then follow the AIDS dummy, landlocked and tropical, which may be proxying for omitted variables or jointly controlling for the region under the AIDS epidemic. Urbanization then follows, but with a negative impact, that could be associated with the poor conditions faced by new urban dwellers. Trade has a negative impact for low literacy levels and a positive impact for higher literacy levels, evidence of a polarizing effect for trade.

Figure 1.4 shows the results for enrolment ratios. Literacy (for all levels of enrolment), AIDS, income (at lower levels of enrolment), life expectancy (at lower levels of enrolment), urbanization and trade (at lower middle levels of enrolment).

Figure 1.5 shows the results for urbanization. Here income per capita, life expectancy, gross enrolment ratio (at lower levels of urbanization) and FDI inflows are the strongest positive associations. Literacy, trade, democracy and population density yield negative associations.

Concluding, the estimates show that in the long-term urbanization is one of the main causal factors of development, often topping the human development indicators themselves. A change in one standard deviation in urbanization consistently has a higher impact than trade, FDI, or the institutional variables we used.

Figure 1.1 Variables Impacting Level of Log GDP per Capita
Coefficient Graphs for Instrumented Quantile Regression

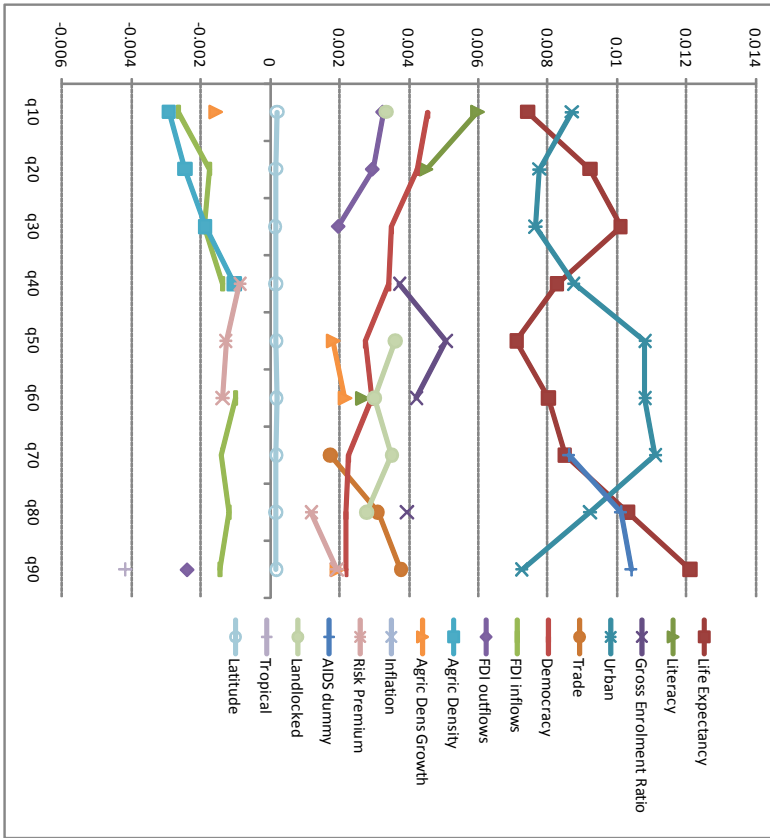


Figure 1.2 Variables Impacting Level of Life Expectancy
Coefficient Graphs for Instrumented Quantile Regression

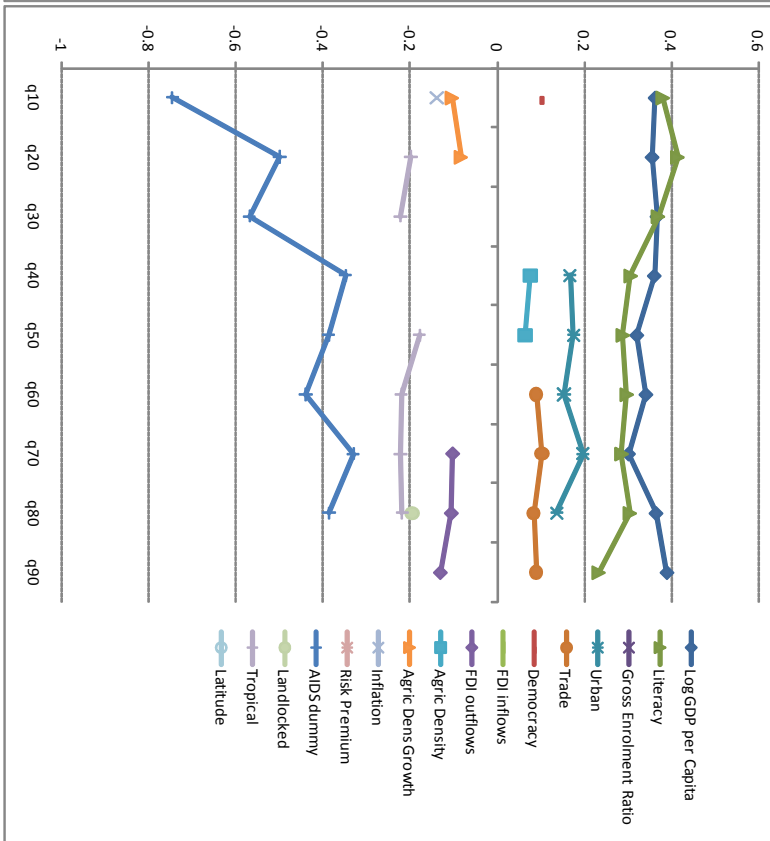


Figure 1.3 Variables Impacting Level of Literacy
Coefficient Graphs for Instrumented Quantile Regression

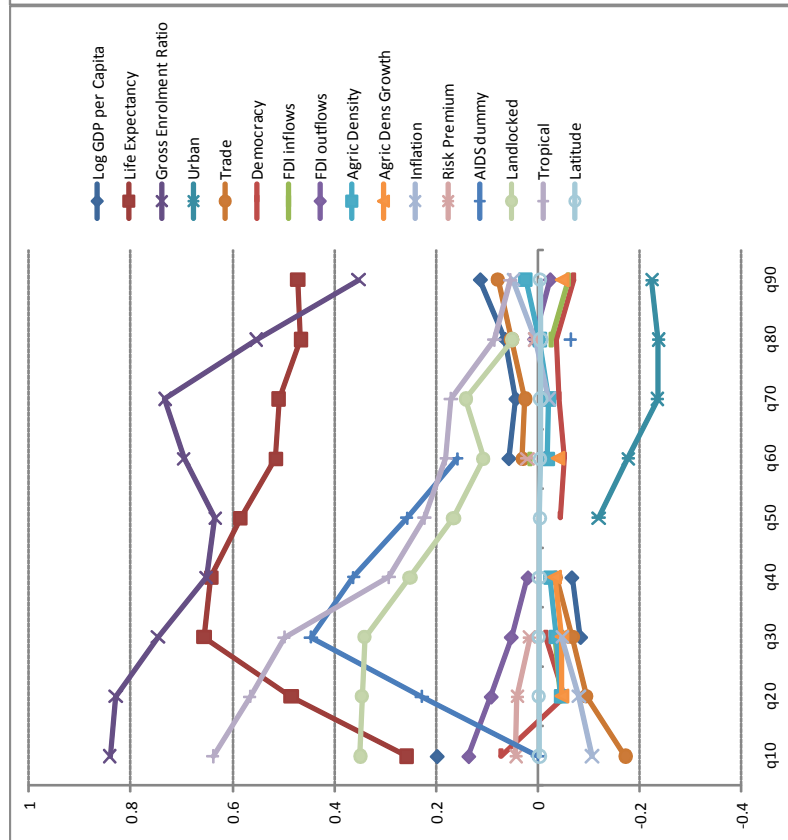


Figure 1.4 Variables Impacting Level of Gross Enrolment Ratio
Coefficient Graphs for Instrumented Quantile Regression

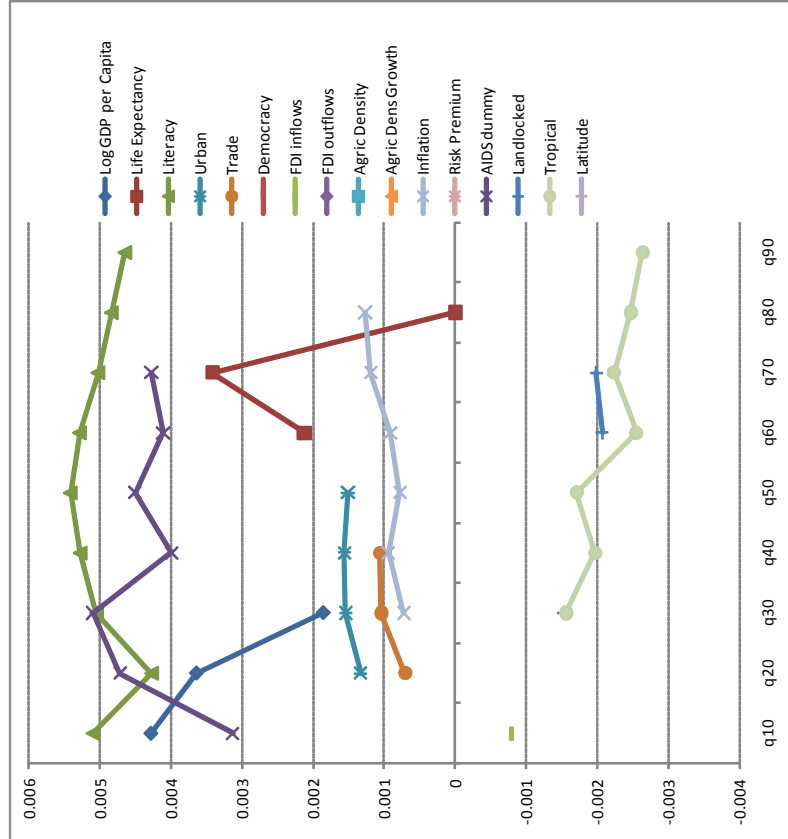
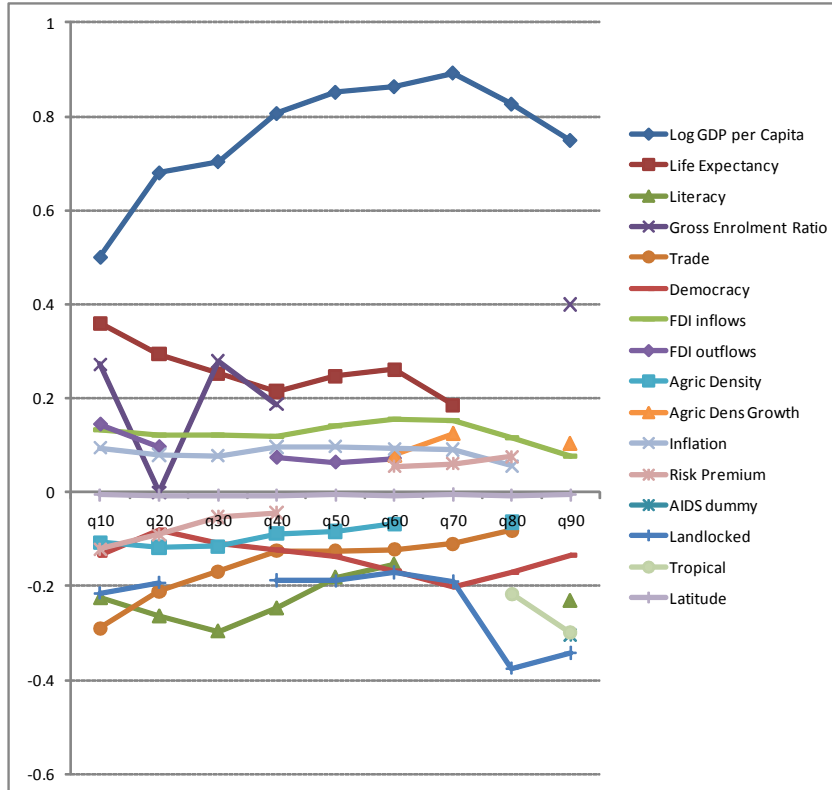


Figure 1.5 Variables Impacting Urbanization
Coefficient Graphs for Instrumented Quantile Regression



4. Urbanization as an intermediate objective for development

The two sets of long- and short-term studies show that urbanization is one of the fundamental causal factors of economic development. While trade, FDI and institutions have stronger short-term impacts, urbanization has stronger long-term impacts. There is a sense in which economic development *is* about urbanization.

Urbanization is a particularly interesting intermediate objective for development for several reasons. First, it is necessary. It is part of the development path. Of course, given modern technologies, this includes making urban quality and externalities available for rural life, possibly redefining urbanization. It certainly also means bringing quality to urban life. Many things go into organizing cities well, such as transportation, provision of health and education, assigning areas for living and for industry and services, managing waste, and so on. It requires political and social organization. Also, each city in each context and at each development level will call for particular improvement objectives. These are all elements for a development program. On the other hand they are concrete objectives, rather than one-fits-all abstract recipes, that also serve to point out the most urgent public tasks. Markets cannot optimally determine all of these choices. Traditionally, in underdeveloped countries what has happened is that urbanization has proceeded in a disorganized way that turns out to be very costly, governments following behind the facts.

What would urbanization policy for development look like? Some preliminary answers can be found in the research we have surveyed. First, there is a reasonably clear idea of what the economic forces governing urbanization are (Baldwin *et al.*, 2003), although their econometric evaluation faces important difficulties (Puga, 2010). These forces are related to market access, industry concentration facilitating specialization, large scale production, lower living costs, congestion costs and competition intensity, and the intensity of local human capital and knowledge externalities, making skills available and promoting technological change. As Henderson (2005) points out, these considerations extend to examining the full systems of cities. It is clear that urban size can overshoot, imposing high costs for economic growth (Henderson, 2003).

Urbanization policy must use diverse policy instruments to manage these economic forces and shape the future. Taking externalities into account, when they rise or when they fall, is essential for optimizing urban development. Examples would be promoting transportation and internet infrastructures to extend the range of positive externalities and to reduce the risk of excessive urban concentration. Initiatives such as privatizing roads do precisely the opposite, by taking only private incentives into account. Once

settled, both population and industry are very costly to move. Managing the rural to urban transition is essential for most underdeveloped countries. Migration barriers affect human capital formation. Lack of urban and migratory planning results in slums and suboptimal industrial location. Why wait for the problems to aggregate and become unmanageable?

The estimates show that promoting the functioning of markets by liberalizing trade and FDI has important short-term benefits, although negative impacts that may work through polarization are also present and must be addressed. However, in the longer term it is also necessary to optimize urbanization, an objective which needs appropriate public policies and investment to channel market forces. The estimates also show that the institutional framework has important short- and long-term impacts on human development and urbanization. What is needed is the kind of social coordination that is successful at creating cities, *together* with the coordination that markets can provide.

Conclusions

Urbanization is a centerpiece of development. Its impact on income, health and education is stronger in the long-term than the impact of trade, FDI or institutions, regarded by some researchers as fundamental causes of economic growth.

It is clear that successful urbanization involves more than just setting markets free. Although the central role of urbanization has long been recognized (recall Harris and Todaro, 1970), for too long now urbanization has been ignored by policy and left to its own devices, particularly in underdeveloped countries. In many places the result has been a suboptimal distribution of population and industry, involving high welfare costs. What is necessary is to complement markets with adequate institutions capable of coordinating urbanization. Urbanization itself can provide a concrete agenda for development by addressing critical local issues involving all aspects of economic, political and social life, as well as human development.

Introducing urbanization policies as long-term development instruments presents an important interdisciplinary challenge that needs the insights of urban studies and can yield high welfare and sustainability benefits.

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