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Fabien Candau, Elisa Dienesch

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**Centre d'Analyse Théorique et de
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**DOES GLOBALIZATION EXPLAIN
URBANIZATION IN THE WORLD
AND IN ASIA?**

Fabien CANDAU
Elisa DIENESCH

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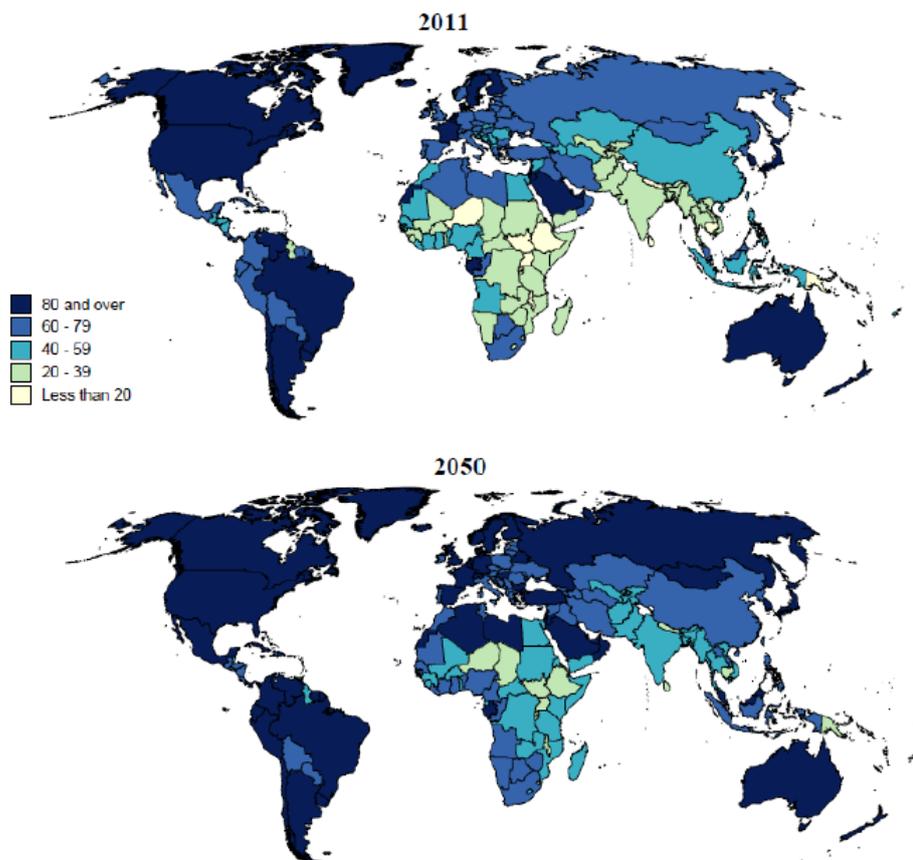
Abstract

Does globalization influence urbanization everywhere or just in highly globalized countries? And to what extent? We propose a theoretical model to derive a micro-founded measure of globalization and we estimate a reduced form of urbanization that depends on trade integration for a panel dataset over 1962-2010. A one percent increase in the market access leads to a rise in urbanization rates of 0.56 percent in Asia and 0.44 percent in the World. The role of globalization via urbanization on Asian economic growth is also evaluated, confirming that a part of the Asian's economic miracle' comes from labor accumulation in cities.

1 Introduction

Urbanization is a major characteristic of the past and future centuries. Northern America, Latin America and Europe are highly urbanized; almost 80% of the population lives in cities. Asia follows the same path, even China and its restrictive policies concerning demography and migration¹, has undertaken a rapid increase in the number of cities. Its urbanization rate has more than doubled over the past thirty years and is expected to reach 60 percent in 2025 (UN, World Urbanization Prospects, 2010). As illustrated in the map below comparing prospects on urbanization in 2050 and the actual situation, the spatial economy of many countries goes quickly towards fewer occupations in rural area.

¹Free migration in China are restricted by an household registration system called "hukou". This system implemented when Mao took the power had been relaxed in 1978, but still limits urbanization (Zhang and Song, 2003).



But how are done these predictions on urbanization? The World Urbanization Prospects use a methodology based on past "rural/urban ratios" which makes hard to analyze what would happen if the future does not follow the past. In the last forty years, Asia has been at the basis of globalization, but the future is less promising. Between higher oil prices and temptation of de-globalization, it seems interesting to analyze how changes in trade costs can affect the spatial economy of Asian countries. Moreover, the process of globalization has changed. International fragmentation of the supply chain generates a specialization of countries on particular fragments. This new organization of globalization offers simplest opportunities for developing countries to enter in the global supply chain (Baldwin, 2011; Collier and Venables, 2007), but has the drawback to reduce the magnitude of industrialization in each country. Desindustrialization has started after a peak in the manufacturing's share of employment at 45% in Britain and 30% in the U.S. *versus* 15% in China and 10% in India (Rodrik, 2013). Since urbanization is in part driven by industrialization, we wonder if urbanization has been affected by these changes. In the first part of this paper we make clear that globalization has been a powerful determinant of urbanization in East Asia but a simple estimation using an ad-hoc index of globalization (the market potential of Harris (1954)) shows that the relationship seems not significant for the world. This lead us to build a model of trade and urbanization to derive a theoretical expression of globalization in order to empirically

invalidate (or verify) this first result. We identify that globalization has fostered urbanization whatever the group of countries considered over the period 1962-2010.

More precisely the model is based on Anderson and van Wincoop (2003) and Helpman (1998) by introducing urbanization and housing in a standard model of trade. Urbanization is driven by three forces. External increasing returns in the urban sector foster urbanization, while decreasing returns in the rural sector and inelastic supply of housing in the urban area play against. Diminishing returns in the agricultural sector imply that population growth reduces wages in the countryside while they raise incomes in urban area.² Contrariwise, faster population growth increases the price of land and this may limit the attractive power of cities.

Regarding the literature on urbanization and globalization, there are relatively few theoretical models. The Economic Geography (EG) literature analyzes the link between agglomeration and trade,³ but urbanization is rarely the main focus. Song, Thisse and Zhu (2012) is a notable exception, since authors extend the Krugman (1991) model to consider location choices of rural workers. They show that trade liberalization hurts rural industrialization and favors urbanization. Here, we propose a model with a different set of assumptions such as external increasing returns (instead of internal) in the industrial sector and decreasing returns in the rural economy. Interestingly, despite these notable differences, the model displays a set of equations similar to those obtained in EG. In particular the measure of globalization is similar to the market access proposed by Redding and Venables (2004).⁴ While this market access has been used to explain various economic phenomena,⁵ to our knowledge its impact on urbanization has not been yet evaluated. To date it is unknown if globalization has an effect on urbanization, and if this effect is localized in a small group of countries highly integrated in the world economy (e.g East Asia) or more generalized. We conclude for this last possibility. The effect of a good market access on urbanization is stronger in Asia than in other countries in the world, however we find that globalization is still a significant factor of urbanization in the world. We find that a one percent increase in the market access of Asian countries increases the urbanization rate by 0.56 percent in these countries *versus* 0.44 percent in the world.

After presenting in the next section some stylized facts regarding urbanization and globalization in the World, we present the theoretical model and then the empirical analysis.

²Only labor is considered here, but one can notice that decreasing returns in the agricultural sector also exist for intermediate inputs. For instance in fertilizer applications (see Tilman et al., 2002).

³See Brühlhart (2011) for a survey.

⁴The sole minor difference between the market access obtained in Redding and Venables (2004) and the market access presented here concerns the introduction of urban GDP. Indeed in Redding and Venables (2004) industrial goods can be produced everywhere while in our model they are only produced in the urban area, as a consequence urban GDP matters in our model while national GDP matters in Redding and Venables (2004).

⁵Redding and Venables (2004) and Head and Mayer (2013) analyze the impact of the market access on economic development, Redding and Schott (2003) on education, Amiti and Javorcik (2008) use it to explain FDI flows and De Sousa and Poncet (2011) focus on its impact on wages.

2 Stylized facts

Do people follow jobs or do jobs follow people? That's an egg and chicken question that is hard to answer for developed countries,⁶ but the response looks easier for some Asian countries where industrialization and globalization seem to have fostered urbanization. For instance, the industrialization of East Asia has been partially financed by regional and global interconnection. At the regional level, relocation of capital and entrepreneurs from the Japanese Tokaido Megalopolis in reason of the rising land-prices in the mid 1970s until the burst of land markets in the 1990s is an example among others (Fujita et al. 2004). At the worldwide level, the search of low wages has attracted the capital in East Asian cities. Early in the 1980s these cities have formed urban corridors enough functional to be a central part of a global production network (Fujita and Ishii, 1991). During all that period of industrialization, urbanization is soaring. The Asian urbanization rate reaches a maximal value in the years 1980-85 and remains the highest in the world until now. Thus to analyze the relationship between urbanization and trade, it seems judicious to focus on Asia and in particular on East Asia.

2.1 Urbanization and Globalization in East-Asia

Globalization has been a crucial process in East-Asia with consequences on the spatial economy of these countries. To illustrate this we briefly analyze Taiwan, Korea, China and Japan.

Taiwan is maybe one of the most powerful example of a small territory of 36 008 km² which is known worldwide. Urbanization in Taiwan is a recent event, in 1950 only 24% of the population lived in cities. Rural-Urban migrations have been more beneficial for Northern and Southern regions than for the central one. In the North, Taipei, the first world city of the country, represents a strong magnet that weakened the central region. In the South, some cities like Kaohsiung, initially specialized in heavy industry sectors, have also been very attractive for rural workers. However, the distribution of activities is more balanced regionally in Taiwan than in other Asian tigers. Each region hosts a metropolitan area that represents a local point of attraction for rural workers. Export-oriented industries became the dominant strategy in the 1960s with the political objective to create job opportunities in rural area. Hsinchu is exemplary of this period since this city undertaken a specialization in the textile industry (see Tsai, 1996). As described by Evans (1995) in its comparative analysis of industrial transformations, the regime has been able to enforce an embedded autonomy leading to a growing integration of Taiwan in the World economy. In brief, the industrialization rent has not been captured by a small localized elite but has been widespread

⁶However Glaeser and Kahn (2001) show that in the USA jobs follow people.

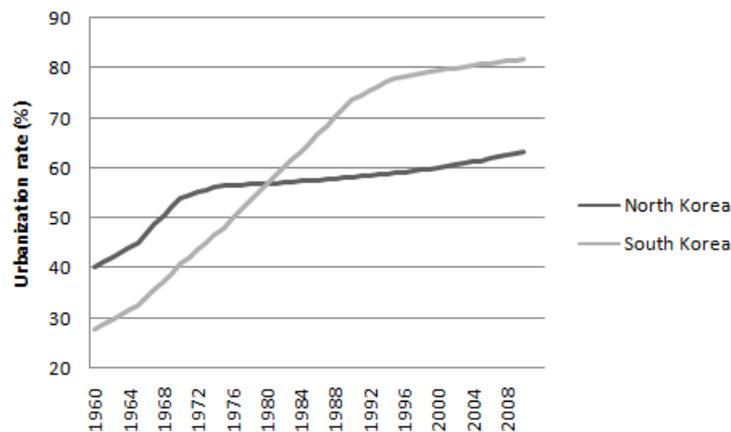
on the territory which explains the past process of urbanization.

South Korea is another example of how globalization has changed the spatial economy of a country. With few natural resources and small-size territory, the growth of South Korea cannot be explained without resorting to economic strategy and openness. After the energy crisis of the 1970s, the Third Five-Year Economic Plan aims to promote strategic industries for exportation. Investments are directed towards heavy and chemical industries. After overcapacity in the heavy industry, the country succeeds its specialization in steel, shipbuilding and then in automobiles and semiconductors (Stuwell, 2013).

The Capital Reorganization Law enacted in 1982 and the Rural Income Source Development Act of 1983 aim to redirect manufacturing industries from the overcrowded Seoul to provincial area. One of the closest region of Seoul which has the most beneficent of these policies is maybe the Kyunggi region in which industrial activities represent only 10% of the national GDP in 1960 but rise to 32% in 1989 (compared to the same period, the share of Seoul is twice smaller). At the same time, labor militancy has helped to reshape the process of industrial transformation by pushing export strategies away from low-skilled jobs and low value-added sectors (Evans, 1995). The integration in the world economy driven by the state has brought new actors who have modified the state itself and then the country specialization in the global landscape. The capital of South Korea becomes a world city that concentrates service, high tech industries and headquarter of multinational firms. According to Hong (1996), in 1990, Seoul agglomerates 96% of the top 50 headquarters of the country and attracts 90,9% of FDI in the service sector.

To conclude, the share of the urban population increases from 28% in 1960 to 74% in 1990. This trend of urbanization is in sharp contrast with the one of North Korea. As figure 1 below illustrates, after fifteen years of trade integration dictated by Park in South Korea, the urbanization level of this country surpasses the one of the autarkic North Korea.

Figure 1: North and South Korea urbanization rates



Globalization has also profoundly modified the urbanization process of China. As it is well known, 1978 is a major turning point in the country's openness. The open door policy has started with the creation of Special Economic Zones (SEZs) with good infrastructures and tax holidays to attract FDI and to promote exports. The integration of China in the world economy increases even more in the 1990s, indeed while exports represent only 10% of the GDP in 1980, this number soar to 37% in 2007 (Jarreau and Poncet, 2012). The design of SEZ and the development of "open economic cities and regions" in 1984 and 1988 has allowed a rapid development of coastal cities. These developments can be categorized by separating old urban settlement such as the Liaodong Peninsula, the Yangtze River Delta, the Pearl River Delta and the triangle Beijing-Tianjin-Tangshan to new urban clusters of cities in the Shandong Peninsula and around Fuzhou and Xiamen. Thus, the open policy has initially reversed the previous policies that aimed to develop Western and Central regions. However, things change quickly. The price of land and wages increase in coastal regions (Zhang et al., 2011; de Sousa and Poncet, 2011) and fierce competition in tax and environmental norms among provinces (Renard and Xiong, 2012) imply that internal regions are more attractive to FDI⁷ and for Chinese investments. All this concurs to spatially spread the process of industrialization and opportunities of urbanization.

Urbanization in Japan is maybe the first example in Asia of how integration in the world economy has stimulated the internal spatial economy. In contrast with first industrialized countries (e.g. England), industrialization in Japan has been financing by the government, in part via high taxation on agricultural incomes. According to Ohkawa and Rovosky (1973) tax on land represented 80% of fiscal income in 1890 and subvention to the industrial sector 60% of expenditure. The Taisho period, that succeeds the Meiji period in 1912, is the starting point of democratization, globalization and industrialization (Sorensen, 2002). Expansion of the textile industry with cotton spinning around big ports such Osaka and Nagoya, where cotton was imported, starts in the 1920s and fastly compete old industrialized nations (Harris, 1982). The authoritarian regime that follows supports heavy industries near Tokyo and Osaka and near naval factories at Yokosuka, Hiroshima and in Sasebo. In the aftermath of the World War II and its terrible consequences on the Japanese urban life, urbanization decreases but not for a long time. In the 50s Japan starts an incredible industrial expansion largely based on exportation. Indeed while the share of Japanese exports represented 1.3% of world exports in 1955, it reaches 6.4% in 1973 (Subramanian and Kessler, 2013).⁸ After a phase of agglomeration in the largest metropolitan areas (Tokyo, Osaka,

⁷ Amiti and Javorcik (2008) by working on 515 Chinese industries at the provincial level during 1998-2001 find that the main determinants of FDI are the market and supplier access of cities.

⁸ To give an emblematic example, in the 50s Japan was a small car maker but in 1980 it becomes the largest producer in the world (Harris, 1982).

Nagoya), dispersion of activities starts and the Economic Planning Agency even proposed a plan for regional dispersion of activities in 1969. Negative externalities of metropolitan concentrations became critical. Traffic congestion, housing price and pollution fostered dispersion and more urbanization (see Fujita et al. 2004). All these events have generated the Pacific Industrial Belt from Tokyo to Osaka, with extensions westward (on the coast of the Seto Inland Sea to Kyushu) and northward (North Kanto Plain).

Obviously, the pace of urbanization has not been magnified by globalization in all Asian countries. Maybe because industrialization has not been so significant in many other Asian countries. In South-east Asia, Thailand is the typical example with a specialization in agriculture and 34% of the population living in cities in 2010. In that case globalization by raising rural incomes can play against urbanization. In South Asia, similar situations can be found. In India for instance, the level of urbanization only reach 30% in 2010.⁹ This raises the question to know whether trade integration fosters urbanization everywhere. Furthermore, rural to urban migration in many parts of the world are not driven by industrialization. Many workers find jobs in informal services which are insulated from the global integration. Moreover many dynamic cities are not directly connected to the world economy. Thus it is possible that globalization has a non significant impact on urbanization. This claim is all the more realistic that industries employ a smaller share of the total employment (even in China) than first industrialized countries in their golden age. The decrease of communication and trade costs has generated a dispersion of industrial activities at the world level, and thus desindustrialization occurs in developing countries with low level of industrialization in comparison with historical standard. For instance Rodrik (2013) reports that Germany has started its desindustrialization after employing 40% of the total employment in manufactures, while South-Korea reach its highest level at 28% and China at 15%.

Lastly, public policies may also explain the divergent impact of globalization on urbanization in different countries. Strategies to import substitution have favored urban primacy (Ades and Glaeser, 1995) while in export-oriented countries, urbanization has been more spatially balanced.

2.2 Prima facie evidence?

Here we lead a first simple econometric exercise to analyze whether globalization matters to explain rural-urban migration. A panel estimation with fixed effects (to control for heterogeneity) regressing urbanization with respect to an indicator of market access is proposed. The indicator of market access is the index of market potential of Harris (1954) defined as the sum of the gross

⁹Mainly in reason of caste networks that allows risk-sharing arrangements and ties individuals where they are born, urbanization due to rural-urban migration has been lower in India than in other Asian countries (Munshi and Rosenzweig, 2009).

domestic product (GDP) of partners, weighted by bilateral distances:

$$\Omega_i^H = \sum_{j=1}^R \frac{Y_j}{d_{ij}},$$

where d_{rs} is the distance between regions r and s , and Y_s is the regional GDP. This indicator is widely used in the literature and usually performed better than more sophisticated measure of trade integration.¹⁰

We use ordinary least squares to estimate the following relationship over the period 1962-2010 on Asian countries:

$$\ln u_{it} = -12.24 - 0.61 \ln \Omega_{it}^H + \gamma_i + \lambda_t + \epsilon_{it}.$$

(8.35) (0.46)

where u_i is the level of urbanization in country i at time t . Standard errors are reported in parentheses, the R-squared is 0.94 and the number of observations is 931. The main result is that the estimated coefficient of the market potential is not significant.

In contrast by estimating the same equation for only East Asian countries (Taiwan, South Korea, China and Japan) for 1962-2010, we obtain:

$$\ln u_{it} = -1.54 + 0.10 \ln \Omega_{it}^H + \gamma_i + \lambda_t + \epsilon_{it}.$$

(0.175) (0.010)

A one percent increase in market potential implies a rise of urbanization of 10 percent, in Eastern Asian countries. This coefficient is highly significant and leads us to confirm that trade integration has really fostered the urbanization process. The global significance is admitted with a R-square equal to 0.87. Thus, globalization seems to have a very localized effect, only significant for East Asian countries. Maybe the level of trade integration needs to be high enough to foster urbanization.

These results also lead to question our indicator of market access that only takes into account distance and nominal GDP. As a consequence, we propose a theoretical model to find micro-foundations of the market access indicator. The index of market access obtained is similar to the one of Redding and Venables (2004), which to date has not been used to analyze urbanization.¹¹

¹⁰This measure of market access has been used in particular by Hanson (2005) to verify the relevance of the EG literature for the U.S. economy. This indicator takes into account the importance of accessibility but overlooks the local competition effect emphasized in many models (including ours). Therefore, Head and Mayer (2004) call this indicator nominal market potential, because local price indexes are not integrated.

¹¹For instance regarding China, Amiti and Javorcik (2008) use this indicator of market access to analyze FDI while de Sousa and Poncet (2011) focus on wages.

3 Model

3.1 Geography and Preferences

Let's start the description of the model by the geography considered here. There is R countries in the world, each divided by an urban and a rural area. Workers are mobile between urban/rural regions but not between countries. As in Anderson and van Wincoop (2003) we assumed that there is a product differentiation by country-of-origin (Armington, 1969). There are three categories of goods. The urban, differentiated good x , traded between each location with iceberg costs. The rural, homogenous good a , traded without costs, and lastly housing h . Preferences are represented by a Cobb-Douglas function with a share α of income spent on h , a share $(1 - \alpha)\mu$ spent on x and $(1 - \alpha)(1 - \mu)$ in a . The manufactured good is a composite made of a continuum of differentiated varieties represented by a CES function. The population is composed of urban and rural individuals with consumption of consumer k ($k = u, r$) obtained from the following utility function:

$$U_{j,k} = (h_{jk})^\alpha \left(x_j^\mu a_j^{1-\mu} \right)^{1-\alpha} \quad (1)$$

$$x_j = \left(\sum_{i=1}^r c_{ijk}(z)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad (2)$$

where x is a basket of different varieties $c_{ijk}(z)$ produced by a firm z located in city i and consumed in the region k ($k = (u, r)$) of a country j . a is the consumption of the agricultural good, and h the housing consumption. σ is the elasticity of substitution between varieties. The budget constraint for urban and rural individuals is given by $Y_{jk} = p_{jkh}h_{jk} + p_a a_j + P_j x_j$ where P_j is the price index of varieties in country j and p_a the price of the homogeneous good and p_{jkh} the price of housing in j for k .

Prices differ between locations in reason of bilateral trade costs (τ_{ij}). A good produced in country i is sold in country j at the price $p_{x_{ij}} = p_{ix}\tau_{ij}$. This gives the following price index P_j :

$$P_j = \left[\sum_{i=1}^r (p_{ix}\tau_{ij})^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (3)$$

When the number of variety increases, price index decreases and so raises the consumption of each variety and improve welfare. Indeed utility maximization yields the demand functions in area k of

country j :

$$\begin{aligned} x_{jk} &= \frac{\mu(1-\alpha)w_{jk}L_{jk}}{P_j}, & a_{jk} &= \frac{(1-\mu)(1-\alpha)w_{jk}L_{jk}}{p_a} \\ h_{jk} &= \frac{\alpha w_{jk}L_{jk}}{p_{h_{jk}}}, & c_{ijk} &= (p_i\tau_{ij}/P_j)^{1-\sigma} \mu(1-\alpha)Y_j \end{aligned}$$

where L_{jk} represent the number of urban and rural people (with $k = u, r$).

Welfare in each location is given by indirect utilities (omitting constant multiplicative terms), respectively denoted V_u and V_r :

$$V_{jk} = \frac{w_{jk}}{p_{jkh}^\alpha P_j^{\mu(1-\alpha)}} \quad (4)$$

3.2 Supply

Perfect competition holds in all sectors. The price of the agricultural good is taken as a numéraire. Subscript regarding countries are dropped when not necessary. This good is produced under decreasing returns in rural area and freely traded, the production function is given by:

$$a_r = L_r^{1-\gamma} \quad (5)$$

which yields

$$w_r = (1-\gamma)L_r^{-\gamma} \quad (6)$$

then wage in the countryside increases with the urbanization rate.

The industrial sector only uses urban labor and exports all around the world. Technology is Ricardian with A_i the marginal product of labor in country i . Increasing returns at the city level is assumed. The existence of this kind of increasing returns are now well documented (see Melo et al., 2009 for a meta-analysis). For instance the elasticity of productivity with respect to population is ranked between 4 to 8%.¹²

Since economies of scale in the industrial sector are external to the firm, perfect competition is sustainable (Chipman, 1970) i.e firms take prices and wages as given and do not take into account the fact that their concentration increases labor productivity. Then under perfect competition and constant returns at the firm level, the wage rate in the urban sector r equals $p_{ix}A_i$. Despite the fact that external increasing returns have found solid micro-foundations,¹³ we keep the modeling

¹²Depending on control for sorting of the most productive individuals and for productivity gains from the toughness of competition. See respectively Combes, Duranton and Gobillon (2008) and Combes, Duranton, Gobillon, Puga and Roux (2009).

¹³Micro-foundations of agglomeration economies are respectively based on sharing (indivisible facilities, a variety of inputs, risks), matching (supply and demand on the labor, banking or goods market) and innovation (or diffusion of ideas). See Duranton and Puga (2003).

as simple as possible by considering an aggregate function for A_i . This modeling has clear drawbacks,¹⁴ but becomes an advantage when turning to the empirical side, data being not available to distinguish the various forms of increasing returns in our sample.

Thus let considers external economies of scale à la Helpman (1998) with $A_i = L_{iu}^\epsilon$ where L_{iu} is the urban labor force in i . This gives the following urban GDP:

$$x_i = L_{iu}^{1+\epsilon} \quad (7)$$

and nominal wage:

$$w_{iu} = p_{ix} L_{iu}^\epsilon \quad (8)$$

The urban wage is then increasing with respect to the population.

Concerning the housing sector, the homogeneous space is broken by considering that the supply of land is elastic in the countryside $h_r = L_r$, and inelastic in the city $h_u = \bar{h}$. Without loss of generality, the urban stock of housing is normalized to one ($\bar{h} = 1$).

3.3 Population and globalization

Market clearing concerning the housing market yields the equilibrium price of housing

$$p_{h_u} = \alpha w_u L_u$$

in the urban area and

$$p_{h_r} = \alpha w_r$$

in the rural region. From the indirect utility (4) the spatial equilibrium is defined by $V_u = V_r \Leftrightarrow w_u (p_{h_u})^{-\alpha} = w_r (p_{h_r})^{-\alpha}$ then by using the price of housing at the equilibrium, this expression can be rewritten $w_u L_u^{\frac{-\alpha}{1-\alpha}} = w_r$. Finally according to the wage equations (8) and (6) one gets the following spatial equilibrium:

$$\frac{L_u^\eta}{L_r^\gamma} = \frac{p_x}{1-\gamma} \quad (9)$$

with $\eta = \frac{\alpha}{1-\alpha} - \epsilon$. Remark that with $\eta > 0$ the ratio of urban/rural is positively correlated with price in the manufacturing sector.

Regarding the market for this good, the nominal sales are obtained by considering demands and iceberg costs:

$$p_{ix} x_{ij} = (p_{ix} \tau_{ij} / P_j)^{1-\sigma} \mu (1-\alpha) Y_j \quad (10)$$

¹⁴Impacts of increasing returns on welfare depend on their forms.

This equation contrasts with the standard model of Anderson and van Wincoop (2003) on various aspects. In particular, concerning the Left Hand Side (LHS), urban GDPs instead of national GDP are considered (since x_{ij} is the urban production). Furthermore, the LHS endogenously vary with urbanization. On the Right Hand Side (RHS), partners GDP are also endogenous as well as price index that depends on urban wages in each countries, which are themselves influenced by location choices. The model is thus similar to the one obtained in the EG literature.

Before fully analyzing this expression, let's analyze the closed economy. Indeed existence of the equilibrium can easily be obtained under autarky.

In a closed economy, the market equilibrium for good x is given by $p_x x = \mu(1 - \gamma)Y$ with $Y = (px + a)/(1 - \alpha)$. Then by inserting (7) and (5), one gets $\mu L_r^{1-\gamma} = (1 - \mu)p_x L_u^{1+\epsilon}$. This expression used with the spatial equilibrium (9) gives:

$$\frac{L_u^{1+\epsilon+\eta}}{L_r} = \frac{\mu}{(1 - \mu)(1 - \gamma)}. \quad (11)$$

Because $1 + \epsilon + \eta > 0$, the ratio of urban/rural increase with respect to industrialization (μ). As a corollary another result can be demonstrated. By using the definition of urbanization ($u = L_u/L$) and considering that $L_u = L - L_r$ one gets:

$$\frac{u^{1+\frac{\alpha}{1-\alpha}}}{1-u} = \frac{\mu}{(1 - \mu)(1 - \gamma)} L^{-\frac{\alpha}{1-\alpha}} \quad (12)$$

Thus because the left hand side of this expression is increasing in u while the right hand side is decreasing in L , the existence of an equilibrium is proven and the urbanization rate decreases with respect to the total population.

Now regarding the open economy, summing sales (10) over all destination markets and using (7) yields:

$$p_{ix}^{-\sigma} = \frac{L_u^{1+\epsilon}}{\Omega_i^{1-\sigma}} \quad (13)$$

$$\text{with } \Omega_i^{1-\sigma} \equiv \sum_{j=1}^r (\tau_{ij}/P_j)^{1-\sigma} \mu(1 - \alpha)Y_j \quad (14)$$

where the term $\Omega_i^{1-\sigma}$ reflects the aggregate market outlet weighted by trade costs for each market i . In the literature this term has taken three different names. Anderson and Yotov (2009, 2010) calls Ω_i the outward multilateral resistance in order to emphasize that this term represents all trade costs on destination markets. Redding and Venables (2004) obtains a similar expression with a monopolistic competition model and refer to $\Omega_i^{1-\sigma}$ as an indicator of market access. Lastly Head

and Mayer (2004) called this term the real market potential because in contrast with the market potential of Harris (1954), price are taken into account.

The main difference with Anderson and van Wincoop (2003) is that Ω_i is endogenously driven by urbanization. There are three opposing effects, two forces that make cities attractive and one that deters urbanization. On one side, there is a scale effect: other things equal, income will tend to be higher in countries with more urbanization, since cities generate economies of scale. On the other side, there is a competition effect, more urban workers imply more firms that compete on the good market. As a result, this increase in the supply of goods generate a decrease in prices.¹⁵ Beside this dispersive force encapsulated in the price index, there is a second agglomerative force. Indeed because price of industrial goods decrease with urbanization, the cost of living falls. The productive city also becomes a consumers city. In other words, there is trade-off between external economies of scale, costs of living and competition.

From the spatial equilibrium one gets p_x and thus from Equation (13) the urbanization rate is implicitly given. Furthermore, from (13) we obtain:

$$\frac{\partial L_{iu}}{\partial \phi} = -\frac{\sigma}{1+\epsilon} p_{ix}^{-\frac{\sigma}{1+\epsilon}-1} \frac{\partial p_{ix}}{\partial \phi} \Omega_i^{\frac{1-\sigma}{1+\epsilon}} + \frac{1-\sigma}{1+\epsilon} \Omega_i^{\frac{1-\sigma}{1+\epsilon}-1} \frac{\partial \Omega_i}{\partial \phi} p_{ix}^{-\frac{\sigma}{1+\epsilon}}$$

Thus as long as trade liberalization reduces price $\frac{\partial p_{ix}}{\partial \phi} < 0$ and multilateral trade costs ($\frac{\partial \Omega_i}{\partial \phi} < 0$), the population in the urban area increases (because $\sigma > 1$). Trade liberalization by raising the market access can foster urbanization. Our empirical analysis aims to study this relationship.

4 Empirical analysis

4.1 Main strategy

The aim of this empirical analysis is to assess the impact of trade on urbanization. By using the previous section to analyze exportation given by $X_{ij} = p_{x,i} x_{ij}$ with

$$P_j = \left(\sum_{i=1}^R \frac{L_{iu}^{1+\epsilon}}{\Omega_i^{1-\sigma}} \phi_{ij} \right)^{1/(1-\sigma)} \quad (15)$$

a micro-founded gravity equation is obtained:

$$X_{ij} = \phi_{ij} \frac{L_{iu}^{1+\epsilon}}{\Omega_i^{1-\sigma}} \frac{Y_j}{P_j^{1-\sigma}} \quad (16)$$

¹⁵This contrasts with model analytical model of the New Economy Geography à la Ottaviano and Forslid (2003) where price only depends on the markup of monopolistic firms and are constant with migration.

The term $L_{i,u}^{1+\epsilon}$ represents urban GDP of the country i (see Equation 7), and Y_j is total GDP of country j . The price index Ω_i , which refers to the multilateral trade resistances, given by Equation (14), once computed, is used to analyze urbanization. This gravity equation is estimated with pseudo-maximum likelihood (PPML) estimator¹⁶ and country-level fixed effects to control for invariant country-specific characteristics:

$$X_{ijt} = \lambda \ln \phi_{ij} + a_i \ln FX_i + a_j \ln FM_j + e_{ijt}, \quad (17)$$

where FX_i and FM_j are fixed effects to control for country's market and supply capacity $L_{iu}^{1+\epsilon}/\Omega_i^{1-\sigma}$ and $Y_j/P_j^{1-\sigma}$. Predicted values of market access are therefore given by equation (14):

$$\widehat{\Omega}_i = \left[(\exp(FM_i))^{\widehat{a}_i} \phi_{ii}^{\widehat{\lambda}} \right] + \sum_{j \neq i} \left[(\exp(FM_j))^{\widehat{a}_j} \phi_{ij}^{\widehat{\lambda}} \right], \quad (18)$$

in which \widehat{a}_i , \widehat{a}_j , $\widehat{\lambda}$ are the parameter estimates of the gravity equation regression. In this equation, bilateral trade costs ϕ_{ij} take the following common specification:

$$\phi_{ij} = \text{dist}_{ij} \exp[Z_{ij}]. \quad (19)$$

where Z_{ij} is a vector of dummies characterizing bilateral trade barriers reflecting diplomatic relations, the sharing of a currency, same language, and common legal system. Turning to internal trade costs ϕ_{ii} , we follow Redding and Venables (2004) by expressing the internal trade costs in function of internal distances, computed for a circular country, as it follows:

$$\begin{aligned} \phi_{ii}^{1-\sigma} &= \text{dist}_{ii}^{\frac{1}{2}\widehat{\lambda}} \\ \text{dist}_{ii} &= 0.66 \left(\frac{\text{area}_i}{\pi} \right), \end{aligned}$$

where area_i is the surface in km.

At the final point, urbanization is regressed with the predicted value of market access using ordinary least squares estimator (OLS). More precisely from Equation (11) the following expression is estimated:

$$\ln u_{it} = \alpha_0 + \alpha_1 \ln \widehat{\Omega}_{it} + \alpha_2 \ln L_{it} + \alpha_3 \ln W_{it} + \varepsilon_{it} \quad (20)$$

where u_{it} is the level of urbanization (urban population/total population), $\widehat{\Omega}_{it}$ the predicted value of market access, L_{it} total population and W_{it} various time-varying control variables.

¹⁶Following the work of Silva and Tenreyro (2006), the use of pseudo-maximum likelihood estimators (Poisson and derived econometric models) is justified for treating heteroskedasticity and dealing with the presence of zero trade values.

4.2 Globalization matters

Table 1 presents a first round of estimations on the basis of Equation (20). Urbanization is regressed with the log of constructed Market Access ($\widehat{\Omega}_i$, given by Equation (18)) by using Least-Squares Dummies Variables (LSDV) estimator implying country-specific dummies as time-invariant controls. In order to assess the coefficient of market access and refine the results, we examine the parameter estimates for different geographical locations. Asia is divided into three sub-regions, Africa into Sub-saharan and northern African countries, America is split into North and South America, Middle East countries which are mainly oil exporters are also gathered into a sub-region.

Table 1: Urbanization and Market Access, selected regional estimates, 1962-2010

	Coef. estim	SE	t-stat	R ²	F	obs
South-Eastern Asia	0,329	0,018	18,31 ***	0,85	266,19	343
Eastern Asia	0,175	0,013	13,47 ***	0,90	480,38	245
Rest of Asia	0,260	0,024	10,73 ***	0,82	214,92	343
South America	0,169	0,006	24,55 ***	0,86	297,19	980
North America	0,059	0,005	10,48 ***	0,61	75,89	147
Europe	0,0061	0,004	13,71 ***	0,91	500,85	539
North Africa	0,264	0,025	10,19 ***	0,73	132,22	245
Sub-saharan	0,330	0,013	23,78 ***	0,76	156,58	2009
Middle-East	0,164	0,011	13,94 ***	0,84	267,72	683
Oceania	0,019	0,003	5,08 ***	0,41	33,36	98

OLS Estimations using country-specific fixed effects. Period of analysis: 1962-2010

The first important statement is the high significant level of all market access coefficients, whatever the region concerned. For all developing regions such as South-Eastern Asia¹⁷, Eastern Asia¹⁸, and Rest of Asia¹⁹, we obtain a strong coefficient of market access. By comparing the three Asian regions, we observe that South-East Asia has the strongest coefficient, followed by the rest of Asia and Eastern countries. This is an interesting result which bears out the idea that globalization implies a rise of urbanization even for countries which are not concerned by strong industrialization processes. The fact that the positive influence of openness is stronger for South-Eastern Asian countries confirms the potential role of globalization even if these countries are lesser industrialized than Eastern Asian countries. It is noticeable that the positive impact of market access is verified for both oil exporting and non exporting countries. The only regions for which market access represents a poor determinant of urbanization are the most developed countries, namely the Euro Zone and North America, with elasticities respectively equal to 0.006 and 0.059. This result is easily explained by initial high levels of urbanization (more than 80% of

¹⁷Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand and Viet Nam

¹⁸China, Hong Kong, Japan, Korea and Singapore.

¹⁹Afghanistan, Bangladesh, India, Mongolia, Nepal, Pakistan and Sri Lanka

population lives in urban areas).

In addition to globalization, the theoretical model underlines the role of population to explain urbanization. However population, used in level can be problematic as it is present in both right and left-hand sides of the equilibrium expression of urbanization (11), since our dependent variable is defined as the ratio of urban to total population. Consequently, an increase of total population will mechanically imply a negative correlation with urbanization rates. Then, if population is introduced on its own, the regression results will be fallacious. Indeed, this is a recurrent issue in many papers working on the reverse relationship, namely the influence of urbanization on population growth, through diverse channels, such as a smaller fertility rate in urban areas (Lee and Farber, 1985; Sato, 2007; Simon and Tamura, 2009). Furthermore, population is theoretically suspected to be correlated with market access. This is confirmed by a Pearson correlation index, equal to 0.18²⁰. Thus population is excluded and heterogeneity is treated by decomposing the sample by regions and by using country-specific effects. As a robustness check in the Appendix we first replace the log of population by growth rates. Similar results are obtained.²¹

4.3 Endogeneity bias

Endogeneity is a serious concern regarding our preceding results, taking sources in both omitted variables and reverse causalities. We first address the problem of omitted variables, instrumental strategies follow.

The role of institutions, such as the political regime, is lacking here while it is presenting as a significant factor of location choices for individuals. Davis and Henderson (2003) show that democratization and fiscal decentralization allow a dispersion of the urban population. Investigating in more details institutions and city growth, Henderson and Wang (2007) show that democratization favors small cities. Ades and Glaeser (1995) underlined the urban bias of autocratic regimes, where urban giants are build (urban primacy). According to their analysis, dictatorial governments have urban giants 50% higher than democratic governments. By asking how governance affects urbanization, instead of urban primacy, our study is complementary to Ades and Glaeser (1995) both regarding the variable explained and the period analyzed. Indeed our study covers the period over 1962-2010 (instead of 1970-1985).

As a measure of governance, we use the Polity IV index, which measures the different expressions of democracy/autocracy in governing institutions (using scores for each expression). This index

²⁰ Pearson correlation matrices are reported in the Appendix

²¹ We have also proceeded to other estimations (available on request) using historical values of population (1920 and 1950). In each case, population has a negative impact of urbanization and its estimated coefficient is stable over time (around -0.05).

has the advantage to be defined on long time-series.

We regress urbanization for the World and for Asia, keeping our variable of interest, the log of market access, with this index. The specification is estimated on pooled data and by using within-group effects. Table 2 presents the different parameter estimates.

Table 2: Urbanization regressed by market access and political regime, from 1962 to 2010

1962-2010	World		Asia		Rest of the World	
log (Market Access)	0.278 (0.012)***	0.188 (0.005)***	0.438 (0.033)***	0.276 (0.016)***	0.262 (0.013)***	0.176 (0.005)***
Polity IV index	0.024 (0.001)***	0.009 (0.000)***	0.03 (0.003)***	0.007 (0.002)***	0.023 (0.001)***	0.010 (0.000)***
Estimation Model	<i>Pooled</i>	<i>Within</i>	<i>Pooled</i>	<i>Within</i>	<i>Pooled</i>	<i>Within</i>
R ²	0.20	0.27 ⁽¹⁾	0.43	0.43 ⁽¹⁾	0.18	0.26
F	738.82	1110.69	201.58	198.50	601.93	934.15
Obs	5897	5890	535	535	5362	5362

LSDV: Least Squares dummy variables model. (1) No intercept in model, R² is redefined.

Political regime has a significant positive impact on urbanization rates. This additional control does not affect the significance of market access. Regarding the global significance of the model, it seems that trade is a key determinant because the coefficient of determination is between 0.18 and 0.43. It is noticeable that this explanatory power is even more important when Asia is concerned. Indeed, the coefficient increases twofold with a restriction on Asian countries.

Reverse causality is another problem requiring to adopt an IV approach.

4.3.1 Measurement errors and simultaneity: constructing an instrument for the Market Access

Reverse causality between our indicator of globalization and urbanization is obvious. The market access ($\widehat{\Omega}_i$) is built from estimated fixed-effects that capture country's market and supply capacities. Because these capacities are influenced by incomes and prices which are correlated to urbanization, this indicator of globalization is potentially endogenous. Consequently, our explanatory variables can be correlated to the error term ε_{it} .

We propose two different classes of instruments for market access. Firstly, following the literature showing that mobility and exchange between population leads to more genetic homogeneity, we used genetic distance as an instrument of trade integration. Secondly, following Frankel and Romer (1999), we instrument the market access with exogenous geographical features. In each case, we conduct to first-step estimations for each year, in order to obtain a time-varying instrumented market access. Furthermore, additional size controls based on populations and areas are used. Finally, when instrumental variables are based on geography, we use infrastructure indexes which also lead to obtain time-varying exogenous market access.

These two intermediate steps are presented successively.

First step using genetic distance The pioneering use of genetic distance in social science is attributed to Cavalli-Sforza (1994) who built a world database of bilateral distance. In a few words, Cavalli-Sforza has studied the human genome which is the whole set of genes that are present in each pair of chromosomes. Each gene (or *gene locus*) has different versions (at least two forms) or "*alleles*". Then human populations present some differences in alleles. These differences can be found within a population (93% of the human variability) or between two populations (7%, Guiliano, Spilimbergo and Tonon 2006). Cavalli-Sforza has reported the allele frequencies among populations and genetic distance is measured by the genetic differentiation among two populations using the gene frequencies.

Guiso, Sapienza and Zingales (2009) used genetic distance as a good proxy for cultural proximity that affects trade exchanges. Guiliano, Spilimbergo and Tonon (2006) deepen this analysis by linking geographical, cultural and genetic distances. Contrary to Cavalli-Sforza (1994) or Spolaore and Wacziarg (2009), they present genetic distance as a good proxy for transportation costs. Since our market access aims to capture trade costs including transport costs, we follow this approach and use the Cavalli-Sforza database to control for trade costs. We build a constructed share of trade costs that relies on cultural distances, instrumented by genetic data. Finally, since trust between two partners comes from informal cultural linkages but also from formal common legal system (den Butter and Mosch, 2003), we add exogenous variables reflecting the legal system to check the robustness of the results of our IV estimates.

To be more specific, we instrument the bilateral term of market access, which can be defined as following

$$\widehat{\Omega}_{ij} = (\exp(FM_j))^{\widehat{a}_j} \phi_{ij}^{\widehat{\lambda}},$$

where we remind that $\widehat{a}_j, \widehat{\lambda}$ are the coefficient estimates of partner-specific fixed effects and bilateral trade costs, results of the first gravity regression. The predicted values of the bilateral foreign market access (annotated $\widehat{\Omega}_{ij}$) are instrumented by the following econometric specification,

$$\ln \widehat{\Omega}_{ij} = \beta_0 + \beta_1 \ln(\phi_{ij}^G) + \beta_2 \ln(Z_{ij}) + \beta_3 \ln(S_i) + \beta_4 \ln(S_j) + \tilde{\varepsilon}_{ij},$$

where ϕ_{ij}^G are the bilateral genetic distances, Z_{ij} are other controls for bilateral formal barriers to trade (i.e. common institutions), S_{it} and S_{jt} are time-varying size controls (i.e. the logs of population, in addition to areas) and β are the set of parameters resulting from an OLS estimation *conducting for each year*.

This new constructed variable ($\ln\widehat{\Omega}_{ijt} = \ln\widehat{\Omega}_{ijt} - \widetilde{\varepsilon}_{ijt}$) can then be used to replace market access in the urbanization equation. First-step estimations for panel data set are reported in the Appendix.

Before presenting the second step of our estimation, we construct an alternative instrument, widely inspired from the existent literature, based on the geographic origin of trade costs.

First step using geography Relying on the geographic origin of trade costs, we follow Frankel and Romer (1999) who have proposed an instrument that only relies on exogenous geographical variables. By this way, this instrument controls for trade costs without any correlation with political and economic component, which ensures that the key variables are not correlated with the residual. In order to obtain a time-varying instrumented market access, we also use infrastructures indexes which vary over time. In brief, we consider the following a-theoretical equation:

$$\ln \frac{X_{ij} + M_{ij}}{Y_i} = a_0 + a_1 \ln \phi_{ij} + a_2 \ln S_i + a_3 \ln S_j + e_{ij}$$

where ϕ_{ij} are bilateral geographic variables, such as bilateral distances and common border, S_i and S_j are measures of country sizes (population, area). Baldwin and Taglioni (2007) have prevented against the use of import additionated to export, because bi-directional exchanges do not refer to the gravity, which explains uni-directional trade. But, as they properly underline, this issue ("silver" mistake) only concerns panel data estimates and our gravity equation is estimated in cross-sectional dimension, since our aim is to obtain time-varying coefficients for building the instrument of market access.

Once the gravity equation estimated, a constructed geographic share of trade can be computed as following:

$$\widehat{T}_i = \sum_{i \neq j} e^{\widehat{a}Z_{ij}}$$

and can be used as an time-varying geographic instrument for market access.

As a last robustness check, we choose to directly instrument the market access at its aggregated level by using unilateral geographical variables such as centrality index, distance-to-equator (as a proxy of climate), the country area, instrumental variables commonly used in the literature. Obviously, the introduction of time-unvariant variables makes the use of country-fixed effects irrelevant. Furthermore, we use in addition the index of infrastructures. Results of this step are also reported in the Appendix.

4.4 Second step, urbanization and globalization

Now we are ready to estimate Equation (20) using the three different instruments presented in the previous section.

Table 3 presents the estimated coefficients for the World. Whatever the instrumental variable used, the market access significantly affects urbanization. Interestingly instrumentation by culture or by bilateral market access are very closed to the naive regression. In contrast instrumentation by unilateral geography can lead to conclude that the initial estimation tends to under-estimate the effect of market access on urbanization.

	World		
log (Market Access)	0.116 (0.007)***	0.111 (0.003)***	0.519 (0.013)***
Estimation Method	IV-Within	IV-Within	IV-Within
Instrument	Culture ⁽¹⁾	Bilateral Geo ⁽²⁾	Geography ⁽³⁾
R ²	0.04	0.37	0.36
F	238.24	2273.25	1544.99
Obs	5006	5647	2957

(1) Market Access instrumented by cultural proximity (genetic distances and eco institutions)

(2) Bilateral trade index instrumented by geographic dyadic variables (Frankel and Romer (1999))

(3) Aggregated index of trade instrumented by centrality (Head and Mayer, 2006) and infrastructures

Table 4 leads the same estimation for Asia and for the rest-of-the world. All coefficients are significant. Market access has the highest impact on urbanization in Asia but it is still significant for the rest of the World, even if deindustrialization has been a major feature of most countries. In the eyes of the R-square and Fisher statistics, the market access instrumented by genetic distance and institutional proximity loose a share of its global explanatory power on urbanization. Quite the reverse, 'geographic' market access is characterized by strong global significance in both cases.

Table 4: Urbanization and Market Access, 1962-2010 for the World and Asia

	Asia			Rest of the World		
log (Market Access)	0.144 (0.020)***	0.136 (0.006)***	0.529 (0.020)***	0.111 (0.008)***	0.110 (0.002)***	0.513 (0.017)***
Estimation Method	IV-Within	IV-Within	IV-Within	IV-Within	IV-Within	IV-Within
Instrument	Genetic	Bilateral Geo	Geography	Genetic	Bilateral Geo	Geography
R ²	0.06	0.35	0.61	0.04	0.29	0.28
F	48.48	449.77	678.01	189.91	2062.90	906.77
Obs	753	833	404	4253	4814	2264

(1) Market Access instrumented by Cultural proximity (genetic distances and economic institutions)

(2) Bilateral trade openness index instrumented by geographic dyadic variables (method of Frankel and Romer (1999))

(3) Aggregated index of trade openness instrumented by geographic centrality (Head and Mayer, 2006) and infrastructures

According to these estimations, the elasticity of urbanization with respect to market access is positive and significant in all cases, but also is slightly higher when Asian countries are concerned

compared to the rest of the world. Market access, which includes the domestic home market effect and the foreign market access, leads to rural exodus of the population even when industrialization represents a small share of the total employment.

4.5 Effect of urbanization on economic growth

Here, we pursue our analysis beyond the scope of our theoretical model, to ask to what extent globalization and urbanization are factors of economic growth. Many studies have separately presented urbanization and trade integration as engines of growth (Bertellini and Black, 2004; Frankel and Romer, 1999) but the effect of globalization via urbanization on economic growth has not been yet analyzed. In order to isolate the role of the market access on the urban agglomeration of workers (labor accumulation), we instrument urbanization with the constructed market access using estimation of $\hat{\alpha}_1$ from Equation (20). Thus \hat{u}_{it} is constructed as follows:

$$\hat{u}_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 \ln \hat{\Omega}_{it} \quad (21)$$

where $\hat{\Omega}_{it}$ is alternatively replaced by $\tilde{\Omega}_{it}$ and \hat{T}_{it} the instrumented indexes. This three step estimation ends by regressing the GDP growth of Asian countries i at time t , denoted g_{it} , on the predicted values of urbanization. The following specification describes the estimated equation:

$$\ln(g_{it}) = \ln(\hat{u}_{it}) + \varphi_i + \delta_t + \varepsilon_{it}$$

with φ_i and δ_t individual and temporal fixed effects. Table 5 reports this last round of estimations. Economic growth of Asian countries is regressed on the predicted values of urbanization following the previous specification. Size controls are introduced in the estimation, based on populations and areas. Indeed, as only Asian countries are represented in this last step, we do not use country-fixed effects. As reported in Table 5 the total significance is quite important even if dummies are not used.

Table 5: Economic growth and Urbanization in Asia, 1962-2010

log (Urbanization)	4.852 <i>(0.468)***</i>	3.612 <i>(1.089)***</i>	3.691 <i>(0.517)***</i>
Estimation Method	<i>IV-2SLS</i>	<i>IV-2SLS</i>	<i>IV-2SLS</i>
Urbanization and Market Access	OLS	2SLS ¹	2SLS ²
Controls	Size ³	Size ³	Size ³
R ²	0.46	0.44	0.41
F	223.97	197.84	99.22

(1) Market Access instrumented by Cultural proximity
(2) Market Access instrumented by Geography
(3) Size controls are the log of area and population.
As expected, the sign of area is <0 and the sign of population is >0

We find that urbanization affects positively growth in all specifications. This result echoes back to the Krugman (1994)’s analysis of growth in Asia. The author discuss factor accumulation *versus* global productivity gains to explain growth in Asia. Although not directly interested by trade, Krugman (1994) has pointed out:

’If Asian success reflects the benefits of strategic trade and industrial policies, those benefits should surely be manifested in an unusual and impressive rate of growth in the efficiency of the economy. And there is no sign of such exceptional efficiency growth’.

In short, Krugman (1994) considers that trade has not contributed to global productivity gain but instead to factor accumulation. Our result confirms that the accumulation of labor via urbanization due to globalization has been a significant factor of growth.

5 Conclusion

We propose a model in which freer trade by raising incomes in urban area fosters urbanization. The theoretical model drives the empirical analysis which confirms that globalization has played a crucial role in the world and in Asia. This result is obtained using control for institutions and instrumental variables. We also show that the urbanization driven by globalization has been a factor of growth.

To open the debate, while we have answered to the title question, it remains to know *how* globalization has changed urbanization in the world. The fact that even in countries where few firms export, globalization matters to explain urbanization, questions us about the diffusion of the effects of international trade at the urban and rural level. We need to open the black box of external increasing returns at the city level to better understand spatial and sectoral externalities generated by exporters. We also wonder whether globalization generates an ”urban bias” for rural workers who choose to migrate.

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Table A.1: Data sources

Variable	Description	Source	Structure
Urbanization	urban pop/total pop	WDI	Panel
Democracy	voice index	WGI	Panel
Urban Klepto	urban water access/taxes	WDI	Panel
Rural Klepto	rural water access/taxes	WDI	Panel
Opposition	educational attainment (urban or rural)	UNSD	Panel
Constructed MA	indirect measure from prior gravity estimates	Authors	Panel
Genetic distance	Cavalli-Sforza calculations	GENDIST	Cross
Geo distance	Geodesic distances	CEPII	Cross
Geo centrality	authors' calculation	Authors	Cross
Infrastructures	Canning database from 1950	WB	Panel

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Appendix

A. Data

Bilateral international trade flows (at the aggregated level) come from the UN Comtrade database. Traditional explanatory variables, namely bilateral distances, common language, contiguity, colonial linkages are available from the CEPII website. The equation is estimated in cross-section, by using a PPML estimator on the basis of the Poisson distribution. Because of the high dimension of our fixed effects and the predominance of zero trade flows, we were confronted with some convergence issues, linked to the presence of countries that are. To bypass these problem of spurious convergence, we use the procedure of Silva and Tenreyro (2011) and the STATA code that is available in their "Log of Gravity" webpage.²² Once convergence is treated, the results of cross-sectional estimates present strong significance and signs that are common to the gravity empirics.

The following table reports data sources of the variables used in the empirical part of this paper

²²<http://privatwww.essex.ac.uk/~jmcss/LGW.html>

Correlation

Table A.2 presents the correlation coefficients of the variables used in the empirical part of this paper.

Table A.2 Pearson correlation coefficient for urbanization, market access and population.

Pearson Correlation Coefficients	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(urbanization) 5483 obs	1							
log(market access) 5483 obs	0.352***	1						
log(population) 5483 obs	0.039***	0.189***	1					
Polity IV index 5442 obs	0.358***	0.363***	0.206***	1				
log(telephone) 4842 obs	0.174***	0.481***	0.134***	0.185***	1			
log(power) 5326 obs	0.156***	0.322***	0.129***	0.179***	0.553***	1		
log(road) 3348 obs	-0.008	0.034**	0.011	-0.007	0.081***	0.130***	1	
log(railway) 3777 obs	0.038***	0.074***	-0.046*	-0.014	0.181***	0.160***	0.05***	1

*** significant at 1% ** significant at 5% and * significant at 10%

Population

Table A.3 regress urbanization by market access and population growth. It is verified that trade fosters urbanization and when population growth rates' coefficients are significant, they are positive. This is particularly true for South-Eastern Asian countries with strong densities of population on reduced territories, such as Indonesia, Malasia or the Philippines.

Table A.3: Urbanization regressed by market access and population growth rates

	log(Market Access)	SE	t-stat	Pop growth	SE	t-stat	R ²	obs
South-Eastern Asia	0,435	0,042	10,36***	7,71	2,949	2,62***	0,24	336
Eastern Asia	0,460	0,041	11,13***	5,91	2,74	2,16**	0,34	240
Rest of Asia	0,402	0,051	7,76***	1,78	2,90	0,61	0,15	336
South America	0,014	0,017	0,86	-19,28	1,25	-15,40***	0,23	960
North America	0,04	0,005	7,79***	-6,23	0,540	-11,55***	0,73	144
Europe	0,109	0,013	8,27***	-4,21	1,49	-2,83***	0,12	528
North Africa	0,418	0,042	9,84***	0,87	1,387	0,63	0,31	241
Sub-saharan	0,372	0,026	14,01***	0,910	1,090	0,84	0,09	1968
Middle-East	0,234	0,028	8,19***	1,509	0,364	4,14***	0,103	669
Oceania	0,019	0,003	5,08***	0,41	33,36	98	0,18	98

OLS Estimations- Pooled Panel - the dependant variable is the log of urbanization

Instrumentation

Table A.4 presents the correlation between market access and the constructed market access using genetic and institution proximity.

Table A.4 Pearson correlation between Market Access and its constructed values

Pearson correlation	Genetic	Genetic and institutions
log(Market Access), log(Constructed Market Access)	0.407***	0.407***

Table A.5 and A.6 report some first-step estimations on the total Panel data set.

Table A.5: Bilateral Foreign Market Access explained by Cultural proximity 1962-2010

	Informal channels		+Formal channels	
log (Genetic Distance)	-0.446 (0.003)***	-0.448 (0.002)***	-0.416 (0.002)***	-0.418 (0.002)***
Common legal system			1.805 (0.021)***	1.792 (0.020)***
Common language			0.265 (0.007)***	0.278 (0.007)***
Common currency			0.402 (0.023)***	0.234 (0.022)***
Controls	Time	Size ⁽¹⁾	Size ⁽¹⁾	Size ⁽¹⁾ /TE
Estimation Model	FT-OLS	OLS	OLS	FT-OLS
R ²	0.12	0.40	0.41	0.46
F	948.19	46393	28003.5	5284.51

(1) Size controls include areas of countries i and j (negative coefficients) and lags of population (positive for i 's pop, negative for j 's pop).

Table 6 reports the results of the alternative first-step estimations based on geography. Two columns refer to the bilateral instrumentation while the third column refers to the aggregated market access instrumentation.

Table 6: Instrumentation of bilateral and aggregated trade openness index

<i>instrumented by Geography,</i>	$\ln\left(\frac{X_{ij}+M_{ij}}{Y_i}\right)$	$\ln\left(\frac{X_i+M_i}{Y_i}\right)$	
log(distance)	-1.405 (0.005)***	-1.319 (0.010)***	
Contiguity	0.293 (0.023)***	0.212 (0.040)***	
i 's log(infrastructures)		0.453 (0.015)***	
j 's log(infrastructures)		0.409 (0.015)***	
log(Centrality index)		-4.167 (0.424)***	
log(area)		-0.679 (0.111)***	
landlock dummy		-1.897 (0.470)***	
Distance to Equator		0.102 (0.009)***	
log(infrastructures _{t})		0.275 (0.262)***	
Estimation Model	TE/LSDV	TE/LSDV	TE-OLS
R ²	0.683	0.695	0.12
F	4436.01	1594.43	7.69
Obs	621274	146828	2685

From these results, it appears that a bilateral strategy is more relevant in the eyes of the R-squared and Fisher statistics.