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When are Cities Engines of Growth in China? Spread and Backwash Effects across the Urban Hierarchy

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Abstract

Chen A. and Partridge M. D. When are cities engines of growth in China? Spread and backwash effects across the urban hierarchy, Regional Studies. China's remarkable growth has an urban bias, but it is unclear whether it has greatly disadvantaged particular regions. To assess this question, a Central Place Theory framework is employed to assess spread and backwash effects. It is found that New Economic Geography representations do not capture the heterogeneity across urban tiers. Market potential in China's mega-cities is inversely related to growth for smaller cities and rural communities, while medium-sized cities have positive spread effects. It is concluded that China's urban-centric process should be re-evaluated because it may not maximize aggregate growth, and growth in the mega-cities may reduce growth elsewhere.

Chen A. and Partridge M. D. [illegible]

[illegible]

Chen A. et Partridge M. D. Les grandes villes, à quel moment sont-elles les forces motrices de la croissance en Chine? Les effets de propagation et de remous à travers la hiérarchie urbaine, Regional Studies. La croissance remarquable de la Chine favorise les villes, mais il n'est pas tout à fait évident si, oui ou non, elle a sensiblement désavantagé certaines régions. Pour aborder cette question, on emploie un cadre fondé sur la théorie de la place centrale (Central Place Theory) pour évaluer les effets de propagation et de remous. Il s'avère que la Nouvelle géographie économique ne capte pas l'hétérogénéité aux niveaux urbains. Le potentiel du marché des mégapoles chinoises se rapporte inversement à la croissance des plus petites villes et des communautés rurales, tandis que les grandes villes de taille moyenne ont des effets de propagation positifs. On conclut que le processus centre-urbain en Chine devrait être réévalué car il se peut qu'il ne maximise pas la croissance globale, et la croissance des mégapoles pourrait ralentir la croissance ailleurs.

Chen A. und Partridge M. D. Wann sind Städte in China Motoren des Wachstums? Ausbreitungs- und Entzugseffekte in der urbanen Hierarchie, Regional Studies. Das bemerkenswerte Wachstum in China ist einseitig auf die Städte konzentriert, wobei jedoch unklar ist, ob bestimmte Regionen hierdurch stark benachteiligt werden. Zur Untersuchung dieser Frage werden Ausbreitungs- und Entzugseffekte im Rahmen einer Theorie der zentralen Orte bewertet. Es stellt sich heraus, dass die Darstellungen der neuen Wirtschaftsgeografie nicht die Heterogenität der verschiedenen urbanen Schichten erfassen. Das Marktpotenzial der chinesischen Megastädte steht in umgekehrter Relation zum Wachstum von kleineren Städten und ländlichen Gemeinden, während mittelgroße Städte positive Ausbreitungseffekte aufweisen. Wir ziehen den Schluss, dass der stadtzentrierte Prozess in China neu bewertet werden sollte, da er das Gesamtwachstum unter Umständen nicht maximiert und weil das Wachstum in Megastädten das Wachstum an anderen Orten beeinträchtigen kann.

Chen A. y Partridge M. D. ¿Cuándo son las ciudades chinas los motores del crecimiento? Los efectos de dispersión y regresión en la jerarquía urbana, Regional Studies. El

extraordinario crecimiento de China presenta un sesgo urbano, sin embargo no queda claro si esto ha perjudicado a determinadas regiones. Para valorar esta cuestión, empleamos una estructura sobre la teoría de los lugares centrales para evaluar los efectos de dispersión y regresión. Observamos que las representaciones de la Nueva Geografía Económica no captan la heterogeneidad en los diferentes niveles urbanos. El potencial del mercado en las mega-ciudades de China está inversamente relacionado con el crecimiento de las ciudades pequeñas y comunidades rurales, mientras que las ciudades de tamaño mediano tienen efectos de dispersión positivos. Concluimos que debería reevaluarse el proceso urbano-céntrico en China porque es posible que no estimule al máximo el crecimiento total, y el crecimiento en las mega-ciudades podría mermar el crecimiento en otros lugares.

Keywords:

Market potential | Spread and backwash effect | Urban hierarchy | Rural growth | China

JEL classifications:

R11 | R12 | R23

Keywords:

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Keywords:

Potentiel du marché | Effets de propagation et de remous | Hiérarchie urbaine | Croissance rurale | Chine

Keywords:

Marktpotenzial | Ausbreitungs- und Entzugseffekte | Urbane Hierarchie | Wachstum im ländlichen Raum | China

Keywords:

Potencial del mercado | Efecto de dispersión y regresión | Jerarquía urbana | Crecimiento rural | China

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Notes

For a discussion of price scissors, see Fujita and Hu (2001).

For a discussion of how the life cycle of industries and the industry composition of cities affect the role of agglomeration economies and technological change, see Neffke et al. (2011). For a survey of the underlying causes of agglomeration economies, see Puga (2010).

Ke and Feser (2010) also allow for heterogeneous effects by different city size. Yet, their approach considerably varies from the present approach in that it considers more explicitly heterogeneous effects between mega-cities, provincial capitals and prefecture cities, which were aggregated together in Ke and Feser's analysis. Moreover, both their sample and their conceptual framework considerably differ from the present market potential Central Place Theory/NEG approach.

Cheng and Selden (1994) provide a general description and history of the hukou system. There have been various analyses of the effects of the hukou system in the literature (Liu, 2005; Poncet, 2006; Whalley and Zhang, 2007). The general assessment is that in recent decades it has not greatly limited migration from rural areas and interior to the larger cities, which is an explanation for the rapid growth of coastal cities (Au and Henderson, 2006; Cai and Wang, 2010).

Glaeser and Gottlieb (2008) provide strong evidence that US regions are approximately in spatial equilibrium; while Glaeser et al. (2011) provide an application of the spatial equilibrium approach being used over a nearly 200-year span.

Data for cities are available back to the late 1980s, but the data for counties are available only back to 2000, which means that if one is going to consider rural areas, one has to begin in 2000. It is possible that China's spread and backwash effects differed in the past. First, countries earlier in the development process appear to experience greater urban backwash effects on rural areas as urbanization begins (for

example, Partridge et al., 2007b). Second, in the case of China before market liberalization, urban/rural spillovers could have greatly differed in unpredictable ways due to government policy, for example, Shanghai's role has greatly changed post-liberalization and globalization.

Counties and county-level cities are in the same hierarchy of administration in China. In fact, many county-level cities are transferred from counties. Compared with counties, county-level cities are better developed (with a higher proportion of the population in urban areas and higher manufacturing output, etc.). Even so, the county-level cities are more like counties than (prefecture and provincial capital) cities according to their economic structure. Thus, the sample of ‘counties’ includes both counties and county-level cities.

There are three growth poles in China's development in the post-1978 period, which include the Pearl River Delta, the Yangtze Delta and Bohai Economic Circle. Guangzhou, Shanghai and Beijing are the core cities of the three poles, respectively. They are highly privileged in the regional development policies. For example, in order to attract foreign direct investment into these poles, special economic zones were developed, which provides investors with preferential tax treatment and an exemption on duties (Demurger et al., 2002). The infrastructure, including the highway access and railway terminals, in these big cities also contributes to the inflow of foreign direct investment into these cities (Wu, 2000).

For a discussion of the city and county-level government structure and its evolution over time, see Ma (2005). One feature of the county-level city structure is that many cities often annex their peri-urban suburbs (Ma, 2005, pp. 491–493), which reduces one's need to account city–suburb interactions in the dataset because the suburbs are part of the ‘county-level city’ observation. The authors also use data from 260 larger cities to construct the market potential variables – namely, the prefecture cities, the provincial capitals and the three mega-cities. To be sure, these 260 larger cities are not in the sample.

Using per-capita GDP directly reflects firm productivity, which ties into the theoretical model's use of firm profitability. It is also common to use per-capita GDP as a proxy for wage and income per-capita (Hering and Poncet, 2010; Redding and Venables, 2004), though GDP does not reflect non-market factors such as pollution. Note that if the primary goal was to measure worker well-being instead of firm well-being, wages may

be a more appropriate measure, but wages are unavailable. In order to compute the real change in GDP, one adjusts by the provincial GDP price deflator, which is from the China Statistical Year Book (National Statistical Bureau, various issues). The results hardly change if instead nominal GDP is used.

Recent NEG models use a Krugman iceberg cost formulation to derive market potential or market access measures. Such a formulation greatly increases the ease in analytically solving the model (Head and Mayer, 2006; Hering and Poncet, 2010). However, the 'Krugman' formulation introduces measurement error into the derived market potential measures because this iceberg function is inconsistent with observations of spatial interactions between firms, individuals and agents (McCann, 2005; Fingleton and McCann, 2007). Fingleton and McCann (2007) note that the problem cannot be resolved with recourse to gravity estimations. Conversely, the Harris market potential does not rely on such restrictive assumptions, making it far more flexible and empirically tractable (and it is the correct measure when the traded good price differentials are small). In fact, Head and Mayer (2006) found that the performance of the structural NEG market potential measure to be 'discouraging' relative to the Harris market potential. Thus, given that the present approach is not an attempt to verify structural NEG models, the use of the Harris market potential measure appears to be a more accurate and flexible method of reflecting the spatial spillovers that the authors are interested in detecting.

For example, Combes and Lafourcade (2005) found that the correlation between distances and transport costs is 0.97.

If China's urban structure is primarily driven by international considerations such as trade and foreign investment, then the domestic market potential variables would be statistically insignificant, which was not the case. This pattern underlies the conclusion that domestic agglomeration-based spillovers are a key factor in describing Chinese regional development. The authors also considered distance to the coast as an alternative accessibility measure to explore more directly whether access to international markets, innovation, and even to multinational corporations and foreign direct investment are driving growth patterns. However, with one exception, this variable was statistically insignificant. The exception was in the rural employment growth model, where, as expected, its coefficient was negative. Yet, the magnitude of the big city market potential variable was even larger in this case. Given the weak performance of the distance to the coast variable, it was not considered further.

The authors further investigated the high correlation between MPN and MPB and found that a few market potential outliers drove the high correlations. When these respective outliers are capped to values of 5 and then 10, the MPN/MPB correlation falls into the 0.7–0.8 range, while the other correlations are modestly higher. The regression models were then re-estimated, respectively, using an MP cap of 5 and 10 and it was found that the regression results were not appreciatively affected (data not shown). The model was also re-estimated by using instead a standardized measure of market potential (that is, dividing by the standard deviation of market potential), but these results also produced similar patterns as the results shown in Table 3.

The authors experimented with using alternative cut-off distances and also a fixed number of neighbours such as five and eight in constructing the spatial weight matrix, but the results are not very sensitive to these changes.

For a discussion of LM tests on spatial dependence, see Anselin et al. (1996).

When the three models are also estimated with both the spatial lag of errors and the spatial lag of the dependent variables, the estimation results are not very different from those reported in Table 6.

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