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Article

Market sccess and home market effect

Open Economics

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De Gruyter

Suggested Citation: Karavidas, Dionysios (2020) : Market sccess and home market effect, Open Economics, ISSN 2451-3458, De Gruyter, Warsaw, Vol. 3, Iss. 1, pp. 42-49, <https://doi.org/10.1515/openec-2020-0003>

This Version is available at:

<https://hdl.handle.net/10419/236604>

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Research Article

Open Access

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Market Access and Home Market Effect

<https://doi.org/10.1515/openec-2020-0003>

Received Oct 3, 2019; accepted Jan 21, 2020

Abstract: Based on the standard Footloose Capital model developed by Martin and Rogers (1995), I consider an integrated model that consists of a system of two regions and a third external region, in order to study the impact of improved market access on the Home Market Effect within the system of the two regions. The concept of the Home Market Effect is well known in the literature, but once we extend the number of regions, many are unknown. The main finding of the model suggests that improved market access with respect to an external market enhances the Home Market Effect within the system of the two regions. Interestingly, I show that this finding comes from the fact that improved market access increases the Market Access Effect, while it has no impact on the Market Crowding Effect.

Keywords: Market Access, Home Market Effect, Footloose Capital, Internal Geography

JEL: F2, F22, F6, R12

1 Introduction

In the current paper, I apply a model consisting of two symmetric regions and an external region, in order to study the impact of improved market access on Home Market Effect (HME) within the system of the two symmetric regions.

In their seminal work, Martin and Rogers (1995) develop the most tractable of all the economic geography models, which we refer to as the "Footloose Capital" (FC) model. They consider a framework with two-regions, two-sectors, and two-factors, introducing the HME, i.e., a given change in market size leads to a more than proportional change in the share of industry in the big region. The HME constitutes the central research issue in several other works, including the one of Krugman (1980). More specifically, Krugman (1980) points out the HME in a model that differs from the FC model by Martin and Rogers (1995), since he assumes a unique immobile production factor and location is driven by firms' creation/destruction instead of capital movement. Helpman (1990) specifies the demand conditions under which the HME materializes, while Davis (1998) shows that under the consideration of transportation costs on homogeneous goods, which are produced under perfect competition, the HME may disappear. Interestingly, Feenstra et al. (1998) find that the consideration of monopolistic competition is not crucial per se as the HME can also be expected in homogeneous-good sectors with restricted entry. In a similar vein, Head et al. (2002) show that scarce immobile factor or preferences for goods from a specific region (Armington, 1969) would work against the HME.

During the last two decades, economies have become more integrated, increasing their market access mainly due to institutional changes within countries and various trade agreements among countries (or groups of countries), which led to the abandonment of many trade barriers. Increased market access has indeed affected the spatial distribution of economic activities within countries or regions in several ways, and hence it has become a major research issue for trade economists. Considering a framework with two symmetric countries, each consisting of two regions, Monfort and Nicolini (2000) show that trade openness to an external market favors regional agglomeration of economic activities. However, relaxing the assumption of

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identical interregional trade costs, Monfort and van Ypersele (2003) find that both integration and agglomeration in one country make agglomeration within its partner country less likely. Extending the CP model of Krugman (1991) by considering 3 or more regions, Castro et al. (2012) conclude that additional regions favour agglomeration and discourage the dispersion of economic activity. There are several studies showing how the number of regions affects the distribution of economic activity, including those of Gaspar et al. (2018) and Gaspar et al. (2019). Studying a Footloose Entrepreneur model with a finite number of equidistant regions, both studies show that as the number of regions increases, agglomeration becomes more likely. In their seminal work, Krugman and Livas-Elizondo (1996) relax the assumptions of "equidistant regions" (i.e., regions symmetric with respect to their access to the world market), assuming rent and commuting costs and show that trade openness to an external market leads to internal dispersion of the economic activity. Motivated by the latest EU enlargement, Brühlhart et al. (2004) consider a version of the standard CP model, showing that improved external market access favors internal agglomeration of the mobile factor within the system of two symmetric regions. Generalizing the model of Brühlhart et al. (2004) by taking into account regional productivity differences and taste bias, Karavidas (2018) shows that pro-agglomeration effects come from an external market being more important relative to the system of the two symmetric regions. Although there is a number of studies dealing with multiple regions, all of them do not really study the impact of market size difference on location patterns. In this line of research, Forslid and Okubo (2012) use a three-country trade and geography model with different market sizes, showing that the large country benefits from globalization since both the intermediate and the small country lose industry when trade costs fall. Relaxing the assumption of constant wages assumed in the work of Forslid and Okubo (2012), Kato and Okubo (2018) conclude that the large country fosters industrial agglomeration in the early stage of globalization, but loses manufacturing in the later stage of globalization.

Despite their effort on proving explanations about the spatial concentration of economic activities, only a few studies mentioned above investigate the impact of improved market access on HME. Thus, it is imperative to study further and shed light on the relationship between market access and HME. In this paper, based on the traditional FC model developed by Martin and Rogers (1995), I consider an integrated model consisting of a system of two symmetric regions and a third region (i.e., the rest of the world), in order to study the impact of improved market access on the HME within the system of the two symmetric regions. In particular, I explore a model with two countries named Foreign country and Domestic country, which is a union of two regions. I abstract from differences in tastes, factor endowments, technology, and market structure, such as (i) changes in factor supplies through internal movements of workers and capital and (ii) improvements of internal transport systems that might lead to relocation of economic activities in peripheral regions. Therefore, I assume that both regions within Domestic country can access the foreign market at equal cost. Any location advantage will bias the results in favour of the region having the better market access (Behrens et al., 2006).

Providing many analytical solutions with respect to the investigation of HME, the results of this paper complement very well several existing ones. First of all, my results confirm the existence of HME in the current model, as introduced by Martin and Rogers (1995). However, my findings enhance the existing literature by showing that improved market access with respect to Foreign country implies stronger HME within the two regions of Domestic country, all else equal. Intuitively, improvement of market access between Domestic and Foreign country intensifies the local price competition within Domestic country by firms located in Foreign country. Thus, agglomeration forces come from the foreign market dominate, since dispersion within Domestic country no longer weakens price competition. Finally, by studying the market forces analytically, I show that the main finding of the paper is driven by the fact that trade openness to an external market increases the Market Access Effect in Domestic country, but it has no impact on its Market Crowding Effect, which is the only dispersion force in the model.

The remainder of the paper is organized as follows. Section 2 presents the model and characterizes the location patterns of the market equilibrium. Section 3 describes the diagrammatic analysis of the results. Section 4 studies the market forces, introducing the Market Access Effect and the Market Crowding Effect for the current model. Finally, Section 5 concludes and summarizes the main findings of the model; it also suggests avenues for future research.

2 The Model

2.1 Set up

The global economy consists of two countries named Domestic and Foreign. Domestic country constitutes a union, consisting of two regions labelled North and South. Following the standard assumptions of the FC model, in each country there are two production sectors: an agricultural and a manufacturing sector. Moreover, there exist two production factors: labor and capital. The FC model is marked by internationally mobile capital and immobile capital owners and workers. Thus, using the standard version of the FC model and based on previous works, such as those of Saito et al. (2011), Forslid and Okubo (2012), Kato and Okubo (2018), labor is assumed to be mobile between sectors, but immobile between regions. Capital, however, which is only used in the manufacturing sector (for fixed input), is mobile between the two regions of Domestic country, but immobile between Domestic and Foreign country. In addition, capital owners in each region spend their income at their fixed home location (repatriation). The assumption of capital immobility between countries can be justified by considering the case of Brexit. More specifically, uncertainty over future trade arrangement between the UK and the EU will tend to dampen FDI (Dhingra et al., 2017). The UK might lose its ability to participate in the free movement of capital in the EU and thus, in terms of economic integration, leaving the EU will affect the free movement of capital, including FDI (Busch and Matthes, 2016). Therefore, applying the current model in the real economy, Domestic country can be considered as the EU and Foreign country as the UK.

The agricultural sector produces a homogeneous good using labor as input under perfect competition and constant returns to scale. The homogeneous good is traded costless between regions and across countries; it also serves as the numeraire; the agricultural sector is sufficiently large to guarantee positive output in all regions. The manufacturing sector produces a large variety of differentiated products under increasing returns to scale in a Dixit-Stiglitz (Dixit and Stiglitz, 1977) monopolistic competition environment. Each variety is produced using both capital and labor. Labor is the variable input, and capital enters as a fixed cost. Manufacturing goods are tradable with iceberg trade costs. The cost mark-up factor is denoted by $\tau_u > 1$ for trade within Domestic country, and by $\tau_f > \tau_u$ for trade between Domestic and Foreign country. Trade of manufacturing varieties within each region and within Foreign country is free.

2.2 Households

Each household earns wage income or capital income. As in the standard version of the FC model, incomes Y_n and Y_s in North and South respectively are constant, independent of the distribution of capital used in the two regions of Domestic country. Let household preferences be a Cobb-Douglas utility function with CES sub-utility over manufacturing varieties

$$U = C_M^\mu C_A^{1-\mu}, \quad (1)$$

with,

$$C_M = \left(\int_V l_i(v)^{\frac{\sigma-1}{\sigma}} dv \right)^{\frac{\sigma}{\sigma-1}}, \quad i = n, s, f, \quad (2)$$

where $0 < \mu < 1$; $\sigma > 1$ and $V = V_n \cup V_s \cup V_f$.

C_M is the consumption of the manufacturing aggregate, and C_A denotes the consumption of the agricultural good. Per capita consumption of a household located in region i is denoted by l_i . V_n , V_s and V_f are the numbers of varieties that are produced in North, South and Foreign country, respectively. σ expresses the elasticity of substitution between any two manufacturing varieties. μ is the expenditure on manufacturing products.

In the upper nest, the household maximizes U with respect to C_M and C_A under the budget constraint

$$P_M C_M + P_A C_A = Y. \quad (3)$$

This yields $P_M C_M = \mu Y$ and $P_A C_A = (1 - \mu)Y$. Inserting the optimal values of C_M and C_A into the utility function (1), the indirect utility is obtained as

$$U = (\mu Y / P_M)^\mu ((1 - \mu)Y / P_A)^{1-\mu}, \quad (4)$$

and after removing constants

$$\omega = \frac{Y}{P_M^\mu P_A^{1-\mu}}. \quad (5)$$

2.3 Market Equilibrium

Prices for the agricultural goods must be uniform and hence also wage rates and mill prices for the manufacturing goods, $p_n = p_s = p_f = p$. In the long run capital is fully mobile between the regions of Domestic country. The long run equilibrium requires that capital migration stops. As in the standard FC model, there exist two types of long run equilibria, i.e., (i) the usual core-periphery outcomes where full agglomeration takes place either in North or in South, and (ii) interior outcomes where capital earns the same (reward) in both regions within Domestic country. Focusing on the interior solution, it yields that

$$\pi_n = \pi_s, \quad (6)$$

where π_n and π_s are the operating profits in North and South respectively. This implies

$$\frac{Y_n}{P_n^{1-\sigma}} + \frac{\phi_u Y_s}{P_s^{1-\sigma}} + \frac{\phi_f Y_f}{P_f^{1-\sigma}} = \frac{\phi_u Y_n}{P_n^{1-\sigma}} + \frac{Y_s}{P_s^{1-\sigma}} + \frac{\phi_f Y_f}{P_f^{1-\sigma}}, \quad (7)$$

where $\phi_f < \phi_u \equiv \tau_u^{1-\sigma} \leq 1$ and $\phi_f \equiv \tau_f^{1-\sigma}$ are parameters which are inversely related to trade costs. They capture the freeness of trade within Domestic country and between the regions of Domestic country and Foreign country. In addition, P_n , P_s and P_f denotes the CES-price indices for the manufacturing varieties in North, South and Foreign country. Then, P_n is the perfect CES-price index for the manufacturing aggregate in North,

$$P_n = \left[\int_{V_n} p_n(v)^{1-\sigma} dv + \int_{V_s} (\tau_u p_s(v))^{1-\sigma} dv + \int_{V_f} (\tau_f p_f(v))^{1-\sigma} dv \right]^{\frac{1}{1-\sigma}}, \quad (8)$$

and P_s is the perfect CES-price index in South,

$$P_s = \left[\int_{V_s} p_s(v)^{1-\sigma} dv + \int_{V_n} (\tau_u p_n(v))^{1-\sigma} dv + \int_{V_f} (\tau_f p_f(v))^{1-\sigma} dv \right]^{\frac{1}{1-\sigma}}. \quad (9)$$

Similarly, the CES-price index for Foreign country is

$$P_f = \left[\int_{V_n} (\tau_f p_n(v))^{1-\sigma} dv + \int_{V_s} (\tau_f p_s(v))^{1-\sigma} dv + \int_{V_f} p_f(v)^{1-\sigma} dv \right]^{\frac{1}{1-\sigma}}, \quad (10)$$

where p_n , p_s , and p_f denote the producer prices for a variety that is produced in North, South and Foreign country, respectively. Dividing equation (7) by $Y_n + Y_s$ and defining $S_r = Y_r / (Y_n + Y_s)$, $r = n, s$, generates

$$\frac{S_n}{P_n^{1-\sigma}} + \frac{\phi_u S_s}{P_s^{1-\sigma}} = \frac{\phi_u S_n}{P_n^{1-\sigma}} + \frac{S_s}{P_s^{1-\sigma}}. \quad (11)$$

Sorting terms and dividing by $(1 - \phi_u)$ yields

$$\frac{S_n}{P_n^{1-\sigma}} = \frac{S_s}{P_s^{1-\sigma}}, \quad (12)$$

or

$$S_n P_s^{1-\sigma} = S_s P_n^{1-\sigma} \quad (13)$$

I normalize the total mass of varieties produced in Domestic country to be equal to one. Thus, a share λ is produced in North and the rest $(1 - \lambda)$ is produced in South. Moreover, δ varieties produced in Foreign country. After following the standard derivation, I obtain the CES-price indices for both regions within Domestic country as

$$P_n^{1-\sigma} = p^{1-\sigma} (\lambda + (1 - \lambda)\phi_u + \delta\phi_f), \quad P_s^{1-\sigma} = p^{1-\sigma} (\lambda\phi_u + (1 - \lambda) + \delta\phi_f), \quad (14)$$

where $p_n = p_s = p = \frac{\sigma}{\sigma-1}$. Equations (13) and (14) imply

$$S_s(\lambda + (1 - \lambda)\phi_u + \delta\phi_f) = S_n(\lambda\phi_u + (1 - \lambda) + \delta\phi_f). \quad (15)$$

Now, using $S_s = 1 - S_n$ yields

$$\begin{aligned} (1 - S_n)(\lambda + (1 - \lambda)\phi_u + \delta\phi_f) &= S_n(\lambda\phi_u + (1 - \lambda) + \delta\phi_f) \Leftrightarrow \\ \Leftrightarrow S_n(1 + \phi_u) &= \phi_u + (1 - \phi_u)\lambda + (1 - 2S_n)\delta\phi_f. \end{aligned} \quad (16)$$

Subtracting $(1 + \phi_u)/2$ and solving for λ , equation (16) can be written as

$$(S_n - 1/2) \frac{(1 + \phi_u)}{1 - \phi_u} + \frac{1}{2} - \frac{(1 - 2S_n)\delta\phi_f}{1 - \phi_u} = \lambda. \quad (17)$$

There is a linear relation between the distribution of expenditures in North (i.e., S_n) and the distribution of firms in North (i.e., λ), representing price equality for the mobile factor in both regions within Domestic country. Expression (17) is valid as long as it implies a λ that is economically relevant, i.e., $1 \geq \lambda \geq 0$. For values of ϕ_u , ϕ_f and S_n that would imply a share below zero or above unity, all industry is concentrated in one region within Domestic country. More specifically, expression (17) holds for combinations of ϕ_u , ϕ_f and S_n that respect the condition $S_n \in \left[\frac{\phi_u + \delta\phi_f}{1 + \phi_u + 2\delta\phi_f}, \frac{1 + \delta\phi_f}{1 + \phi_u + 2\delta\phi_f} \right]$; when $S_n < \frac{\phi_u + \delta\phi_f}{1 + \phi_u + 2\delta\phi_f}$, λ is zero and when $S_n > \frac{1 + \delta\phi_f}{1 + \phi_u + 2\delta\phi_f}$, λ is one.

Proposition 1: The slope of expression (17) (with λ on the ordinate) exceeds 1. This can be easily seen as $\frac{d\lambda}{dS_n} = \frac{\phi_u + 1 + 2\delta\phi_f}{1 - \phi_u} > 1$; the distribution of firms reacts more than proportionally on the distribution of demand. This is the Home Market Effect (HME) in the current model.

In the standard FC model that consists of two regions, the slope of the linear relation between the distribution of expenditures and the distribution of firms is equal to $\frac{d\lambda^{FC}}{dS_n^{FC}} = \frac{1 + \phi_u}{1 - \phi_u}$, with ϕ_u being the freeness of trade between those two regions. Thus, my findings with respect to the HME are qualitatively the same as those come from the framework of Martin and Rogers (1995). However, it can be easily seen that trade openness to an external market enhances the HME that takes place within the system of the two regions.

Proposition 2: Comparing the first derivative of λ with respect to S_n from equation (17) with the one comes from the standard FC model, we can see that $\frac{d\lambda}{dS_n} - \frac{d\lambda^{FC}}{dS_n^{FC}} = \frac{2\delta\phi_f}{1 - \phi_u} > 0$.

Therefore, trade openness to an external market implies stronger HME within the system of the two regions. Intuitively, improved market access with respect to Foreign country intensifies the local price competition within Domestic country by firms located in Foreign country. As a result, dispersion within the regions of Domestic country no longer weakens price competition, and thus, agglomeration forces come from the foreign market dominate.

3 Diagrammatic Analysis

Analysis of how trade openness to an external market enhances the HME is easily illustrated with the help of Figure 1. It plots the share of industry in North on the vertical axis and the expenditure share in North on the horizontal axis.

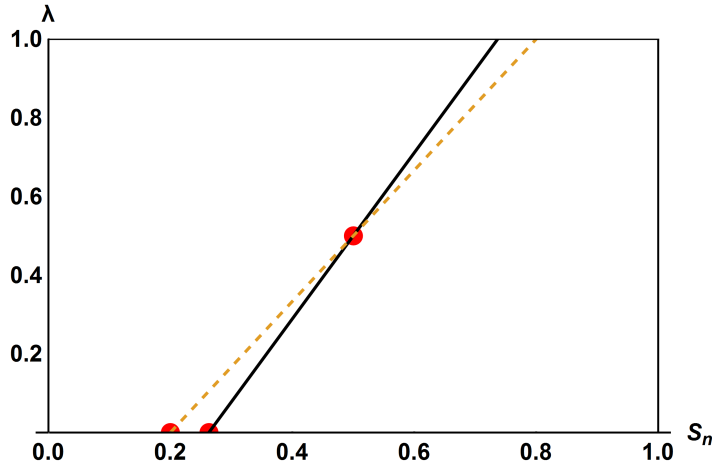


Figure 1: Scissor Diagram (λ : Share of industry in North; S_n : Expenditure share in North)

The solid line depicts the HME for the current model and the dashed line is the HME that comes from the standard FC model. Notice that both solid and dashed lines are linear. The slope of the solid line is equal to $\frac{\phi_u + 2\delta\phi_f}{1 - \phi_u} > 1$ and intersects the x-axis at $\frac{\phi_u + \delta\phi_f}{1 + \phi_u + 2\delta\phi_f}$. Similarly, the slope of the dashed line is equal to $\frac{1 + \phi_u}{1 - \phi_u} > 1$ and intersects the x-axis at $\frac{\phi_u}{1 + \phi_u}$. Obviously, the solid line is steeper than the dashed line. This shows diagrammatically that trade openness to an external market makes the HME stronger within Domestic country, all else equal. Moreover, both lines pass through the point $(1/2, 1/2)$, regardless of the internal and external freeness of trade. So, any change in ϕ_u and/or ϕ_f rotates the solid line around the midpoint. For example, as trade between Domestic and Foreign country becomes freer (i.e., ϕ_f goes up), the solid line gets steeper, while the dashed line remains unchanged. Steeper solid line implies stronger HME. Similarly, as trade gets freer within Domestic country (i.e., ϕ_u goes up), the solid line gets steeper. This result is the same as the one comes from the standard FC model, all else equal.

4 Market Forces

As it is shown by Ottaviano (2001), the differential of the rental rate is zero, positive or negative when the right-hand side of the following expression is zero, positive or negative, respectively. This yields

$$\text{sing}(\pi_n - \pi_s) = (1 - \phi_u) \text{sing} \left\{ \left(S_n - \frac{1}{2} \right) (1 + \phi_u + 2\delta\phi_f) - \left(\lambda - \frac{1}{2} \right) (1 - \phi_u) \right\}. \quad (18)$$

When the internal freeness of trade (i.e., ϕ_u) is equal to one, the right-hand side is equal to zero. This implies that the rental rates are the same in both regions within Domestic country no matters the spatial distribution of firms. Intuitively, with no internal trade costs, the location of firms is immaterial. An interesting case is when the internal trade is not perfectly free (i.e., $\phi_u < 1$). Then, expression (18) shows that the decision of firms to relocate within Domestic country depends on the interaction of two opposing forces: the Market Access Effect (MAE) and the Market Crowding Effect (MCE). The first term inside the brackets is the MAE and it is positive, since $(1 + \phi_u + 2\delta\phi_f) > 0$. This shows the market access advantage of producing in the larger

market when trade is not perfectly free. Intuitively, a larger sales market makes the rental rate large, because it makes sales per firm large. This is actually the sale agglomeration force in the model.

Comparing the MAE of the current model with the one that comes from the standard FC model, one can see that trade openness to an external market makes the MAE stronger within Domestic country. More specifically, the MAE of the standard FC model is equal to $(1 + \phi_u)(S_n - 1/2)$, which is weaker than the one that comes from the current model that is equal to $(1 + \phi_u + 2\delta\phi_f)(S_n - 1/2)$. Therefore, trade openness to an external market increases the MAE and this implies that the agglomeration force in the model goes up, all else equal.

The second term inside the brackets is the MCE and it is negative, since $-(1 - \phi_u) < 0$. This shows the market crowding disadvantage of producing in the large market. Intuitively, more firms in the region shrink sales per firm and hence also the return on capital. This is actually the sale dispersion force in the model. Interestingly, the MCE of the current model is the same as the one that comes from the standard version of the FC model. Thus, trade openness to an external market has no impact on the MCE, and this implies that the dispersion force remains unchanged.

Proposition 3: Trade openness to an external market (i) increases the Market Access Effect in Domestic country, and (ii) has no impact on its Market Crowding Effect.

The proof of Proposition 3 is quite trivial. From expression (18) it can be easily seen that (i) $d((1 + \phi_u + 2\delta\phi_f)(S_n - 1/2))/d\phi_f > 0$, and (ii) $-(\lambda - 1/2)(1 - \phi_u)$ is independent of ϕ_f . Intuitively, the MAE shows how the spatial distribution of expenditure affects the spatial distribution of firms, and the MCE shows that the small region (i.e., $\lambda < 1/2$) is more attractive because firms installed there face less competition. These two effects explain the HME. Since firms are allowed to move within the two regions of Domestic country, but not across countries, the MCE remains unchanged. However, improved external market access reinforces the MAE, and that makes the big region within Domestic country more attractive. This explains why trade openness to an external market enhances the HME within Domestic country.

5 Conclusion

The HME is well known in the literature, but once we extend to multiple regions, many are unknown. In this paper, I show that improved market access affects the agglomeration force (i.e., MAE) within Domestic country, while the dispersion force (i.e., MCE) remains unchanged. As a result, trade openness to an external market results in stronger HME within Domestic country. The findings of the current model could also be applied in the real economy, showing, for example, that Brexit will affect capital mobility between the core and the periphery of the EU in a particular way. More specifically, Foreign country can be considered as the UK and Domestic country can be considered as the EU. The big region (i.e., North) represents the core of the EU, while the small region (i.e., South) represents the periphery of the EU. In this case, the model suggests that impaired access from and to the UK will result in weaker HME within the EU countries. Of course, more dimensions should be taken into account in order for one to reach broader conclusions about the impact of Brexit on spatial issues within European economies. In general, this paper sheds light on the impact of improved market access on the domestic HME. More issues could be studied with respect to the HME, including the value chain phenomenon that is taking place inside the EU that favors relocation of the activities in the periphery nurtured by the bettering of the transport system. However, addressing this interesting task is beyond the purview of this paper. Thus, the obtained theoretical findings may justify the need for further research.

Acknowledgement: I would like to thank the Editor Antonella Nocco and the two anonymous referees for their suggestions and comments.

Financial Support: This research received no specific grant from any funding agency, commercial or nonprofit sectors.

Conflict of Interests Statement: The authors have no conflicts of interest to disclose.

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