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"INFANT" ECONOMIES IN SOUTH-EASTERN EUROPE

ABSTRACT: *Transition economies have responded quite differently to similar procedures and foreign economic and sociopolitical interventions. This is partly because of the exogenous (from the economic perspective) features of each country. In the present paper we focus on the economic explanation. Following an introductory discussion of the stylized facts of the deepening segregation within the Central and Eastern European transition economies, we proceed with a general equilibrium model of imperfect competition (a la Dixit-Stiglitz). We introduce (1) more than one imperfectly competitive manufacturing sectors and (2) capital as the 'pseudo' production factor that provokes economies of scale.*
Based on the abstract theoretical model, we argue that the supposed automatic, self-balancing process for closing cross-country disparities may not appear, even if the non-economic factors are neutralized. This is because there is a possibility of experiencing a virtuous cycle of endogenously reinforced attraction of foreign accumulated capital. Economies that do not have the necessary features for this to happen because they start from a comparatively inferior level of development and/or due to a lack of pre-existing strong manufacturing – 'infant economies' according to our proposed terminology – will experience an endogenously justified, flatter path of development and may not find it easy to catch up with others.

KEY WORDS: *FDI under imperfect competition, infant economies, South-Eastern Europe*

JEL CLASSIFICATION: F21, F41

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1. INTRODUCTION

Foreign direct investment (FDI) is a critical factor in economic catching up. Damijan and Rojec (2004) show that FDI is an important if not the main vehicle of manufacturing-sector restructuring and productivity growth in the new EU member states from Central Europe. In general, the literature confirms this pattern around the globe, though the impact of FDI depends on emerging economies' local capacity to absorb superior technologies (Glas, Hubler, & Nunnenkamp, 2015).

Even if the effect on different aspects of economic development is debatable – especially with respect to distributional and sustainability issues[1] – capital accumulation and the resulting formation of production means and soft and hard infrastructure are crucial for the strengthening of domestic growth. As domestic (primary) accumulation may be time-demanding and given the increasing spatial mobility of capital, the inflow of foreign accumulated exchange value is both unavoidable and useful, especially (yet not only) when it comes to direct productive investment.[2]

The case of Central and Eastern European transition countries (CEECs) is similar, including those in South-Eastern Europe. Nevertheless, despite the common patterns of the COMECON[3] past, the spatial, political, cultural, and structural peculiarities of the different economies generated very different responses and development paths following the historical changes at the beginning of the 1990s (Popescu, 2014).

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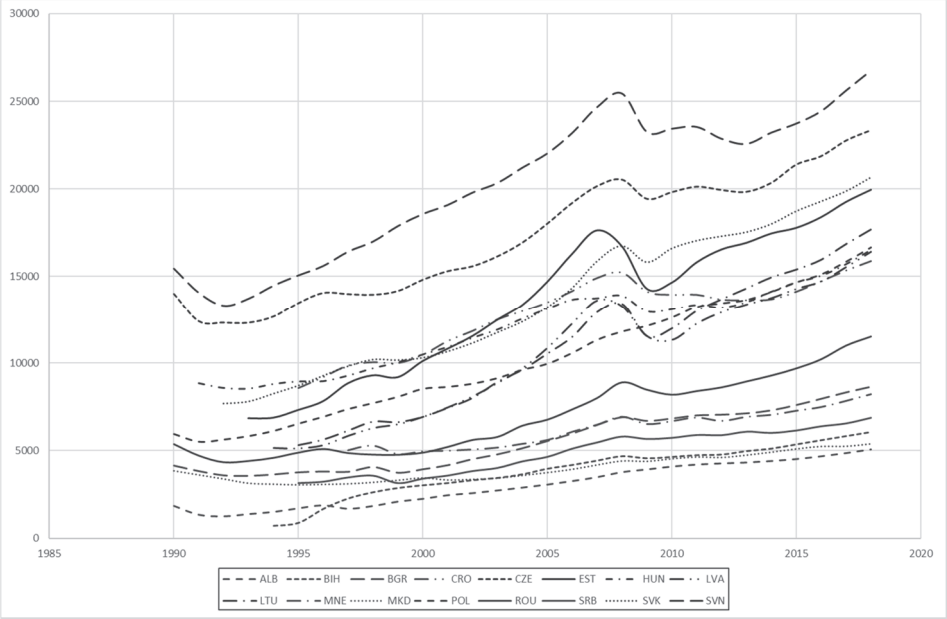
1 Think of the so-called FDI-crowding-out effect in specific sectors (Ahmed et al., 2015) and in the short run (Jude, 2017), and the cases of unsustainable exploitation of local human resources (Brandl, Strohmer, & Traxler, 2013), as well as the relevant comprehensive literature review in a report serving as a background document to the OECD-ILO Conference on Corporate Social Responsibility in 2008). Consider finally the environmental resources (Mabey & McNally, 1999), or the earnings outflow in the future.

2 See Almfraji and Almsafir (2014) for a relevant literature review

3 The Council for Mutual Economic Assistance (1949–1991) comprised the countries of the 'Eastern Block' under the economic and political leadership of the Soviet Union.

Diagram 1: Real GDP per capita in CEECs 1990–2018 (2010 US$)



Source: World Bank Development Indicators Database

The previous diagram of real GDP per capita evolution in the last decades reveals that this is especially true for the Balkans (the blue lines in the diagram and the purple line representing Romania, with the exception of Croatia, which seems to have a similar pattern to its northern neighbours). Post-imperialistic antagonisms along with local particularities induced processes quite different to those in the rest of the CEECs: dramatic migration, primary capital accumulation similar to the illicit and scandalous practices of primitive capitalism, and political disorder including heavy military interventions, large-scale crimes, and war.

The literature widely examines the special socioeconomic and political conditions referring to global circumstances and how they affected the Balkan countries along with their special characteristics. Balfour and Stratulat (2011) provide a useful review of this discussion, which, however, mainly indicates exogenous reasons for an atypical 'transition' of longer duration and dissimilar outcomes: progress in the South-Eastern Europe EU enlargement "has been uneven, marred by the persistence of unsolved statehood problems, which affect much of the

region" despite "the progress that the Balkan states have made in transforming themselves from war-torn countries into new democracies… At present, the countries in the region are still not fully effective democracies, as enforcing the rule of law remains problematic and accountability channels … are still dysfunctional" (Balfour & Stratulat, 2011: vii).

Our intention in the present paper is to analyse the macroeconomic impact of FDI inflows in an abstract theoretical way and thus to focus on an endogenous economic justification for addressing the different way that FDI worked in the South-Eastern European economies (among others). This should not be understood as a substitute, alternative explanation, but rather as an argument complementing the socio-political discussion.

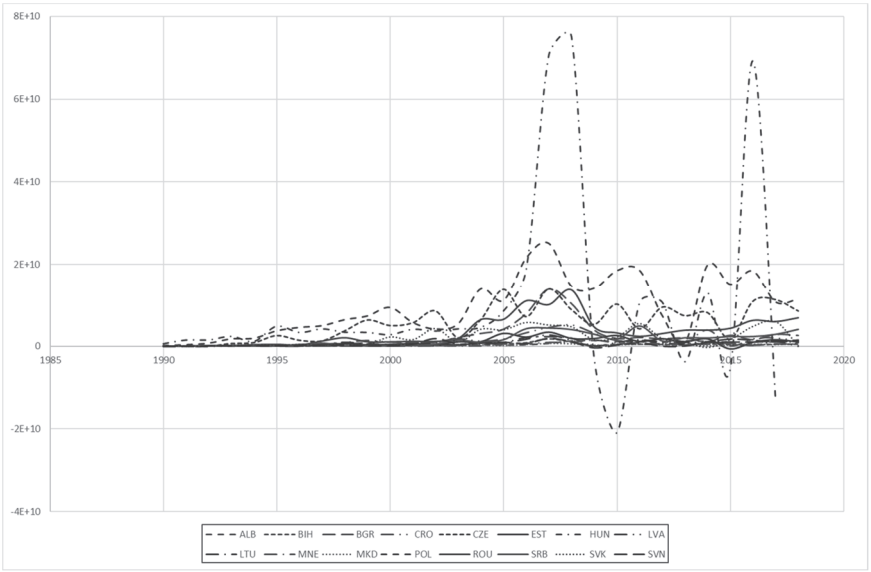
We first set up a general equilibrium model of imperfect competition (a la Dixit-Stiglitz) to analyse the macroeconomic impacts of FDI. We introduce (1) more than one imperfectly competitive manufacturing sector, and (2) capital as the 'pseudo' production factor that provokes economies of scale. Next, we derive theoretical arguments that can also be used in the Balkan economies. We expose a virtuous cycle of endogenously reinforced attraction of foreign accumulated capital. In reverse this means a case of 'infant economies', which, lacking pre-existing strong manufacturing, find it difficult to catch up with other economies. In our concluding remarks we discuss relevant policy implications and proposals for further research, especially to test the derived theoretical deductions empirically.

2. EMPIRICAL FACTS

Diagram 1 shows the clear segregation of CEECs: although they share similar socioeconomic and geopolitical starting conditions, in terms of GDP per capita there are two groups that are becoming increasingly disparate: the central/northern part and the southern part consisting of the Balkan countries (Croatia being an exception).

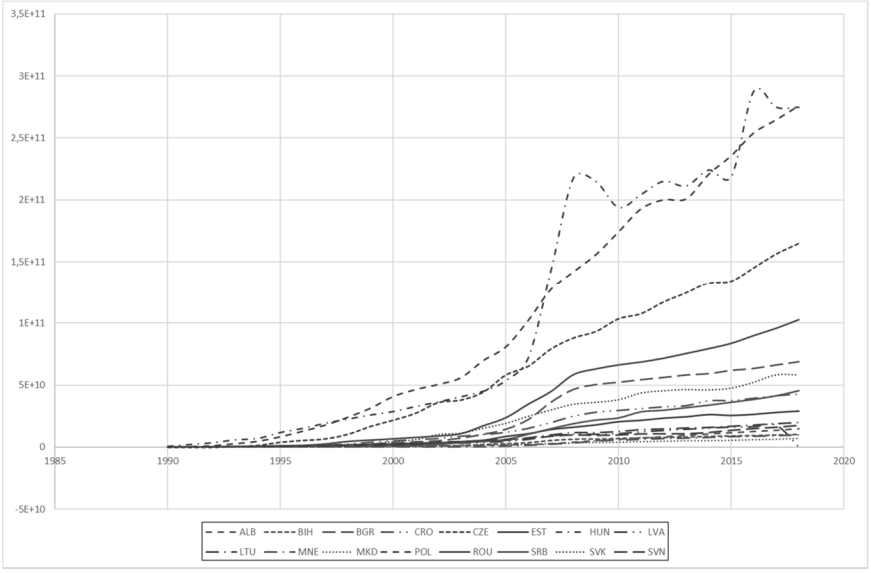
In the following we will argue that as well as the political, historical, and institutional arguments that explain the different development paths, they can also be explained by FDI, which may provoke quite different non-standard effects in host economies because of their crucial endogenous economic peculiarities.

Diagram 2: FDI net inflows in CEECs 1990–2018 (current US$)



Source: World Bank Development Indicators Database

Diagram 3: FDI net stock in CEECs 1990–2018 (current US$)



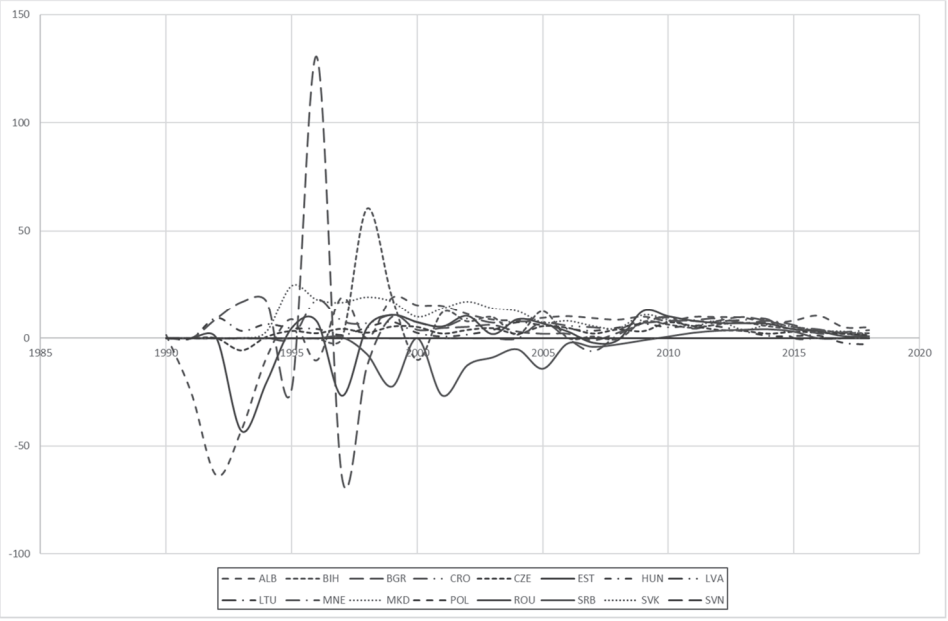
Source: World Bank Development Indicators Database

Diagrams 2 and 3 depict the evolution of FDI in CEECs over the same period (1990–2018), first in terms of annual net inflow and then in terms of the accumulated stock of foreign capital directly invested in production.

In particular the second diagram showing the evolution of the stock of FDI repeats the aforementioned segregation, with the exception of Bulgaria and Romania after their accession to the European Union. The matching of the different cross-country evolution of (real) income and the accumulation of foreign capital revealed in the present descriptive analysis is not particularly surprising. The literature has plenty of theoretical arguments for and empirical evidence of FDI being one of the most important factors in economic catching up.

The argument proposed in this paper refers to the endogenous process of reinforced FDI inflow forming this segregation, rather than a balanced process of closing the development path. As we will see, this appears mainly due to the non-standard effect on capital's remuneration in the host countries.

Diagram 4: Real interest rates in CEECs 1990–2018



Source: IMF, International Financial Statistics and data files using World Bank data on the GDP deflator

Indeed, the fourth diagram shows that despite the continuous pattern of FDI concentration in the central/northern CEECs since 1990, there is no indication of the opposite trend in real interest rates in the host countries. On the contrary, although there are significant cross-country differences, there is no certain pattern that could eventually, ceteris paribus, lead to a closure of the gap in FDI, and thereby in real GDP.

3. THEORETICAL FRAMEWORK

Relaxing the assumptions of perfect competition brings theoretical considerations closer to modern capitalist reality and allows for non-monotone, non-linear relations between the studied variables.

3.1 Basic model and autarky general equilibrium

The Dixit-Stiglitz (Dixit & Stiglitz, 1977) general equilibrium model incorporates imperfect markets by modelling monopolistic competition. It divides the economy into two sectors: one retains the classical features of perfect competition (symbolized by *A* for homogeneous products typically resulting from agriculture) and the second introduces the main manufacturing characteristic, namely products' inhomogeneity (*M*). Consumers' preferences can be represented in two interconnected equations. First, the basic utility function:

$$U = A^{1-m\mu} \prod_{i=1}^{m} M_i^{\mu} \tag{1}$$

where M_i represents a composite satisfaction derived from the consumption of the differentiated goods in the manufacturing branch $i(i=1,2,\ldots,m)$,[4] according to the following 'sub-utility function':

$$M_i = \left(\int_0^{n_i} x_{i,j}^{\rho} dj\right)^{1/\rho} \tag{2}$$

In that sense, $x_{i,j}$ is the consumption of variety j from manufacturing branch i. Note also that the differentiation of products is continuous within the specific

[4] Different to the standard version of the model, we introduce the existence of *m* different manufacturing branches in *M* sector. Still, note that the Cobb-Douglas-type utility function shows constant returns to scale.

range *[0,n_i]*. Therefore, we use the integral in the definition of M_i. Further, $0<\rho<1$ represents the intensity of consumers' preference for variety in manufactured goods and $\sigma \equiv \frac{1}{1-\rho}$ is the elasticity of substitution between any pair of varieties.

In this setting, consumer's behaviour can be solved in two steps:[5] first, we minimize costs ($\int_0^{n_i} p_{i,j} x_{i,j} dj$) for attaining a given M_i (subject to Equation 2), where $p_{i,j}$ is the price of variety j in manufacturing branch i. Thus, we obtain the compensated demand function. In the second step, consumers maximize U, subject to the following overall income constraint of the whole economy:

$$p_A A + \sum_{i=1}^{m} G_i M_i = Y_i \tag{3}$$

where G_i is an endogenously derived price index of all varieties in branch i[6]:

$$G_i = \left(\int_0^{n_i} p_{i,j}^{\rho/\rho-1} dj \right)^{\rho-1/\rho} \tag{4}$$

This yields the uncompensated aggregate demand functions:

$$A = {(1-\mu)Y}/{p_A} \tag{5a}$$

and $M_i = {\mu Y}/{G_i}$, or equally, given the minimum cost expression from the first step in Equation (3) and the already defined elasticity of substitution between any pair of varieties ($\sigma \equiv \frac{1}{1-\rho}$),

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5 A two-stage budgeting procedure is applicable because preferences are separable between the perfect competitive sector and each manufacturing branch, M_i, the sub-utility function for manufacturers, is homothetic in the quantities m_{ij} (Deaton & Muellbauer, 1980). For a more detailed presentation of the derivation that we use here, see Fujita, Krugman, and Venables (1999).

6 For a more detailed derivation of G_i see also Fujita, Krugman, and Venables (1999). Note that in G_i the intensity of consumers' preference for variety defines the weighting of each variety's price. Moreover, the range of differentiation in each branch is also important for the price index: the higher the n_i the lower the *Gi*.

$$x_{i,j} = {\mu Y G_i^{\sigma-1}}\Big/{p_{i,j}^{\sigma}} \tag{5b}$$

Having solved the demand side,[7] the next task is to model the decision-making on the supply side. Here also we build on the Dixit-Stiglitz approach. The homogenous good in sector *A* shows constant returns to scale retaining the conditions of perfect competition. Manufacturing, however, involves fixed costs in addition to the variable labour costs, and thereby economies of scale at the level of each firm produce a specific variety.

In order to set up the cost function, we start with variable costs defined as the wage (w) multiplied by the 'amount' of labour required in a firm producing variety j of branch i ($l_{i,j}$), which in turn is a linear function of the quantity of products: $l_{i,j} = \gamma_i q_{i,j}$, where $q_{i,j}$ refers to the relevant level of production and γ_i is the branch-specific labour intensity (or in other words γ_i^{-1} is the constant labour productivity).

Next, we proceed with defining fixed costs (FC_i), which leads us to the second main innovation introduced in our model, namely the fact that $FC_i = rk_i$, where r is the remuneration of capital and k_i the amount of capital that has to be invested in order to enable production in each firm of manufacturing branch i.[8]

Therefore, (total) cost function ($C_{i,j}$) can be written as follows:

$$C_{i,j} = rk_i + w\gamma_i q_{i,j} \tag{6}$$

Note that all firms producing different varieties in branch *I* face the same cost function (the above-mentioned homogeneity with respect to production conditions). In other words, products' inhomogeneity may depend on their usability (how they contribute to consumers' utility, objectively or subjectively),

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7 For more details of the described solutions, see Fujita, Krugman, and Venables (1999) and Zarotiadis (2008).

8 Note that, next to labour, we introduce capital as a 'pseudo' production factor in the model. Although we do not explicitly discuss the type of the underlying production function, the way the cost function is structured means that while capital is necessary and useful (enables production and strengthens labour's productivity), it does not produce directly; therefore, it appears only as a fixed cost and is not related to the level of production.

but when it comes to the way how they are produced, all varieties of the same branch are equal.

To obtain producers' behaviour, we first define the profit function for each unit j in branch i ($\pi_{i,j} = p_{i,j}q_{i,j} - rk_i - w\gamma_i q_{i,j}$). After substituting $q_{i,j}$ with the demanded quantity $x_{i,j}$ and assuming that producers are price-takers considering G_i as given, we derive that the perceived elasticity of demand is σ. Therefore, marginal revenues are $p_{i,j}\rho$; setting them equal to marginal costs ($w\gamma_i$ in Equation 6) yields the π-maximizing price setting (see Zarotiadis 2008 for more details)[9]:

$$p_{i,j}^* = p_i^* = {w\gamma_i}/{\rho} \tag{7}$$

Thereafter, the maximized profit for each manufacturing firm in branch i is $\pi_{i,j} = \frac{w\gamma_i q_{i,j}}{\sigma-1} - rk_i$. Recall that $\pi_{i,j}$ presents the excessive profits achieved, above the economy-wide adequate remuneration of capital (this is apparent in the above expression of profits). If we now assume free entry or exit, as soon as any firm j in branch i makes a positive excessive profit, new firms enter i producing a differentiated variety. As n_i increases, the branch-specific price index decreases ($\frac{dG_i}{dn_i} < 0$). Hence, the demand for each one variety in branch i (Equation 5b) shifts downwards. This continues till the maximum excessive profit that can be achieved equals zero ($\pi_{i,j} = 0$), which implies that the equilibrium output of any active firm in branch i is:

$$q_{i,j}^* = q_i^* = {r\rho k_i}\Big/{w\gamma_i(1-\rho)} \tag{8}$$

Before we proceed with solving the general equilibrium, a last point needs to be made: recall that marginal labour intensity (γ_i) and the need for fixed capital to be initially invested (k_i) are both branch-specific. We can easily imagine the different manufacturing branches ordered from the lowest to the highest capital-demanding technology: $\frac{dk_i}{di} > 0$. At the same time, as capital investments

[9] Note that the price for selling the profit-maximizing output is the same for all varieties of a branch.

strengthen labour productivity, $\frac{d\gamma_i}{di} < 0$. This means that as we move to higher-ranked branches, capital intensity increases and therefore labour intensity falls.

Having discussed all the aspects of the model, we can now proceed with solving the general equilibrium and deriving all crucial parameters. For this we need to set the three market-clearing equations, starting with the two full-employment conditions:

$$\sum_{i=1}^{m} \int_0^{n_i} k_i \, dj = \sum_{i=1}^{m} n_i k_i = K \tag{9a}$$

and

$$\sum_{i=1}^{m} \int_0^{n_i} \gamma_i q_i^* \, dj = \sum_{i=1}^{m} {n_i k_i r \rho}\Big/{w(1-\rho)} = L \tag{9b}$$

where K and L represent the country's capital and labour endowments respectively.

Further, to have autarky equilibrium, product markets also need to be cleared, which implies $q_i^* = x_{i,j}$. Substituting Equation (5b) with Equation (8) and taking the simplified version of $G_i = p_i^* n_i^{1/(1-\sigma)}$ (derived as all varieties in branch i setting the same price p_i^*) on the one hand and p_i^* from equation (7) on the other, leads to the third clearing condition:

$${rk_i}\Big/{(1-\rho)} = {\mu Y}\Big/{n_i} \tag{10}$$

We solve Equation (10) for k_i and put the derived expression in the full employment conditions (Equations 9a and 9b). We get:

$$r^* = {m(1-\rho)\mu Y}\Big/{K} \tag{9a}$$

$$w^* = {m\rho\mu Y}\Big/{L} \tag{9b}$$

Next, in equilibrium, economy's income (Y) can be determined as the sum of the produced value (note the similarity to Equation 3):

$$p_A A + \sum_{i=1}^{m} \int_0^{n_i} p_i^* q_i^* \, dj = Y^*$$

or equally:

$$p_A A + \sum_{i=1}^{m} n_i p_i^* q_i^* = Y^*$$

Next, we substitute p_i^* from Equation (7). Also, note that we can write output in terms of labour inputs, $q_i^* = {}^{l_i^*}/_{\gamma}$. Thus we get:

$$p_A A + ({}^{w}/_{\rho}) \sum_{i=1}^{m} n_i l_i^* = Y^*$$

or equally:

$$p_A A + ({}^{w}/_{\rho}) L = Y^* \tag{11}$$

Finally, we substitute *Y* from (11) in (9a) and (9b) and rearrange accordingly so that we get the endogenous definition of capital's and labour's nominal remuneration:

$$r^* = \frac{m\mu(1-\rho)p_A A\left(1+\frac{m\mu}{1-m\mu}\right)}{K} \tag{12a}$$

$$w^* = \frac{m\mu\rho p_A A}{(1-m\mu)L} \tag{12b}$$

The solution for an autarkic economy is complete. We can now derive some concluding expressions that give us a better picture of the model's behaviour. First, substituting w^* with r^* in Equation (8) and the respective rearranging yields the following derivation:

$$q_i^* = \frac{L}{K}\frac{k_i}{\gamma_i} \tag{13}$$

Second, we substitute Equation (11) with Equation (10) and replace *w* and *r* from Equations (12a) and (12b). The appropriate rearranging yields:

$$n_i^* = \frac{K}{k_i m} \tag{14}$$

We can also derive an expression for total output of branch *I* and its value:

$$n_i^* q_i^* = \frac{L}{\gamma_i m} \tag{15}$$

$$p_i^* n_i^* q_i^* = \frac{wL}{\rho m} \tag{16}$$

Based on the above, we can conclude on the comparative statics in autarky. As we move to branches of higher capital intensity (recall that $\frac{dk_i}{di} > 0$ and $\frac{d\gamma_i}{di} < 0$), we observe:

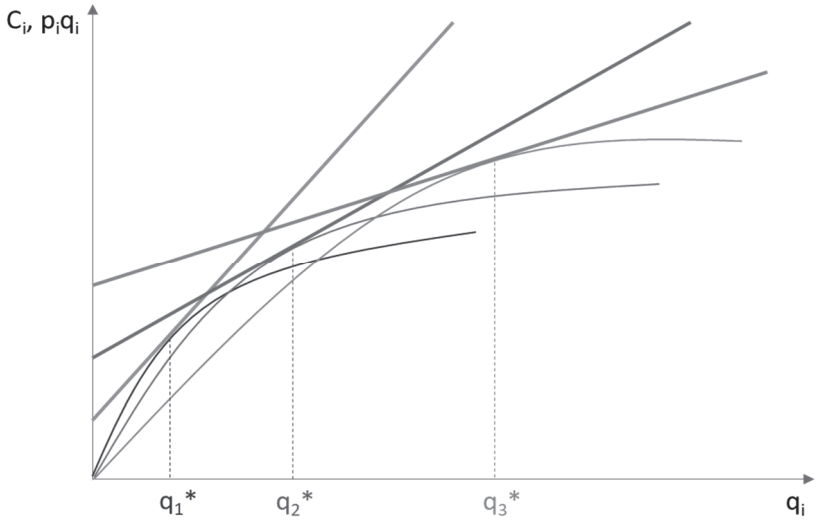
(i) fewer firms (Equation 14) and therefore
(ii) fewer differentiated products, but
(iii) higher labour input in each different firm, meaning the branch consists of bigger firms (Equation13).
(iv) Further, total output increases (Equation 15), but, because of
(v) lower prices (Equation 7),
(vi) the value of a branch's total output is the same for all branches (Equation 16).

The last deduction (vi) conforms completely to the 'logic' of the model, as the significance of each branch in consumers' preferences is the same (μ). This conformity is also obvious for all the above conclusions, with one exception: consider the fifth deduction (and see Equation 7) according to which the price of products in branches of higher capital intensity will be lower! Although the first impression is that the outcome is obscure, note that in all branches output is expressed in a common measure, namely in 'units of utility' or 'units of produced use-value'. If branch *1* produces clothes and branch *3* produces cars (with higher intensity of initial invested capital and therefore higher labour productivity, or in other words lower γ_i), Equation 7 does not imply that a shirt is more expensive than a car; rather it means that the exchange value (price) of a unit of utility (or

of use-value) produced in the clothing industry is higher than that of a unit of utility (or of use-value) produced in the automobile industry.

The following diagram depicts how the general equilibrium we presented applies in different branches simultaneously. The straight lines represent the three cost functions (Equation 6): red for firms in branch 1, blue for branch 2, and green for branch 3. As we see, firms in higher-order branches have higher initial capital investment requirements (higher fixed costs) and less labour intensity for scaling up production (smaller positive slope). Positive-sloped convex curves represent the turnover of a firm in each branch (p_iq_i) – their convexity signifies that each firm produces a differentiated variety and thereby holds a specific range of monopolistic power. Nevertheless, as we see in the diagram, in equilibrium all the firms in all branches have zero profit. Respective demands (and thereby turnover curves) have accordingly been condensed in order to be tangential to the valid cost line.

Diagram 5: Equilibrium price and output in the different branches



A final task is to determine endogenously the real income of the economy and the real compensations of capital and labour. For this we need to define the cost of living index (*CLI*)[10]:

$$CLI = p_A^{1-m\mu} \prod_{i=1}^{m} G_i^{\mu} \tag{17}$$

Next, we first put in the above-mentioned simplified version of $G_i = p_i^* n_i^{1/(1-\sigma)}$ and then we substitute p_i^* with n_i^*, from Equations (7) and (14) respectively. We get:

$$CLI = p_A^{1-m\mu} \left(w/\rho\right)^{m\mu} \left(K/m\right)^{m\mu/1-\sigma} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1} \tag{17'}$$

Thereafter, total real income (*RY*) for the whole economy, real wage (ω^*), and real interest (ε^*) can be attained by simply dividing respectively *Y*, *w*, and *r* by *CLI*.

$$RY = \left(m\mu/1-m\mu\right)^{1-m\mu} \left(1+\frac{1-m\mu}{m\mu}\right) \frac{A^{1-m\mu} L^{m\mu}}{\left(K/m\right)^{m\mu/1-\sigma} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}} \tag{18}$$

$$\omega = \left(m\mu/1-m\mu\right)^{1-m\mu} \frac{\rho A^{1-m\mu} L^{m\mu-1}}{\left(K/m\right)^{m\mu/1-\sigma} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}} \tag{19}$$

$$\varepsilon = \left(m\mu/1-m\mu\right)^{1-m\mu} \frac{(1-\rho) A^{1-m\mu} L^{m\mu}}{K\left(K/m\right)^{m\mu/1-\sigma} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}} \tag{20}$$

To cross-check the above results, and also to reveal aspects of the functionality of the model, we proceed with the following exercise: we first calculate the real income produced in manufacturing by multiplying Equations 19 and 20 by *L* and *K* respectively.

$$\omega^* L + \varepsilon^* K = \left(m\mu/1-m\mu\right)^{1-m\mu} \frac{A^{1-m\mu} L^{m\mu}}{\left(K/m\right)^{m\mu/1-\sigma} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}}$$

We then compare this with the previously derived Equation 18 for the economy-wide real income. Given that *RY* measures total income in real terms, which means in 'units of utility' or 'units of produced use-value', this can be interpreted

[10] For the specific definition of CLI see Fujita, Krugman, and Venables (1999).

as follows: the additional real income produced in sector A increases the economy's GDP by the multiplicator $\left(1+\frac{1-m\mu}{m\mu}\right)$. This expression takes values in the interval (1,+∞), and indicates the relevant significance of the two sectors for consumers. For instance, if the significance is the same ($1-m\mu=m\mu$), real GDP is double the real income produced in the manufacturing sector and distributed to capital and labour. (Note that in the determination of $\omega$and ε, production of A has already been considered.)

3.2 Checking the effects of FDI inflow

Our intention in the present paper is to analyse the macroeconomic impacts of FDI inflow in an abstract theoretical way and then to draw relevant conclusions for the Balkan economies. The preceding discussion provides us with all the necessary instruments for this. We have determined real income parameters and the other macroeconomic variables endogenously. What we now need is simply to study ceteris paribus all the possible changes that FDI inflow may induce (based on the relevant literature).

The first argument we can think of is that FDI apparently increases endowments of capital in the economy (K). In the relevant literature this refers to the standard trade theory, where FDI flows from origin to host country simply because of lower (relative) abundance of capital, and therefore higher interest and profit.

Based on the comparative statics studied above, we can easily see that as K increases, the total output in each branch i (Equation 15) as well as its exchange value (Equation 16) remain unchanged. Nevertheless, the number of producing units increases (Equation 14) and so does the variety of offered products (n_i). This is the reason why total real income increases too: recall that in this setting of imperfect competition, satisfaction rises not only by quantity but also by intensified quality differentiation. The first derivative of RY with respect to K verifies this:

$$\frac{\partial RY}{\partial K}=\left(\frac{m\mu}{\sigma-1}\right)\left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu}\left(1+\frac{1-m\mu}{m\mu}\right)\frac{A^{1-m\mu}L^{m\mu}}{m^{\frac{m\mu}{\sigma-1}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{\mu/\sigma-1}}K^{(m\mu/\sigma-1)-1} \qquad (21)$$

therefore, $\frac{\partial RY}{\partial K}>0$

We proceed with the effect on real remuneration. The real wage is also affected in a standard way, as the first derivative of capital inflow is positive:

$$\frac{\partial \omega}{\partial K} = \left(\frac{m\mu}{\sigma-1}\right)\left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu} \frac{\rho A^{1-m\mu} L^{m\mu-1}}{m^{m\mu/\sigma-1} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}} K^{(m\mu/\sigma-1)-1} \tag{22}$$

therefore, $\frac{\partial \omega}{\partial K} > 0$

Yet, when it comes to the effect on ε, things become more interesting:

$$\frac{\partial \varepsilon}{\partial K} = \left(\frac{m\mu}{\sigma-1} - 1\right)\left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu} \frac{(1-\rho) A^{1-m\mu} L^{m\mu}}{m^{m\mu/\sigma-1} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}} K^{(m\mu/\sigma-1)-2} \tag{23}$$

therefore, $\frac{\partial \varepsilon}{\partial K} > 0$ if $m\mu > \sigma - 1$ and vice versa.

The setting of imperfect competition allows for different effects of capital inflow in host economies: FDI-attracting countries in which domestic consumers have sufficiently low preference for variety (ρ) and/or sufficiently high preference for manufacturing products ($m\mu$) experience a non-standard increase in domestic returns to capital (ε). This means the endogenous onset of a virtuous cycle that highlights these countries against others with an analogue starting position.

Nevertheless, FDI is more than simply an inflow of foreign accumulated exchange value. Being directly involved in domestic manufacturing production, besides the increase in capital abundance that has been studied in the previous paragraphs, probably also dramatically changes the features of local production. In terms of the present model, this could mean two things: on the one hand, FDI induces a technological improvement, in other words an increase of initially demanded fixed capital investment k_i, and thereby an improvement in labour's productivity (shrinking of γ_i). This would have an impact on RY, ω, and ε through the term $\prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}$ in the denominator of Equations 18, 19, and 20.

In order to analyse this, we link linearly γ_i and k_i: $\gamma_i = {\varphi}/{k_i^{1-\eta}}$ where $\varphi$is simply a positive constant and $\eta \in (-\infty, 1)$. Therefore, $(1-\eta) \in (0, +\infty)$ shows how strongly k_i inversely affects γ_i.

In this setting, $\prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}$ becomes $\prod_{i=1}^{m} (\varphi k_i^{-\eta} k_i^{{1}/{\sigma-1}})^{\mu}$. To answer the question of how a change in k_i will affect the specific product is equivalent to seeing how it will affect the succeeding terms of the product. In other words, we need to check the sign of the following first derivative:

$$\frac{\partial \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}}{\partial k_i} = \frac{\partial \varphi k_i^{\eta-1} k_i^{{1}/{\sigma-1}}}{\partial k_i}$$
$$= \left({(\eta\sigma - \eta - \sigma + 2)}/{(\sigma - 1)}\right) \varphi k_i^{\left({\eta\sigma-\eta-\sigma+2}/{\sigma-1}\right)-1}$$

Apparently, the sign of the above first derivative depends on the sign of the nominator in the expression in the first parenthesis $\eta\sigma - \eta - \sigma + 2 >< 0$,[11] which leads to the following conclusion: any increase of k_i (and thereby a decrease of γ_i) will have a positive effect on *RY* and εif $\sigma > {(\eta - 2)}/{(\eta - 1)}$. For instance, if $\eta=0$, any change in initial investment k_i has the inverse proportional effect on labour's intensity, and in order to have a positive effect on *RY* and $\varepsilon$the critical value for $\sigma$is 2. Otherwise, if ηrises towards 1, the effect on labour's productivity (γ_i^{-1}) becomes underproportional, the critical value of σgrows to infinity, and therefore having a sufficiently strong σ becomes less likely. On the contrary, if ηfalls towards $-\infty$, the effect on labour's productivity is over-proportional and the critical value of σtends to 1, which more or less secures a positive effect of FDI-induced technical improvement on *RY* and ε.

Putting the above together, when FDI triggers a process of technological improvement, the stronger the induced improvement in labour productivity is and/or the higher σ is, the more likely FDI is to also boost the real income

[11] Recall that $0<\rho<1$ and therefore $\sigma \equiv \frac{1}{1-\rho}$ is always greater than 1.

variables. To reverse this argument, induced technological improvements may also have reverse effects.

On the other hand, the expansion of manufacturing may result in the emergence of new sectors, that is, an increase in their number *m*. As we can see above, *m* plays an important yet also a very complex role in determining real income. Therefore, it is not possible to have a clear deduction, but only conditional conclusions. For this reason, we start by providing the first derivatives of *RY* and *e* with respect to *m*. Note that in this calculation of $\frac{\partial RY}{\partial m}$ and $\frac{\partial \varepsilon}{\partial m}$ we consider the expression $\prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}$ as remaining constant, in order to focus on the other impacts:

$$\frac{\partial RY}{\partial m} = RY\left[\mu(lnL - lnA) + \frac{\mu}{\sigma-1}(lnK - lnm) - \left(ln\frac{m\mu}{1-m\mu}\right)\frac{\mu^2}{(1-m\mu)^2} - \frac{1}{m}\right] \quad (24)$$

$$\frac{\partial \varepsilon}{\partial m} = RY\frac{(1-\rho)\mu}{K}\left[m\mu(lnL - lnA) + \frac{m\mu}{\sigma-1}(lnK - lnm) - \left(ln\frac{m\mu}{1-m\mu}\right)\frac{\mu^2}{(1-m\mu)^2}\right] (25)$$

In both partial derivations in the brackets there is a clear negative effect, which comes from the simple fact that, for a given *K*, more branches simply means less variety. This is an argument that may lessen the positive impacts of the above-studied increase in *K*. Nevertheless, despite this argument, the sign of the derivations in Equations 23 and 24 may still be positive the more abundant a country is with respect to manufacturing production factors (*L* and *K*). In other words, for countries that already have a relatively expanded manufacturing sector, in the very reasonable scenario that FDI will also open new manufacturing branches, the previously discussed effects of an increase in *K* will probably be enhanced. Turning this around provides an additional argument for the case of 'infant countries'; in other words, countries at a comparatively inferior level of industrialisation get less strength from and/or utilise less effectively the inflow of accumulated exchange value from abroad.

The last important impact of FDI can be discussed if we proceed in the derivation of $\frac{\partial RY}{\partial m}$ and $\frac{\partial \varepsilon}{\partial m}$ after assuming that the significance of sector *A* (1-$m\mu$) will remain unchanged. In algebraic terms this could mean that μ is related in an inversely proportional way to *m*. Thereby, wherever *m* appears in the endogenous

determination of *RY*, *ω*, and *ε*, any change in this will be neutralised by the inversely proportional modification of μ.

Yet there is an exception, namely the term $\prod_{i=1}^{m} \gamma_i^{\mu} k_i^{\mu/\sigma-1}$, which appears in the denominator of Equations 18, 19, and 20: whatever is caused by this, the opposite results for *RY*, *ω*, and *ε*. To proceed, we first check how a change in *m* affects through μeach one of the terms of the product:

$$\frac{\partial\left(\gamma_i k_i^{1/\sigma-1}\right)^{\mu}}{\partial m} = \frac{\partial\left(\gamma_i k_i^{1/\sigma-1}\right)^{\mu}}{\partial \mu}\frac{\partial \mu}{\partial m} = \frac{\partial \mu}{\partial m}\left(\gamma_i k_i^{1/\sigma-1}\right)^{\mu}\left(\ln \gamma_i k_i^{1/\sigma-1}\right) \tag{26}$$

The sign of the above derivative depends on the natural logarithm. Given that we set $\frac{\partial \mu}{\partial m} < 0$, if $\gamma_i k_i^{1/\sigma-1} > 1$ the last parenthesis in Equation 26 will be positive and $\frac{\partial\left(\gamma_i k_i^{1/\sigma-1}\right)^{\mu}}{\partial m} < 0$. If we recall that we can define γ_i as a function of k_i, namely $\gamma_i = \varphi / k_i^{1-\eta}$, then the condition for *m* having a negative effect on each term of the product becomes:

$$k_i^{(\eta-1)(\sigma-1)+1/(\sigma-1)} > 1/\varphi.$$

As we move to higher order branches, k_i increases and so does the likelihood of having negative spillovers from *m*. On the other hand, an increase in *m* will have a positive effect for the product if the additional terms (the new branches) that are included are branches of sufficiently high capital intensity, k_i. All these make the final effect of FDI that we analysed (by checking the effects of a change in *m*) even more ambiguous. What we can keep from this discussion is only the strangely interesting result that if FDI concentrates on higher-ranked branches, this partly means negative pressure on its impact on the real income variables (*RY*, *ω*, and *ε*).

4. CONCLUDING REMARKS

In the present paper we relaxed the assumptions of perfect competition and set up a general equilibrium framework a la Dixit and Stiglitz, in order to

endogenously address the different way FDI may have worked in the South-Eastern European economies (also applicable in other cases worldwide).

Our model has two main innovative characteristics: (1) we allow m different manufacturing branches in M sector, and more importantly (2) we introduce capital as a pseudo-production factor: while necessary and useful (enabling production and strengthening labour's productivity), it does not directly produce; it appears only as a fixed cost and is not related to the level of production.

Solving the model and checking for the effects of FDI inflow in the country's real income (RY) and real compensations of labour (ω) and capital (ε) led us to the core theoretical conclusion: despite the positive effect of FDI in RY and ω,εmay also be positively affected if domestic consumers have sufficiently low preference for variety (ρ) and/or sufficiently high preference for manufacturing products ($m\mu$). In other words, countries that have a pre-existing strong (in relative terms) manufacturing sector (for whatever reason) may experience a virtuous cycle of endogenously reinforced attraction of foreign accumulated capital. Moreover, for those countries that have a relatively expanded manufacturing sector, in the very reasonable scenario that FDI opens new manufacturing branches, the effect of endogenously strengthened FDI attraction will be enhanced.

The detailed theoretical discussion revealed further arguments affecting the intensity of this process that appears due to non-standard effects on ε. For instance, when FDI triggers a process of technological change, the stronger the induced improvement in labour productivity is the more likely it is to also boost the real income variables. On the other hand, if FDI concentrates on higher-ranked branches, this partly means opposite pressures on the standard impacts on real income variables, ε included.

Overall, the message of the paper is that in an 'imperfect' economic environment – product inhomogeneity and increasing returns to scale – the supposed automatic, self-balancing process for closing cross-country disparities may not appear, even if the non-economic factors are neutralised. We revealed arguments for experiencing a virtuous cycle of endogenously reinforced attraction of foreign accumulated capital. Economies that do not have these features because they start from a comparatively inferior level of development and/or due to a lack of pre-existing strong manufacturing – 'infant economies' in our proposed terminology

– will experience an endogenously justified, flatter path of development and may not find it easy to catch up. Therefore, political intervention is needed for an energetic improvement of local production, infrastructure, and human capital, as well as to remove any pre-existing disadvantage in terms of industrialisation.

There are two paths that future research could take. First, it could proceed with more theoretical simulations – for instance, by letting the different manufacturing branches have dissimilar μ and/or by widening the presented general equilibrium model to opening product markets as well.

Second and more urgent, we need to get stronger empirical evidence for the derived theoretical arguments, either by focusing on the disparities among the CEECs or by including other regions as well. We can proceed by (1) examining the non-monotone relationship between FDI inflow and capital's compensation in time-series analysis, and (2) checking the cross-sectional differences of FDI welfare effects, in relation to appropriate control variables proxying the features revealed in the previous theoretical discussion.

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APPENDIX

A.1 Derivation of real income and real capital and labour's remuneration (Equations 18, 19, and 20)

In order to derive real (equilibrium) income (RY), divide Y^*(Equation 11) by CLI (Equation 17):

$$RY = {Y^*}/{CLI} = \frac{p_A A + ({w}/{\rho})L}{p_A^{1-m\mu}({w}/{\rho})^{m\mu}({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}} =$$

$$= \frac{({w}/{\rho})^{1-m\mu} L}{p_A^{1-m\mu}({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}} + \frac{p_A^{m\mu} A}{({w}/{\rho})^{m\mu}({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}}$$

Next, we substitute w from Equation (12b):

$$RY = \frac{({m\mu}/{(1-m\mu)})^{1-m\mu} A^{1-m\mu} L^{m\mu}}{({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}} + \frac{({m\mu}/{(1-m\mu)})^{-m\mu} A^{1-m\mu} L^{m\mu}}{({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}}$$

$$= \frac{A^{1-m\mu} L^{m\mu} (\left({m\mu}/{(1-m\mu)}\right)^{1-m\mu} + \left({m\mu}/{(1-m\mu)}\right)^{-m\mu})}{({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}} =$$

If we rearrange accordingly, we reach the final expression (Equation (18) in the main text):

$$RY = \left({m\mu}/{1-m\mu}\right)^{1-m\mu} \left(1 + \frac{1-m\mu}{m\mu}\right) \frac{A^{1-m\mu} L^{m\mu}}{({K}/{m})^{{m\mu}/{1-\sigma}} \prod_{i=1}^{m} \gamma_i^{\mu} k_i^{{\mu}/{\sigma-1}}}$$

Further, for real wage (ω) we divide w^* by CLI (Equation (17)):

$$\omega = \frac{w^*}{p_A^{1-m\mu}\left({}^{w}/_{\rho}\right)^{m\mu}\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}} = \frac{w^{1-m\mu}}{p_A^{1-m\mu}(\rho)^{-m\mu}\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}$$

After substituting w^* from Equation (12b) and several rearrangements we get the final expression (Equation (19) in the main text):

$$\omega = \left({}^{m\mu}/_{1-m\mu}\right)^{1-m\mu}\frac{\rho A^{1-m\mu}L^{m\mu-1}}{\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}$$

Similarly, we divide r^* from Equation (12a) by CLI from Equation (17):

$$\varepsilon = \frac{r^*}{CLI} = \frac{m\mu(1-\rho)p_A A\left(1+\frac{m\mu}{1-m\mu}\right)\Big/_{K}}{p_A^{1-m\mu}\left({}^{w}/_{\rho}\right)^{m\mu}\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}$$

Appropriate rearranging yields the final expression (Equation (20) in the main text):

$$\varepsilon = \left({}^{m\mu}/_{1-m\mu}\right)^{1-m\mu}\frac{(1-\rho)A^{1-m\mu}L^{m\mu}}{K\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}$$

A.2 Derivation of Equations (23) and (24)

We want to discover the effect of an increase in m – the number of branches in the manufacturing sector – on real income (RY) and real compensation of capital (ε).

As m is included in all terms of the defined RY in Equation (18), we first analyse the first derivative in separate parts, as follows:

$$\frac{\partial RY}{\partial m} = \frac{\partial \left({}^{m\mu}/_{1-m\mu}\right)^{1-m\mu}\left(1+\frac{1-m\mu}{m\mu}\right)}{\partial m}\left(\frac{A^{1-m\mu}L^{m\mu}}{\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}\right) + \frac{\partial\left(\frac{A^{1-m\mu}L^{m\mu}}{\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}\right)}{\partial m}\left({}^{m\mu}/_{1-m\mu}\right)^{1-m\mu}\left(1+\frac{1-m\mu}{m\mu}\right)$$

The above two sub-derivatives can be analysed even further. After proceeding with all calculations, we reach the following longer expression:

$$\frac{\partial RY}{\partial m} = -\left(\left(1+\frac{1-m\mu}{m\mu}\right)\left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu}\left(\frac{m\mu}{1-m\mu}\right)^{2}\ln\left(\frac{m\mu}{1-m\mu}\right) + \left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu}\frac{\mu}{(m\mu)^2}\right)\left(\frac{A^{1-m\mu}L^{m\mu}}{\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}\right) + \left(\frac{A^{1-m\mu}L^{m\mu}}{\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}}\right)\left(\mu(\ln L+\ln A) + \frac{\mu}{\sigma-1}(\ln K+\ln m)\right)\left(\frac{m\mu}{1-m\mu}\right)^{1-m\mu}\left(1+\frac{1-m\mu}{m\mu}\right)$$

Rearranging accordingly reveals RY as a common factor on the right-hand side, which leads us to the expression of Equation (24):

$$\frac{\partial RY}{\partial m} = RY\left[\mu(lnL-lnA)+\frac{\mu}{\sigma-1}(lnK-lnm)-\left(ln\frac{m\mu}{1-m\mu}\right)\frac{\mu^2}{(1-m\mu)^2}-\frac{1}{m}\right]$$

We then proceed with the same exercise for ε, where we start with appropriate rearrangements in Equation (20) so that RY also appears here as a common factor:

$$\varepsilon = \left({}^{m\mu}/_{1-m\mu}\right)^{1-m\mu}\frac{(1-\rho)A^{1-m\mu}L^{m\mu}}{K\left({}^{K}/_{m}\right)^{{}^{m\mu}/_{1-\sigma}}\prod_{i=1}^{m}\gamma_i^{\mu}k_i^{{}^{\mu}/_{\sigma-1}}} = RY\frac{(1-\rho)m\mu}{K}$$

Now the first derivative with respect to m can be derived more easily:

$$\frac{\partial \varepsilon}{\partial m} = \frac{\partial RY}{\partial m}\frac{(1-\rho)m\mu}{K} + \frac{(1-\rho)\mu}{K}RY$$

Substituting $\frac{\partial RY}{\partial m}$ with RY from above along with the algebraic transformations yields the final expression:

$$\frac{\partial \varepsilon}{\partial m} = RY\frac{(1-\rho)\mu}{K}\left[m\mu(lnL - lnA) + \frac{m\mu}{\sigma - 1}(lnK - lnm) - \left(ln\frac{m\mu}{1-m\mu}\right)\frac{\mu^2}{(1-m\mu)^2}\right]$$