Journal of
Risk and Financial Management

MDPI

Article

International Borrowing and Lending in the Presence of Oligopolistic Competition

Ronald Ravinesh Kumar [1] and Peter J. Stauvermann [2,*]

[1] Department of Economics and Finance, The Business School, Saigon South Campus, RMIT University, Ho-Chi-Minh City 700000, Vietnam; ronald.kumar@rmit.edu.vn
[2] Department of Global Business and Economics, Changwon National University, Changwon 51-142, Republic of Korea
* Correspondence: pjsta@changwon.ac.kr

Abstract: This paper examines the implications of imperfect competition in a two-country framework where a single good is produced. Using an overlapping generation model, we analyze the effects of market structures. Specifically, one country is assumed to operate under a perfectly competitive market structure, while the other country operates under an oligopolistic market structure. Our analysis reveals that the differences in factor prices between the two countries when they are in autarky lead to intergenerational trade once their capital markets are integrated. A key finding is that the country with an oligopolistic market structure becomes a lending country, while the country with a competitive market structure becomes a borrowing country. Furthermore, we find that the country with an oligopolistic market structure, serving as a lender, experiences a current account surplus, while the country with a perfectly competitive market structure, acting as a debtor, incurs a current account deficit.

Keywords: oligopolistic competition; international borrowing and lending; two countries; one-sector overlapping generations model; anti-trust policy

Citation: Kumar, Ronald Ravinesh, and Peter J. Stauvermann. 2023. International Borrowing and Lending in the Presence of Oligopolistic Competition. *Journal of Risk and Financial Management* 16: 357. https://doi.org/10.3390/jrfm16080357

Academic Editor: Thanasis Stengos

Received: 16 June 2023
Revised: 25 July 2023
Accepted: 25 July 2023
Published: 28 July 2023

1. Introduction

In recent decades, market concentration has experienced a significant rise in most developed countries. However, the factors contributing to the increase in market power among firms vary, as discussed by various studies (Díez et al. 2018; Chen et al. 2019; Barkai 2020; Barkai and Benzell 2018; Karabarbounis and Neiman 2018; Philippon 2019).

One argument suggests that the relaxation of anti-trust policies is responsible for this trend (Van Reenen 2018; Zingales 2012, 2017). Scholars such as Van Reenen and Patterson (2017), Autor et al. (2020), and others attribute this phenomenon to the emergence of “superstar firms” that derive their market power from network economics.

An important empirical consequence associated with the growing market power of firms is the decline in the labor income share. This decline in the share of income going to labor is a well-documented trend supported by studies such as Eggertsson et al. (2021). Furthermore, the authors summarize that the increasing market power is a new stylized fact, noting that along with the rise in market power, both the capital income share, and the real (natural) rate of interest have declined.

The empirical literature has extensively explored the connections between market power and economic outcomes. However, the theoretical literature on imperfect competition within a general equilibrium framework, specifically focusing on oligopolistic competition, is relatively limited. Many models that incorporate imperfect competition draw from the Dixit and Stiglitz (1977) approach and predominantly consider monopolistic competition (Romer 1990). These models typically determine price mark-up and market power based on technological factors. One exception is the work of Melitz and Ottaviano (2008), who make specific assumptions regarding utility and technologies.

Within the realm of oligopolistic market structures in a general equilibrium context, there are three primary strands of literature. One notable contribution comes from Neary (2002a, 2010, 2016), who developed and applied the general oligopolistic equilibrium (GOLE) model in multiple studies. More recently, two additional approaches have emerged. Azar and Vives (2018, 2021) have developed one approach, while Kumar and Stauvermann (2021) and Stauvermann and Kumar (2022) have introduced another.

In our research, we aim to contribute to the existing literature by examining the long-run implications of imperfect competition in a global context that involves international borrowing and lending. While Neary's (2002a, 2002b, 2003, 2007) studies predominantly focus on international trade in goods with the presence of oligopolies, we specifically concentrate on intertemporal international trade.

To achieve this, we employ the overlapping generation (OLG) framework in an international setting, drawing inspiration from the work of Buiter (1981). In our model, we assume that one of the countries in the two-country setup operates under imperfect competition in its markets, as suggested by Stauvermann and Kumar (2022). This approach aligns with the one-good OLG model, which has been discussed by scholars such as Diamond (1965) and Buiter (1981).

While Buiter (1981) explores international borrowing and lending driven by differing pure time preference rates, we investigate the scenario where different market structures induce international borrowing and lending. This perspective allows us to examine the effects that arise from the integration of national capital markets, including impacts on trade balance, current account balance, factor prices, and capital allocation. This paper primarily presents a positive theory aimed at deriving new insights that can effectively explain real-world phenomena within the realm of international borrowing and lending.

The remainder of the paper is structured as follows. In the subsequent section, we provide a concise overview of studies that examine the implications of international movements of factors of production on the global economy. Section 3 is dedicated to introducing our overlapping generation (OLG) model that incorporates imperfect competition within a country operating in autarky. We derive the equilibria that arise in this autarkic setting. In Section 4, we present an analysis of the integration of capital markets, considering one economy characterized by an oligopolistic market structure and the other by a perfectly competitive market structure. In Section 5, we investigate the consequences of altering the level of competition within a country. Specifically, we analyze the effects that result from changes in the degree of competition. Finally, in Section 6, we provide concluding remarks based on our findings and contributions.

2. Literature Review

We organize the review into two parts. First, we review the literature on oligopolies within a general equilibrium framework. Second, we examine the literature on international factor movements in a one-good two-country OLG model.[1] In this section, we selectively review foundational research and highlight a few extensions of the basic models.

As mentioned earlier, the literature on imperfect competition in general equilibrium models has predominantly focused on monopolistic competition. One drawback of these models is that they determine market power based on the elasticity of substitution between monopolistically produced goods, thereby disregarding the strategic behavior of firms. However, the prevalence of monopolistic competition over oligopolistic competition in general equilibrium models can be attributed to certain challenges associated with oligopolies. One significant challenge pertains to the fact that if firms are large and possess market power, their influence extends not only to the respective goods market but also to the factor markets.

Neary (2002a, 2002b, 2002c) addresses this issue by introducing multiple sectors, allowing firms to be large within their own sector while remaining small within the overall economy. This is accomplished by assuming that consumer utility depends on a continuum of goods, which are produced in different sectors. In each sector, only a small number of firms produce the respective goods.

In contrast, Azar and Vives (2018, 2021) do not overlook the issue of large firms exerting market power in both the goods and factor markets. To tackle the technical challenges that arise, they address the inclusion of the actual asset management firms, such as BlackRock, Vanguard, and State Street, and demonstrate common ownership, governed by only a few asset managers. As a result, it is assumed that firm managers maximize a weighted average of the utilities of shareholders who have stakes in all the firms. Consequently, managers no longer solely focus on maximizing the profits of the firm they represent, but also consider the impact of their actions on the profits of other firms. This approach allows for the determination of a Cournot-Nash equilibrium, where the objective function of each firm manager represents a weighted average of the utilities of the shareholders.

Studies such as Stauvermann and Kumar (2022) and Kumar and Stauvermann (2021) expand on Neary's (2010, 2016) idea by employing an OLG (Overlapping Generations) framework. They distinguish their analysis by assuming one final good sector and m intermediate goods sectors (where m is a large number). Within each intermediate sector, there are n firms producing the respective intermediate goods. Similar to Neary's model, these firms possess market power in their respective intermediate goods market but cannot influence factor prices. Additionally, this approach enables their model to be treated as a standard one-good economy.

The study of international capital allocation in a two-country OLG (Overlapping Generations) model traces back to Buiter (1981), who specifically examines the role of differing time preference rates in a global economy with capital mobility. Buiter's findings indicate that a country with a lower savings rate will experience a current account deficit in the steady state, particularly when the population is growing. The world capital intensity, which is equal in both countries, lies between the steady-state capital intensities of the two countries in autarky. However, the welfare implications are ambiguous and depend on the steady state in autarky. It can be observed that the wage rate in the country with a higher propensity to save is lower than in autarky, while the world interest rate is higher compared to the interest rate in autarky. Conversely, the opposite holds for the country with a lower propensity to save. Nevertheless, opening the capital markets does not result in a Pareto improvement.

Galor (1986) modifies Buiter's model by assuming that capital is immobile, but labor is mobile; i.e., migration is possible. Again, it is assumed that the citizens of both countries differ regarding their subjective or pure time preference rates. Galor (1986) shows that the citizens in the immigration (receiving) country suffer from immigration, while the non-migrants in the emigration (sending) country are at least as better off as in the autarkic steady state. The direction of labor migration is influenced by the characteristics of the autarkic steady-states. When both countries are in an intertemporally inefficient steady state of autarky, the workers migrate from the high to the low-wage country. When the opposite assumption is true (both autarkic steady states are intertemporally efficient), the direction of migration is reversed. Additionally, when the autarkic steady state is in one country intertemporally efficient and in the other country intertemporally inefficient, bilateral migration may occur.

Galor (1992) employs a similar approach to examine the welfare implications of international labor and capital mobility, aiming to identify the circumstances in which a country should open its capital and/or labor market. One significant finding of this analysis is that capital and labor mobility do not yield symmetric effects on welfare and international factor allocation. The asymmetry arises due to the impact of labor mobility on population structure. Migration can introduce individuals with different time preference rates into a country, thereby altering the previously homogeneous population. Additionally, Galor (1992) explores the effects of labor or capital mobility on national steady-state welfare and highlights that the outcomes are contingent upon the nature of steady states in autarky, particularly with regard to intertemporal efficiency.

Crettez et al. (1996) expand upon Galor's (1986) model by introducing land as a factor of production. They examine a world with migration and conclude that population density and interest rates will be equal in the steady state of the global economy. Furthermore, as a result of migration, both types of individuals will be represented in both populations. Importantly, the steady-state equilibrium is always intertemporally efficient, which is not surprising, as the existence of land is known to guarantee intertemporal efficiency (Homburg 1991, 1992). One notable difference compared to the aforementioned papers is that Crettez et al. (1996) demonstrate that in certain cases, a Pareto improvement is possible.

Crettez et al. (1998) further expand upon the model introduced by Crettez et al. (1996) by incorporating internationally mobile capital. They compare the outcomes derived from international labor mobility with those resulting from international capital mobility. Their findings indicate that capital mobility alone is insufficient to equalize standards of living. Instead, the equalization of standards of living is only achieved when both capital mobility and labor mobility are allowed.

Furthermore, research has demonstrated that specific policy measures can influence factor allocation in a global economy with mobile capital and immobile labor. For example, Persson (1985) examined how public debt in one country impacts factor allocation and the current account of both countries. He concludes that in the long run, public debt results in a lower world capital intensity, leading to a decline in the steady-state wage rate and an increase in the steady-state interest rate with public debt. The welfare effects are ambiguous, but it is possible that the steady-state welfare of the country with public debt may benefit from its introduction, particularly if the country is a creditor country. This is because public debt induces changes in the intertemporal terms of trade in favor of that country. However, it is also possible that the steady-state welfare of the other country increases, but simultaneous gains in welfare for both countries are not possible. In contrast, it is possible for both countries to experience a welfare loss due to public debt in one of the two countries.

Haaparanta (1989) examines the impact of an international transfer in Persson's (1985) model and investigates the welfare effects when the transfer is funded through a tax based on the government's fiscal deficit. He demonstrates that it may be possible to increase steady-state welfare in both countries. Hamada (1986) extends Persson's (1985) model by incorporating fiscal policy in both countries (see Wilson (1999) for theories of tax competition) and concludes that fiscal coordination is necessary to prevent inefficiently high government expenditures.

Until now, the prevailing assumption has been that countries differ in terms of the saving propensity or time preferences of their citizens. However, Vidal's (2000) model, based on Barro's (1974) concept of perfect altruism, introduces intergenerational altruism and assumes that two countries differ in the degree of altruism exhibited by parents towards their children. Vidal demonstrates that the more altruistic country becomes a net exporter of capital, with its steady-state welfare increasing upon the integration of capital markets. On the other hand, the change in steady-state welfare for the other country is ambiguous. However, in contrast to Vidal (2000), Michel and Vidal (2000) propose a model where parental bequest represents the education received by their parents, making the growth of economies endogenous. Utilizing this model, they demonstrate that global market integration can enhance growth in both countries, provided that strong positive cross-border externalities of human capital exist. It can be noted that Buiter's (1981) approach is still popular and extended in other directions, such as extending the model to trade in goods (c.f. Farmer and Schelnast 2013; Farmer 2014; Farmer and Mihaiescu 2015).

In contrast to the aforementioned models, our study focuses on a two-country one-good overlapping generations (OLG) model, where the two countries exhibit distinct market structures and how these differences influence intertemporal trade. Hence, our model closely resembles the approach presented by Buiter (1981). Particularly, we are interested in the changes in interest rates, wage rates, current accounts, and the balance of trade induced by differing market structures.

3. The Model

3.1. The Production in the Domestic Country

To establish a general equilibrium model with imperfect competition, it is necessary to ensure that firms with market power in the goods market do not influence factor prices (Hart 1982, 1985). Building on Hart's (1982, 1985) arguments, we assume that the quantity of the final goods Y is produced in a perfectly competitive market. The final goods can be either consumed or transformed one-to-one into capital goods. The firms in the final goods sector utilize m intermediate goods, denoted as quantity Q_i, where $i = 0, \ldots, m$ to produce the final goods. The intermediate goods markets exhibit an oligopolistic market structure, with n firms producing each respective intermediate good. These firms engage in Cournot competition. We assume that m is a sufficiently large number, such that all oligopolists behave as price takers in the factor markets.

A representative firm in the final goods sector utilizes the following production technology:

$$Y = m\prod_{i=1}^{m}(x_i)^{\frac{1}{m}} \tag{1}$$

where x_i is the quantity of intermediate good i. Given that the price of the final good is denoted as p_Y and the prices of the intermediate goods as p_i, $\forall i = 1, \ldots m$, the resulting profit maximization problem of a representative firm in the final good sector becomes:

$$\max_{x_i} \Pi_y = \underset{x_i}{max}\left(p_Y m\prod_{i=1}^{m}(x_i)^{\frac{1}{m}} - \sum_{i=1}^{m} p_i x_i\right) \tag{2}$$

The resulting first-order conditions are:

$$\frac{p_Y Y}{m x_i} - p_i(x_i) = 0,\ \forall i = 1, \ldots, m \tag{3}$$

Accordingly, the inverse demand function for intermediate good i is given by:

$$p_i(x_i) = \frac{p_Y Y}{m x_i},\ \forall i = 1, \ldots, m \tag{4}$$

Now, we assume that the market structure of every intermediate good market is an oligopoly with n symmetric oligopolistic firms, where $n \geq 2$. These firms use a Cobb Douglas production function and produce the output x_{ij}, $j = 1 \ldots n$ by hiring the input factors labor L_{ij} and capital K_{ij}:

$$x_{i,j} = AK_{ij}^{\alpha} L_{ij}^{1-\alpha},\ 0 < \alpha < 1 \tag{5}$$

We assume a Cournot competition in all intermediate markets. Then, the profit function of an oligopolist j in intermediate market i can be written as:

$$\Pi_{i,j}(x_{ij}, x_{-i,j}) = p(x_i)x_{ij} - RK_{i,j} - wL_{i,j} \tag{6}$$

where w is the wage rate and R the interest factor. We assume a depreciation rate of one per period, which is appropriate if we assume that a period is equal to 25 to 30 years. Inserting (4) and (5) in (6) leads to:

$$\Pi_{i,j}(x_{i,j}, x_{-i,j}) = \frac{p_Y Y}{m x_i} x_{i,j} - RK_{i,j} - wL_{i,j} = \frac{p_Y Y}{m}\left(\frac{AK_{ij}^{\alpha} L_{ij}^{1-\alpha}}{\sum_{j=1}^{n} AK_{ij}^{\alpha} L_{ij}^{1-\alpha}}\right) - RK_{i,j} - wL_{i,j} \tag{7}$$

where we note that $x_i = \sum_{j=1}^{n} AK_{ij}^{\alpha} L_{ij}^{1-\alpha}$. Firm i maximizes its profits by determining its optimal capital stock and labor force. The resulting first-order conditions are given by:

$$\frac{p_Y Y}{m}\left[\frac{\alpha AK_{ij}^{\alpha-1}L_{ij}^{1-\alpha}\left(\sum_{j=1}^{n} AK_{ij}^{\alpha}, L_{ij}^{1-\alpha}\right) - \left(AK_{ij}^{\alpha}L_{ij}^{1-\alpha}\right)\alpha AK_{ij}^{\alpha-1}L_{ij}^{1-\alpha}}{\left(\sum_{j=1}^{n} AK_{ij}^{\alpha}L_{ij}^{1-\alpha}\right)^2}\right] - R = 0 \quad (8)$$

$$\frac{p_Y Y}{m}\left[\frac{(1-\alpha)AK_{ij}^{\alpha}L_{ij}^{-\alpha}\left(\sum_{j=1}^{n} AK_{ij}^{\alpha}L_{ij}^{1-\alpha}\right) - \left(AK_{ij}^{\alpha}L_{ij}^{1-\alpha}\right)(1-\alpha)AK_{ij}^{\alpha}L_{ij}^{-\alpha}}{\left(\sum_{j=1}^{n} AK_{ij}^{\alpha}L_{ij}^{1-\alpha}\right)^2}\right] - w = 0 \quad (9)$$

Because of the assumed symmetry of firms and sectors, it follows that the produced quantities of all firms are equal to $\overline{x}_{ij}$ in the equilibrium. Thus, $x_{ij} = \overline{x}_{ij}$, $\forall i = 1, \ldots, m$ and $\forall j = 1, \ldots, n$. Accordingly, it also follows that $\sum_{j=1}^{n} x_{ij} = n\overline{x}_{ij} = nA\left(\frac{K}{nm}\right)^{\alpha}\left(\frac{L}{nm}\right)^{1-\alpha}$, where K is the aggregate capital stock of the economy and L is the aggregate labor force. The symmetry assumptions also guarantee that the following equalities hold: $K_i = \sum_{j=1}^{n} K_{i,j} = \frac{K}{m}$ and $L_i = \sum_{j=1}^{n} L_{i,j} = \frac{L}{m}$. Furthermore, the symmetry guarantees $K_{i,j} = \frac{K}{mn}$ and $L_{i,j} = \frac{L}{mn}$, . We also use the fact that a partial derivative of a liner-homogenous function is homogenous of degree zero. Furthermore, it is easy to see from (1) that if $x_i = \overline{x}_i$, $\forall i = 1, \ldots, m$, then $Y = m\overline{x}_i$, where $\overline{x}_i = n\overline{x}_{ij}$. Subsequently, we can reformulate (8) and (9) to:

$$\frac{p_Y Y}{m}\alpha AK_{ij}^{\alpha-1}L_{ij}^{1-\alpha}\left[\frac{n\overline{x}_{ij} - \overline{x}_{ij}}{\left(n\overline{x}_{ij}\right)^2}\right] = \frac{p_Y Y}{m}\alpha AK_{ij}^{\alpha-1}L_{ij}^{1-\alpha}\left[1 - \frac{1}{n}\right] = p_Y \alpha AK^{\alpha-1}L^{1-\alpha}\left[\frac{n-1}{n}\right] = R \quad (10)$$

$$\frac{p_Y Y}{m}(1-\alpha)AK_{ij}^{\alpha}L_{ij}^{-\alpha}\left[\frac{n\overline{x}_{ij} - \overline{x}_{ij}}{\left(n\overline{x}_{ij}\right)^2}\right] = \frac{p_Y Y}{m}(1-\alpha)AK_{ij}^{\alpha}L_{ij}^{-\alpha}\left[1 - \frac{1}{n}\right] = p_Y(1-\alpha)AK^{\alpha}L^{-\alpha}\left[\frac{n-1}{n}\right] = w \quad (11)$$

From the necessary condition that marginal revenues must equal marginal costs, we derive the price of the final good, noting that in the case of linear homogeneous production functions, the marginal costs are equal to one. Consequently, the price of the final good is:

$$p_Y^* = \frac{n}{n-1} > 1 \quad (12)$$

Then, it follows for the aggregate profits in terms of the final goods Π are given by:

$$\Pi = Y - \left(\frac{n-1}{n}\right)\left((1-\alpha)AK^{\alpha}L^{-\alpha}L + \alpha AK^{\alpha-1}L^{1-\alpha}K\right) = \frac{Y}{n} = \frac{F(K,L)}{n} \quad (13)$$

To summarize, the factor prices and profits of sectors and firms in terms of final goods can be written as:

$$\left(\frac{n-1}{n}\right)\alpha AK^{\alpha-1}L^{1-\alpha} = R \quad (14)$$

$$\left(\frac{n-1}{n}\right)(1-\alpha)AK^{\alpha}L^{-\alpha} = w \quad (15)$$

The aggregate profits of each sector i are:

$$\Pi_i = \frac{AK^{\alpha}L^{1-\alpha}}{nm} = \frac{F(K,L)}{nm},\ \forall i = 1, \ldots, m \quad (16)$$

and profits of each firm j in each sector i:

$$\Pi_{i,j} = \frac{Y}{n^2 m} = \frac{F(K,L)}{n^2 m}.\ \forall i = 1, \ldots, m \text{ and } \forall j = 1, \ldots, n \quad (17)$$

We can define the term $n/(n-1)$ as the price markup factor. This implies that the input factors are not paid according to their real marginal products. However, this outcome is evident because if the input factors were paid according to their real marginal products, the profits would have to be zero, which is not the case.

3.2. The Individuals

Following Diamond's (1965) model, we adopt a two-period overlapping generations (OLG) framework, where the young individuals inelastically participate in the labor force and supply their labor wage. The size of the young generation born in period t is denoted as L_t, and the population is growing at a rate of g_L. Additionally, we assume that mn young individuals inherit the exclusive right to operate a firm from their retiring parents. We have taken the assumption that members of the young generation own the firms from d'Aspremont et al. (1995). Upon reaching retirement age, they pass on this right to their eldest child. These mn individuals receive the wage rate as income and also earn profits from their respective firms.

In a similar model, Laitner (1982) proposed that firm shares are acquired by savers at the end of the first period of life, and sold at the end of the second period. However, this approach has a drawback. It is possible that the aggregate wage income in our present model may not be sufficient to afford the firm shares, as the net present value of all shares could exceed the total wage income. Laitner (1982) does not encounter this problem as he considers a two-sector model, comprising both a perfectly competitive sector and an oligopolistic sector, where the oligopolistic firms act as price takers in the factor markets due to their relatively small size.

Unlike Laitner's assumption regarding firm ownership, we adopt the assumption of d'Aspremont et al. (1995) as an alternative. For instance, let us consider economies such as Germany, Japan, or Korea, where families predominantly own firms, including major companies such as Toyota, Samsung, BMW, LG, or Robert Bosch. In practice, it is common for parents who own a family business to pass it down to their children, which supports our assumption regarding the transfer of firm ownership. Later, we will see that the equilibrium outcome strongly depends on the assumption that younger or older members of the economy own the firms.

Given the population growth rate g_L, we can express this as:

$$\frac{L_t}{L_{t-1}} = 1 + g_L \tag{18}$$

According to the considerations above, the individual intertemporal budget constraint of a worker is given by:

$$c_{w,t}^1 + \frac{c_{w,t+1}^2}{R_{t+1}} = w_t \tag{19}$$

where $c_{w,t}^1$ and $c_{w,t+1}^2$ are the consumption expenditure of a worker in the first and second period of life, respectively. The intertemporal budget constraint of firm owner or entrepreneur is given by:

$$c_{e,t}^1 + \frac{c_{e,t+1}^2}{R_{t+1}} = w_t + \pi_t \tag{20}$$

where $c_{e,t}^1$ and $c_{e,t+1}^2$ are the consumption expenditure of an entrepreneur in the first and second period of life, respectively.

Furthermore, we assume that all individuals have identical preferences and perfect foresight. Following Crettez et al. (1996, 1998), the utility of an individual born in t is given as a log-linear utility function:

$$U\left(c_t^1, c_{t+1}^2\right) = ln\left(c_t^1\right) + q ln\left(c_{t+1}^2\right) \tag{21}$$

where c_t^1 is the consumption in the first period of life, c_{t+1}^2 is the consumption in the second period of life, and $q > 0$ is the subjective discount factor. The budget constraints of an individual can be written as:

$$c_t^1 + \frac{c_{t+1}^2}{R_{t+1}} = y_{i,t} \tag{22}$$

where $i = w, e$ and $y_{e,t} = w_t + \pi_t$ and $y_{w,t} = w_t$. The first order condition of the utility maximization problem can be written as:

$$\frac{qR_{t+1}}{R_{t+1}s_{i,t}} - \frac{1}{y_{i,t} - s_{i,t}} = 0 \tag{23}$$

where the individual savings $s_{i,t}$ are given by:

$$s_{i,t} = y_{i,t} - c_{i,t}^1 \tag{24}$$

Using (23) and (24), we obtain for the savings $s_{i,t}$:

$$s_{i,t} = \frac{q}{1+q} y_{i,t} \tag{25}$$

Adding (13) and (15), dividing this by L_t results in the average income per capita of a member of the young generation. Using this in combination with (25) and defining the savings rate as $s = \frac{q}{1+q}$ leads to the average per capita savings s_t:

$$s_t = s\left(\left(\frac{n-1}{n}\right)(1-\alpha) + \frac{1}{n}\right) A(k_t)^\alpha \tag{26}$$

Thus, the average savings rate of the economy S, defined as aggregate savings divided by domestic product, is given by:

$$S = s\left(\left(\frac{n-1}{n}\right)(1-\alpha) + \frac{1}{n}\right) \tag{27}$$

The aggregate savings rate is not solely determined by the savings of workers; it also takes into account the savings of firm owners. The inclusion of firm owners' savings makes a significant difference compared to Laitner's (1982) approach, which assumes that only workers save while firm owners, who belong to the older generation, consume profits. Thus, in this context, savings are determined not only by time preference and the production elasticity of capital α, as in Diamond's (1965) model, but also by the level of market concentration. A smaller value of α and a lower number of firms lead to a higher savings rate.

The profits are a direct outcome of the market power held by companies, allowing them to reduce the purchasing power of capital owners and workers. Consequently, this leads to an income redistribution from the older generation to the younger generation, which leads to increased savings.

3.3. Production and Households in the Foreign Country

We make the assumption that the foreign economy utilizes the same technologies and produces the same types of intermediate goods and final goods as the domestic country. Moreover, the preferences of individuals in both countries are identical. The only distinction lies in the market structure of the intermediate goods markets. Specifically, we assume that the domestic country has oligopolistic intermediate goods markets, while the foreign country has perfectly competitive intermediate goods markets. This assumption implies that in autarky, the factor prices in the foreign country are equal to the marginal products of the respective factors.

$$\alpha A(K^*)^{\alpha-1}(L^*)^{1-\alpha} = R_{aut}^* \tag{28}$$

$$(1-\alpha)A(K^*)^{\alpha-1}(L^*)^{-\alpha} = w^*_{aut} \tag{29}$$

where the asterisk represents variables of the foreign country and the subscript *aut* indicates that the respective variables are derived in autarky.

Furthermore, we assume that the population size of both countries is identical, $L^*_t = L_t$ and, accordingly, $g^*_L = g_L$. Then, the average savings per capita of the foreign country are given by:

$$s^*_{aut,t} = s(1-\alpha)A(k^*_t)^\alpha \tag{30}$$

and the average savings rate of the foreign economy is given by:

$$S^* = s(1-\alpha) \tag{31}$$

3.4. Equilibria in Autarky

Prior to analyzing the characteristics of an equilibrium with an integrated capital market, we first derive the equilibria of both economies in autarky to compare the two economies. The capital market clearing condition of the domestic country, expressed in per capita terms, is given by $s_{aut,t} = (1+g_L)k_{aut,t+1}$ or:

$$s\Omega(n)A(k_{aut,t})^\alpha = (1+g_L)k_{aut,t+1} \tag{32}$$

where $\Omega(n) = \left(\frac{(n-1)(1-\alpha)+1}{n}\right) = (1-\alpha) + \frac{\alpha}{n}$, with $\lim_{n\to\infty} \Omega(n) = 1-\alpha$.

The condition for local stability is given by:

$$\frac{dk_{aut,t+1}}{dk_{aut,t}} = \frac{s\Omega\alpha A(k_{aut,t})^{\alpha-1}}{n(1+g_L)} < 1 \tag{33}$$

Solving (32) for the relevant equilibrium capital intensity k_{aut}, we obtain:

$$k_{aut} = \left(\frac{s\Omega A}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{34}$$

The capital market clearing condition in autarky for the foreign country is given by:

$$s(1-\alpha)A\left(k^*_{aut,t}\right)^\alpha = (1+g_L)k^*_{aut,t+1} \tag{35}$$

We can substitute $1-\alpha = \Omega(\infty) = \Omega^*$ and obtain:

$$s\Omega^* A\left(k^*_{aut,t}\right)^\alpha = (1+g_L)k^*_{aut,\, t+1} \tag{36}$$

According to the procedure above, the equilibrium capital intensity is given by:

$$k^*_{aut} = \left(\frac{s\Omega^* A}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{37}$$

Proposition 1. *Maintaining other variables unchanged, with differences in market structure alone, the capital stock (capital intensity) of an economy with oligopolistic markets always exceeds the capital stock (capital intensity) of an economy with perfectly competitive markets.*

Proof of Proposition 1. Calculating the difference between Ω and Ω^*, we obtain $\Omega - \Omega^* = \frac{\alpha}{n}$. From this, it follows that $k_{aut} > k^*_{aut}$. □

If we compare the two equilibrium capital intensities in autarky, it becomes evident that the difference is caused by the varying values of Ω and Ω^*, which represent the shares of income received by the young generation in their respective countries. Intuitively, the oligopolistic firms owned by members of the young generation have the power to pay the input factors less than their marginal product, and this leads to a redistribution of income from the old to the young generation. However, this does not imply that firms have market power in the factor markets, it is simply a consequence of the fact that the final good price exceeds one.

From Proposition 1, it is obvious that $k_{aut} > k^*_{aut}$, hence, we have Proposition 2 as:

Proposition 2. *Maintaining other variables unchanged, the domestic product or output of an economy with an oligopolistic market structure always exceeds the domestic product of a similar economy with a perfectly competitive market structure.*

Proposition 2 directly follows from Proposition 1 in combination with the characteristics of the production function.

Proposition 3. *The interest rate in an economy with an oligopolistic market structure is always lower than the interest rate of a similar economy with a perfectly competitive market structure.*

Proof of Proposition 3. This follows from a comparison of both countries' interest factors: $R_{aut} = \left(\frac{n-1}{n}\right)\alpha A(k_{aut})^{\alpha-1} < \alpha A(k^*_{aut})^{\alpha-1} = R^*_{aut}$, because $k_{aut} > k^*_{aut}$ and $\frac{n-1}{n} < 1$. □

Regarding a comparison of the wage rates, it is not clear in which economy the wage rate is higher in autarky. To see this, we consider the relative wage rate as:

$$\frac{w_{aut}}{w^*_{aut}} = \left(\frac{n-1}{n}\right)\left(\frac{n-1}{n} + \frac{1}{(1-\alpha)n}\right)^{\frac{\alpha}{1-\alpha}} \tag{38}$$

A plot of relative wage (38) implies that the ratio can be smaller or bigger than one. Rewriting it as $\frac{w_{aut}-w^*_{aut}}{A(1-\alpha)\left(\frac{sA}{1+g_L}\right)^{\frac{\alpha}{1-\alpha}}}$, we can have the ratio as bigger or smaller than zero (see Figure 1). Figure 1 shows that we can only state in general $w_{aut} \gtreqless w^*_{aut}$. For some parameters in the range $\alpha \in]0,1[$ and $n \in [2,10]$, the wage rate of the home country exceeds the wage rate of the foreign countries; for other parameter values the opposite holds. For example, if the value of α is close to zero, then the wage rate in the foreign country exceeds the wage rate in the home country, if $\alpha = 0.7$ and $n \in [2,10]$, the opposite is valid.

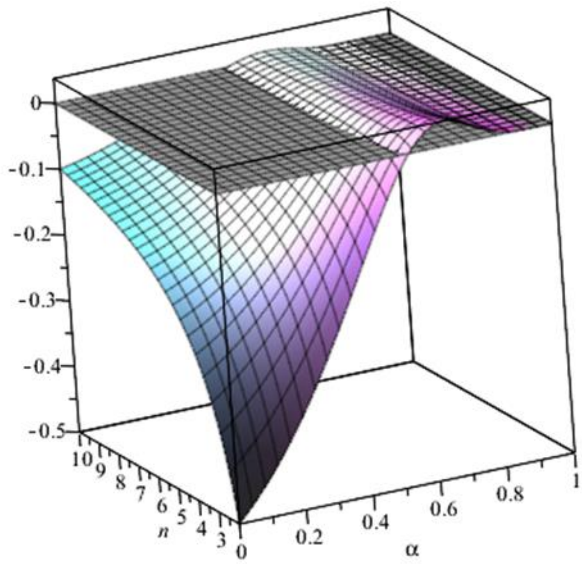


Figure 1. Ratio of wages rates in autarky.

Thus, if the production elasticity of capital is relatively low, the wage rate in the perfectly competitive economy exceeds the wage rate of the oligopolistic economy, although the capital intensity in the latter economy is higher than the capital intensity in the former economy. The reason for this is because part of the income of the young generation in the home country is received by the firm owners. If the production elasticity is relatively high, the opposite outcome holds.

In summary, if two identical economies only differ with respect to the market structure, the oligopolistic economy has, in autarky, a higher capital intensity, a higher income per capita, and a lower interest factor than a perfectly competitive economy in autarky. While these outcomes are clear, it is unclear in which economy the wage rate is higher.

4. The International Capital Market with Borrowing and Lending

Following Buiter's (1981) framework, we proceed to determine the long-run equilibrium in a two-country model with unrestricted capital mobility, where capital can freely flow between countries without any transaction or transportation costs. In this model, we assume that oligopolistic firms in the intermediate goods markets have the ability to safeguard their market power, only allowing the trade of final goods between countries. As a result, each transaction that affects the trade balance involves borrowing and lending, and direct barter of goods is not possible. When the domestic country acts as a capital lender, it receives a claim on foreign capital and its corresponding interest. Conversely, when the foreign country borrows capital, it assumes a loan and commits to repay the principal along with interest. Implicitly, we assume perfect mobility of financial capital, where the claims of capital owners on domestic and foreign real capital are considered perfect substitutes. Consequently, interest rates will be equalized across the world economy. The non-arbitrage condition for capital can be expressed as follows:

$$R_t^w = R_t = R_t^*,\ \forall t \tag{39}$$

Inserting the interest factor of the domestic and foreign country in (39) delivers:

$$\left(\frac{n-1}{n}\right)\alpha A(k_t)^{\alpha-1} = \alpha A(k_t^*)^{\alpha-1} \tag{40}$$

The non-arbitrage condition leads to the following ratio between foreign and domestic capital:

$$\frac{k_t^*}{k_t} = \theta = \left(\frac{n}{n-1}\right)^{\frac{1}{1-\alpha}} \tag{41}$$

Proposition 4. *In a world economy, the capital stock (capital intensity) of a perfectly competitive economy always exceeds the capital stock (capital intensity) of an oligopolistic economy.*

Proof Proposition 4. Proposition 4 directly follows from Equation (41). The value of θ is always bigger than one, because the exponent on the RHS of (41) is bigger than one, and the price markup factor $\frac{n}{n-1}$ also exceeds one. If the number of firms strives to infinity, the value of θ will become one. □

Proposition 5. *In a world economy, the domestic product or output of a perfectly competitive economy is always higher than the domestic product or output of an economy with an oligopolistic market structure.*

Proof of Proposition 5. Proposition 5 is a consequence of Proposition 4, and the assumptions about the production functions. □

From (39), it can also be derived that Proposition 6 holds.

Proposition 6. *In a world economy, the wage rate in an economy with perfectly competitive markets is always higher than the wage rate of an economy with oligopolistic markets.*

Proof of Proposition 6. $w_t = \left(\frac{n-1}{n}\right)(1-\alpha)A(k_t)^\alpha < (1-\alpha)A(\theta k_t)^\alpha = w_t^*$. A simple reformulation yields: $\left(\frac{n-1}{n}\right) < (\theta)^\alpha$. Since the inverse of the price markup factor is smaller than one and the ratio θ of capital stocks (capital intensities) exceeds one, the inequality is always valid. □

In a world economy consisting of two similar economies, it can be summarized that a perfectly competitive economy tends to exhibit higher domestic product, capital stock, and wage rates compared to an oligopolistic economy. Consequently, the opening of capital markets has a significant influence on the relative performance of the two economies. It is important to note that in a world economy, unlike in the case of autarkic economies, the domestic product and national product no longer coincide.

Intuitively, the explanation lies in the power of oligopolies to decrease the purchasing power of factor incomes. This results in a situation where the physical marginal product must be higher in the domestic country compared to the foreign country in order to achieve interest rate parity between the two economies. The attainment of a higher physical marginal product of capital is only possible if the domestic country has a smaller capital stock and lower capital intensity compared to the foreign country. Because of the smaller capital stock, the wage rate and total output in the domestic country are also smaller compared to the foreign country.

4.1. The Long-Run Steady-State Equilibrium of an Open Economy

To determine the long-run equilibrium, we begin by defining the world capital intensity as the average of the capital intensities in the domestic and foreign country:

$$k_t^w = \frac{k_t + k_t^*}{2} \tag{42}$$

Using this definition, we can rewrite the respective national capital intensities as:

$$k_t = \frac{2k_t^w}{1+\theta} \tag{43}$$

$$k_t^* = \frac{2\theta k_t^w}{1+\theta} \tag{44}$$

Now, we can determine the world savings per capita by using (26), (29), (43) and (44):

$$s_t^w = sA\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha) + \frac{1}{n}\right)\left(\frac{2}{1+\theta}\right)^\alpha + (1-\alpha)\left(\frac{2\theta}{1+\theta}\right)^\alpha\right](k_t^w)^\alpha \tag{45}$$

The world capital market clearing condition is given by $s_t^w = 2(1+g_L)k_{t+1}^w$ or:

$$sA\left(\frac{2}{1+\theta}\right)^\alpha\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha) + \frac{1}{n}\right) + (1-\alpha)\theta^\alpha\right](k_t^w)^\alpha = 2(1+g_L)k_{t+1}^w \tag{46}$$

The condition for local stability is given by:

$$\frac{dk_{t+1}^w}{dk_t^w} = \frac{A\left(\frac{2}{1+\theta}\right)^\alpha\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha) + \frac{1}{n}\right) + (1-\alpha)\theta^\alpha\right]\alpha(k_t^w)^{\alpha-1}}{2(1+g_L)} < 1 \tag{47}$$

Solving (46) for the non-trivial equilibrium world capital intensity, we obtain:

$$k^w = \frac{1}{2}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha)+\frac{1}{n}\right)+(1-\alpha)\theta^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{48}$$

where $\theta(n) = \left(\frac{n}{n-1}\right)^{\frac{1}{1-\alpha}}$ and $\theta' = \frac{\partial\theta}{\partial n} = -\frac{\left(\frac{n}{n-1}\right)^{\frac{1}{1-\alpha}}}{(n-1)(1-\alpha)n} < 0$. We can rewrite (48) as

$$k^w = \frac{1}{2}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}[\Omega+\Omega^{*}\theta^{\alpha}]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{49}$$

Using (41) and (44), we obtain the equilibrium capital intensities in the domestic country k and the foreign country k^* as follows:

$$k = \frac{1}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha)+\frac{1}{n}\right)+(1-\alpha)\theta^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} = \frac{1}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}[\Omega+\Omega^{*}\theta^{\alpha}]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{50}$$

$$k^* = \frac{\theta}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha)+\frac{1}{n}\right)+(1-\alpha)\theta^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} = \frac{\theta}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}[\Omega+\Omega^{*}\theta^{\alpha}]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \tag{51}$$

Proposition 7. *After the opening of the international capital market, the steady-state capital intensity in the foreign country exceeds the capital intensity in the domestic country.*

Proof of Proposition 7. Because $\theta = \left(\frac{n}{n-1}\right)^{\frac{1}{1-\alpha}} > 1$, it follows from the comparisons of the left-hand sides of (50) and (51) that in a world economy with open capital markets $k^* > k$—a validation that Proposition 4 also holds in the long-run equilibrium. □

Intuitively, this shift in capital is caused by the non-arbitrage condition. It is beneficial for savers in the domestic country to invest part of their savings in the perfectly competitive economy. To underscore this statement, we consider the per capita wealth of both countries. The wealth per capita, a_t and a_t^*, respectively, is no longer equal to the capital intensity, as is the case in a closed economy.

Proposition 8. *In the world economy, the oligopolistic economy's wealth per capita always exceeds its capital intensity. The opposite holds for the competitive economy.*

Proof of Proposition 8. The wealth per capita of the domestic country a_t is defined as $a_t = \frac{SA(k_{t-1})^{\alpha}}{1+g_L}$. Proposition 8 states that in the long-run equilibrium the following inequality holds $a = \frac{SAk^{\alpha}}{1+g_L} > k = \frac{2k^w}{1+\theta}$. Inserting the relevant values from above, we obtain: $\frac{s\left(\left(\frac{n-1}{n}\right)(1-\alpha)+\frac{1}{n}\right)A\left(\frac{2k^w}{1+\theta}\right)^{\alpha}}{1+g_L} > \frac{2k^w}{1+\theta}$. After some reformulations, we obtain: $\frac{\Omega}{\Omega^*} > 1 > \frac{1}{\theta^{1-\alpha}}$. □

The opening of the world capital market leads to a decrease in the capital intensity of the domestic country compared to its capital intensity in autarky. This change is primarily driven by the capital exports originating from the domestic country. As capital flows out of the domestic economy and into the foreign economy, the capital intensity of the domestic country decreases in the context of the world economy.

Proposition 9. *After the opening of the international capital market, the country with oligopolistic markets has a lower capital stock (capital intensity) than it has in autarky.*

Proof of Proposition 9. Proposition 9 is supported by detailed proof provided in Appendix A. The underlying intuition behind this result is that individuals in the young generation find it beneficial to allocate a portion of their savings towards foreign investments. As a consequence of this capital movement from the domestic country to the foreign country, the steady-state capital stock in the domestic country decreases. Consequently, in the new steady-state equilibrium, the incomes of both workers and firm owners in the domestic country are lower compared to the autarky scenario. □

Proposition 10. *In a world economy, the country with a competitive market structure has a bigger capital stock (capital intensity) than in autarky.*

Proof of Proposition 10. Proposition 10 is accompanied by detailed proof provided in Appendix B. As expected, the foreign country experiences an increase in its capital stock compared to the autarky scenario, as it has the ability to attract capital from the domestic country. Consequently, in a world economy, the domestic country functions as a capital lending country, while the foreign country acts as a capital borrowing country. □

In the context of the world economy, the overall global capital stock is lower compared to a scenario with autarkic economies. This is because, upon opening the capital market, a larger portion of capital is allocated to the country with a lower average savings rate. As a result, the total amount of capital in the world economy decreases, reflecting the redistribution of capital towards the country with relatively lower savings.

Hence, we can summarize these comparisons by stating that $k < k_{aut}$, $k^* > k^*_{aut}$ and from above we know that $k^* > k$. Furthermore, in Appendix C, we deliver the reason for the fact that $k^w_{aut} > k^w$.

In the next step, we derive the consequences of the factor prices in the domestic and foreign countries. Regarding the interest factor in the foreign and domestic countries, we can state that:

$$R^w = R = \left(\frac{n-1}{n}\right)\alpha A(k)^{\alpha-1} > R_{aut} = \left(\frac{n-1}{n}\right)\alpha A(k_{aut})^{\alpha-1} \tag{52}$$

because of $k < k_{aut}$. If we consider the foreign interest factor, it is obvious that

$$R^w = R^* = \alpha A(k^*)^{\alpha-1} < R_{aut} = \alpha A(k^*_{aut})^{\alpha-1} \tag{53}$$

because $k^* > k^*_{aut}$. The workers in the domestic country suffer from the opening of the international capital market, because

$$w = \left(\frac{n-1}{n}\right)(1-\alpha)A(k)^{\alpha} < w_{aut} = \left(\frac{n-1}{n}\right)(1-\alpha)A(k_{aut})^{\alpha} \tag{54}$$

In contrast, the workers in the foreign country benefit from a higher wage rate because of the increased capital intensity in the foreign country:

$$w^* = (1-\alpha)A(k^*)^{\alpha} > w_{aut} = (1-\alpha)A(k^*_{aut})^{\alpha} \tag{55}$$

In a further step, we can conclude that in the long-run equilibrium

$$w^* > w \tag{56}$$

The reason for the latter inequality results from the fact that $k^* > k$.

With respect to the profits in the domestic country, we recognize that the profits decline after opening the international capital market:

$$\pi = \frac{A(k)^{\alpha}}{n} < \pi_{aut} = \frac{A(k_{aut})^{\alpha}}{n} \quad (57)$$

These considerations can be summarized in Proposition 11.

Proposition 11. *The opening of the world capital market will lead to a decline in the wage rate and profit per capita in the domestic country with oligopolistic markets, and an increase in the wage rate in the foreign country with perfectly competitive markets. Additionally, the wage rate in the foreign country exceeds that in the domestic country.*

In the next step, we analyze the balance of payments accounts. Due to the assumption of only two countries in this world, it is sufficient to focus on the domestic country. Furthermore, it should be noted that a current account deficit (surplus) of the domestic country is equal to the capital account surplus (deficit) of the domestic country. The per capita balance of trade surplus, denoted as b_t, which represents the excess of domestic production over domestic absorption, can be expressed as follows:

$$b_t = A(k_t)^{\alpha} - c_t^1 - \frac{c_{t-1}^2}{1+g_L} - (1+g_L)k_{t+1} \quad (58)$$

In the long-run equilibrium, the trade balance surplus becomes:

$$b = ((1+g_L) - R^w)(a-k) \quad (59)$$

Because of the fact that $a - k = k^* - a^*$, the trade balance deficit of foreign country is given by:

$$b^* = ((1+g_L) - R^w)(a^* - k^*) \quad (60)$$

Thus, if the world economy is dynamically inefficient, the domestic country will consistently have a trade surplus, while the foreign country will have a trade deficit. On the other hand, if the world economy is dynamically efficient, the country with perfectly competitive markets will have a permanent trade surplus, while the economy with the oligopolistic market structure will experience a permanent trade deficit. We summarize these results in Proposition 12.

Proposition 12. *Opening the world capital markets results in persistent trade imbalances in the long-run equilibrium. If the interest rate is higher than the natural growth rate, the economy with perfectly competitive markets will experience a trade surplus, while the economy with oligopolistic markets will have a trade deficit. Conversely, if the natural growth rate exceeds the interest rate, the situation is reversed. Trade balances will be balanced when the golden rule of capital accumulation is satisfied, that is,* $(1+g_L) = R^w$.

Intuitively, the young generation of the home country exports, in the long-run equilibrium every period, the difference between wealth per capita and capital intensity times the natural growth factor to the foreign country, at the same time, old generations import the same difference times the interest factor from the foreign country as compensation for their foreign investments. If the natural growth factor exceeds the interest factor, the exports of the young generation exceed the imports of the old generation; otherwise, the imports exceed the exports.

Furthermore, the current account of the domestic country, which can be interpreted as the domestic country's net foreign investment ca_t, is positive. The current account surplus in per capita terms is defined as national product per capita $gnp_t = w_t + \pi_t + R_t a_t$

minus national absorption per capita. In other words, national wealth minus domestic capital formation:

$$ca_t = w_t + \pi_t + R_t a_t - c_t^1 - \frac{c_{t-1}^2}{1+g_L} - (1+g_L)k_t = (1+g_L)(a_{t+1} - k_{t+1}) \tag{61}$$

After a few reformulations, we obtain:

$$ca_t = (a_{t+1} - k_{t+1})(1+g_L) > 0 \tag{62}$$

In the long-run equilibrium, Equation (62) reduces to:

$$ca = (a-k)(1+g_L) > 0 \tag{63}$$

Accordingly, in the long-run equilibrium, the current account of the foreign country becomes:

$$ca^* = (a^* - k^*)(1+g_L) < 0 \tag{64}$$

We summarize these results in Proposition 13.

Proposition 13. *In the long-run equilibrium, the opening of the international capital market leads to a persistent current account surplus for the country with an oligopolistic market structure and a permanent current account deficit for the country with perfectly competitive markets.*

Because the wealth per capita exceeds the capital intensity, the home country is a net investor in the foreign country, and the size of the net investments per capita increases with the natural growth factor.

4.2. Transition from Autarky to the World Economy

Then, we examine the transition path from the autarkic equilibrium to the new steady state of the world economy. We assume that in period 1, both economies are in their respective autarkic steady states, and at the beginning of period 2, they reach an agreement to open their capital markets before any capital investments have occurred. This agreement prompts the older generation in the domestic country to invest a portion of their savings abroad, as the foreign country offers a higher interest rate. To illustrate the transitional process, we calibrate the economic development of both economies. It should be noted that the shape of the graphs will remain qualitatively similar regardless of the specific parameter values used. First, let us examine the evolution of capital intensities. In period 2, the older generation in the domestic country diverts a portion of their savings to foreign investments, resulting in a relatively substantial increase in the capital intensity of the foreign country and a significant decline in the capital intensity of the domestic country.

In Figure 2, we present the development of capital intensities. The black line represents the capital intensity of the foreign country, the dark gray line represents the capital intensity of the domestic country, and the light gray line in the middle represents the world capital intensity. During period 2, the world capital intensity remains unchanged compared to period 1. However, starting from period 3, it begins to gradually decline until it reaches the new steady state. The same pattern can be observed in both the domestic and foreign countries, with their capital intensities also decreasing from period 3 onwards. It is important to note that in the new steady state, the capital intensity in the foreign country is higher than in autarky, while the domestic country experiences a lower capital intensity in the new steady state compared to autarky.

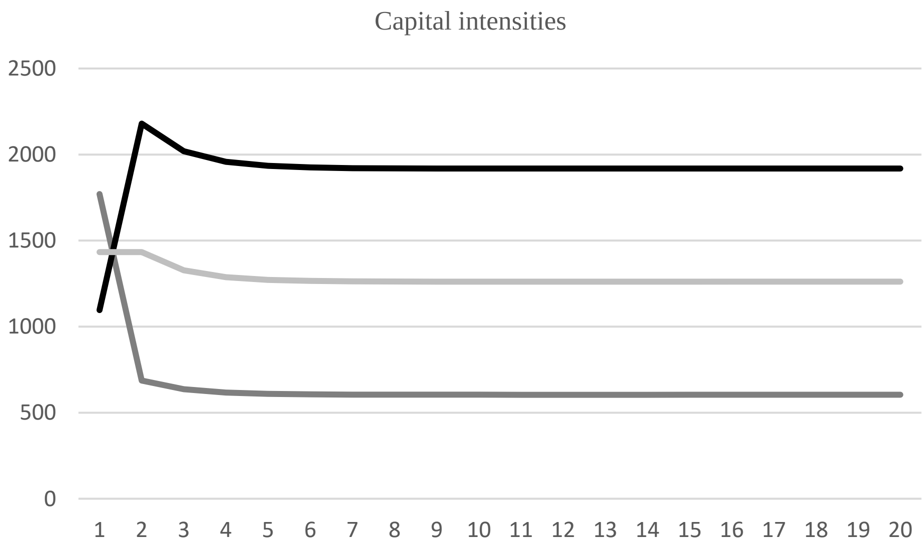


Figure 2. Development of capital intensities.

The adjustment process of the interest factors is represented in Figure 3.

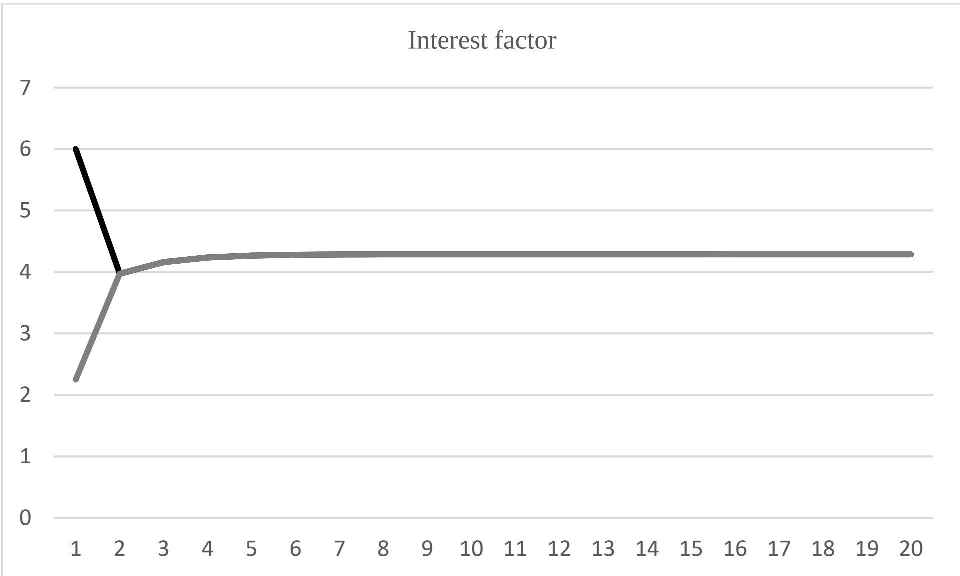


Figure 3. Development of interest factors.

In autarky, the interest rate of the domestic country (represented by the gray line) is lower than the interest rate in the foreign country. However, in period 2, the interest rates start to equalize due to the arbitrage effect. As we move to period 3, the world interest rate continues to increase as a result of the declining world capital intensity, until it reaches the new steady state. It should be noted that the new steady-state interest rate is below the steady-state interest rate of the foreign country in autarky and is above the interest rate of the domestic country in autarky.

In Figure 4, we can observe the foreign country's wage rate (represented by the black line) and the domestic profits per capita (represented by the dark gray line), as well as the domestic wage rate (represented by the light gray line). In period 2, the foreign country's wage rate experiences a relatively strong increase, followed by a decline from period 3 until the new steady-state wage rate is reached. Similarly, both the profits per capita and the wage rate of the domestic country decline from period 2 until they reach the new steady-state levels. It is important to note that the new steady-state wage rate in the foreign country is higher in the world economy compared to autarky. Conversely, the profits and wage rate in the domestic country show the opposite trend. Moving on to Figure 5, we present the trade balance deficit and current account surplus of the domestic country

Figure 4. Development of wages and profits.

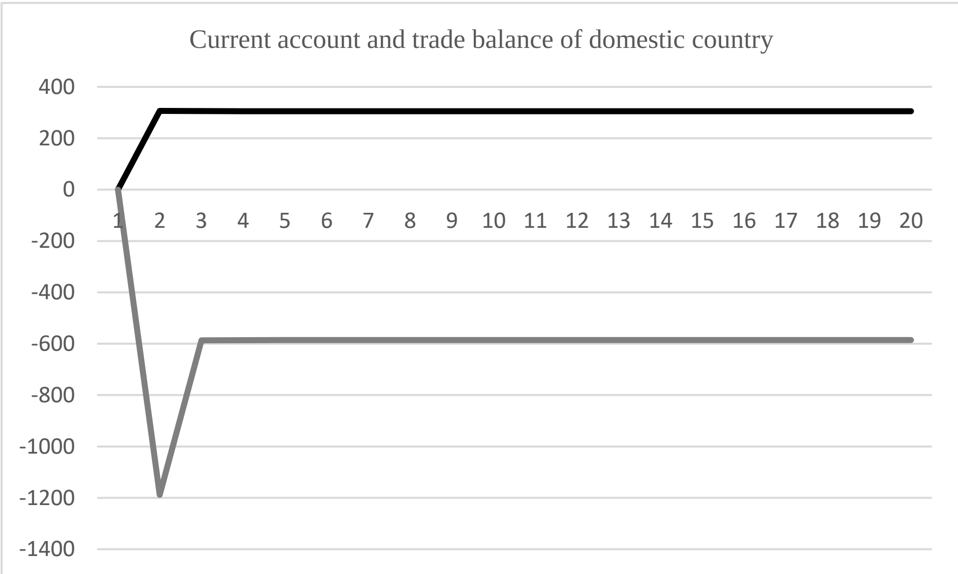


Figure 5. Development of the current account and trade balance of the home country.

In Figure 5, the gray line represents the trade balance deficit, which occurs when $R^w > 1 + g_L$. In autarky, where there is no international trade, the trade balance is zero. However, in period 2, as the domestic country exports a relatively large amount of capital, there is a substantial increase in imports, resulting in a relatively high trade balance deficit. Similarly, the current account surplus is relatively large in period 2. As we move into period 3 and beyond, both the trade balance deficit and current account surplus marginally decline and converge towards their new steady-state values. The situation changes if $R^w < 1 + g_L$. In this case, from period 2, the domestic country realizes a trade balance surplus, which slowly declines to its new steady-state value (see Figure 6).

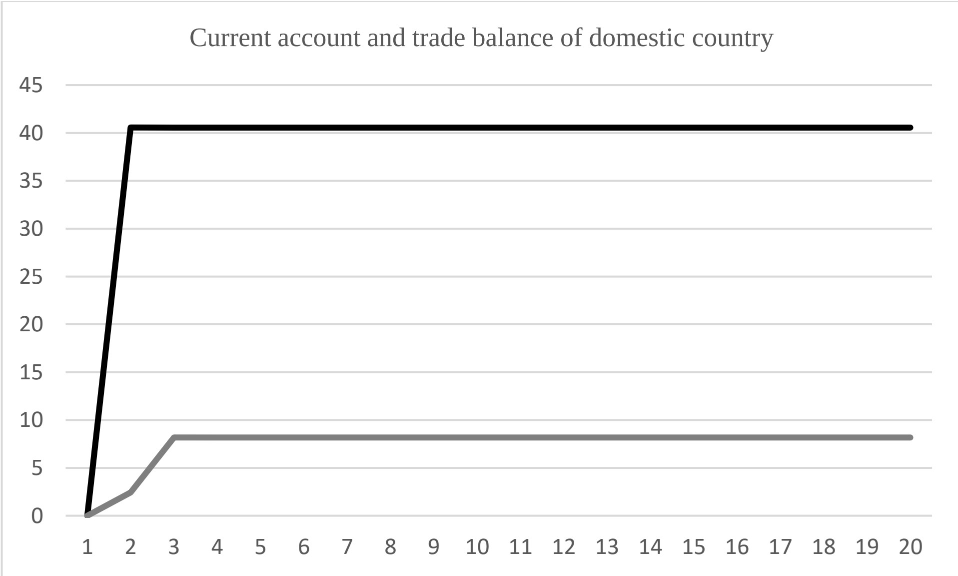


Figure 6. Development of the current account and trade balance of the home country.

5. The Influence of a Changing Market Structure on the World Economy

In this section, our objective is to examine how a change in the market structure of the domestic economy influences the world economy.

At first, we analyze how the long-run capital intensity responds to a change in the number of firms in the oligopolistic economy. To do this, we differentiate the world capital intensity with respect to the number of firms in the domestic country, using Equation (49).

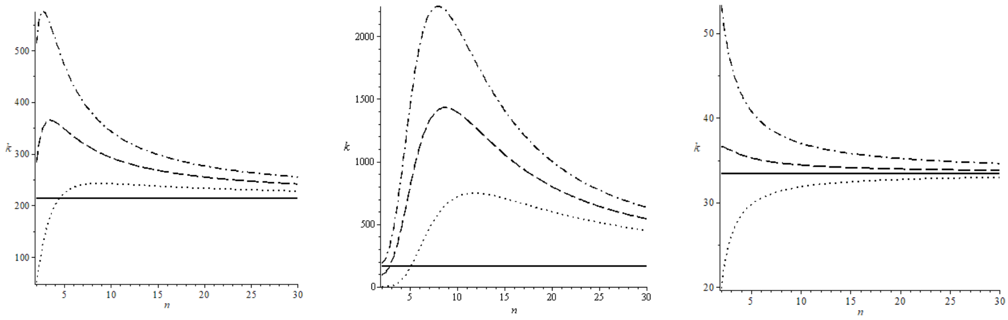
$$\frac{\partial k^w}{\partial n} = \frac{1}{2}\left(\frac{sA}{1+g}\right)^{\frac{1}{1-\alpha}} \left(\underbrace{Z_1[\Omega + \Omega^* \theta^\alpha]}_{+} + \underbrace{Z_2\left(\frac{1}{1+\theta}\right)^{\frac{\alpha}{1-\alpha}}}_{-} \right) \lesseqgtr 0 \tag{65}$$

where $Z_1 = \frac{\partial\left(\left(\frac{1}{1+\theta}\right)^{\frac{\alpha}{1-\alpha}}\right)}{\partial n} = -\frac{\alpha\theta\left(\frac{1}{1+\theta}\right)^{\frac{\alpha}{1-\alpha}}}{(n-1)n(1-\alpha)^2(1+\theta)} > 0$ and $Z_2 = \frac{\partial\left((\Omega+\Omega^*\theta^\alpha)^{\frac{1}{1-\alpha}}\right)}{\partial n} = -\frac{\alpha(\theta^\alpha n+n-1)\left(\frac{(1-\alpha)n(1+\theta^\alpha)+\alpha}{n}\right)^{\frac{1}{1-\alpha}}}{(n-1)n(1-\alpha)((1-\alpha)n(1+\theta^\alpha)+\alpha)} < 0.$

Obviously, the response of the world capital intensity is ambiguous, as it depends on the changes in the income share of the young generation in the domestic country and the allocation of world capital between the two countries. However, it is important to note that:

$$\lim_{n\to\infty} k^w = k^*_{aut},\ k_{aut} \geq \lim_{n\to\infty} k = k^*_{aut},\ \lim_{n\to\infty} k^* = k^*_{aut} \tag{66}$$

This implies that in the limit, the market structure of the domestic country becomes perfectly competitive. Therefore, as the number of firms in the domestic market approaches infinity, all three capital intensities converge to the equilibrium capital intensity of a perfectly competitive economy. The behavior of the capital intensities can significantly vary, as illustrated in Figure 7a–c. Two main forces are at play: firstly, an increasing market power leads to higher savings in the domestic country, and secondly, the proportion of the world capital stock located in the domestic country decreases with increasing market power. The problem is that the function $\left(\frac{1}{1+\theta}\right)^{\frac{\alpha}{1-\alpha}}$ can be a (partly) concave or (partly) convex function in n. If the value of alpha is relatively small, the function is concave, and if the value is relatively close to one, the function is convex in n. Decisive with respect to the course of the graphs is the production elasticity of capital α.



(**a**) (**b**) (**c**)

Figure 7. (**a**) [2] $\alpha = 0.9$; (**b**) $\alpha = 0.7$; (**c**) $\alpha = 0.3$.

In the next step, we differentiate the steady-state capital intensities in the domestic and foreign economy:

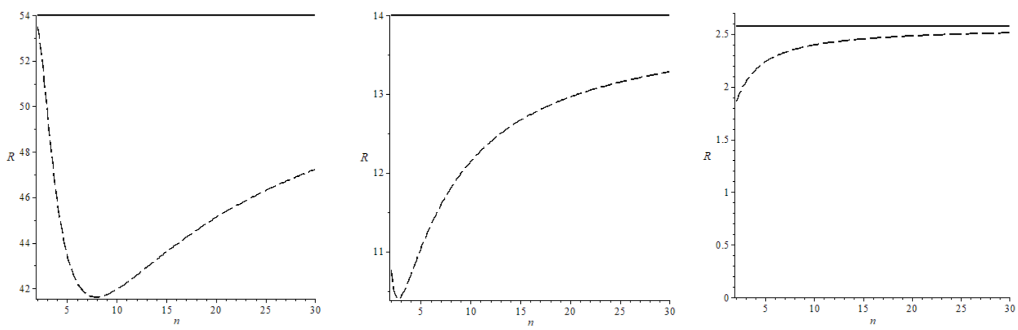
$$\frac{\partial k}{\partial n} = \underbrace{\frac{\theta}{(n-1)n(1+\theta)^2(1-\alpha)}}_{+} k^w + \underbrace{\left(\frac{1}{1+\theta}\right)\frac{\partial k^w}{\partial n}}_{+/-} \lesseqgtr 0 \tag{67}$$

$$\frac{\partial k^*}{\partial n} = -\underbrace{\frac{\theta}{(n-1)n(1+\theta)^2(1-\alpha)}}_{-} k^w + \underbrace{\left(\frac{1}{1+\theta}\right)\frac{\partial k^w}{\partial n}}_{+/-} \lesseqgtr 0 \tag{68}$$

B-cause of the complexity of possible developments of the capital intensities, we present in Figure 7a–c the possible characteristic developments:

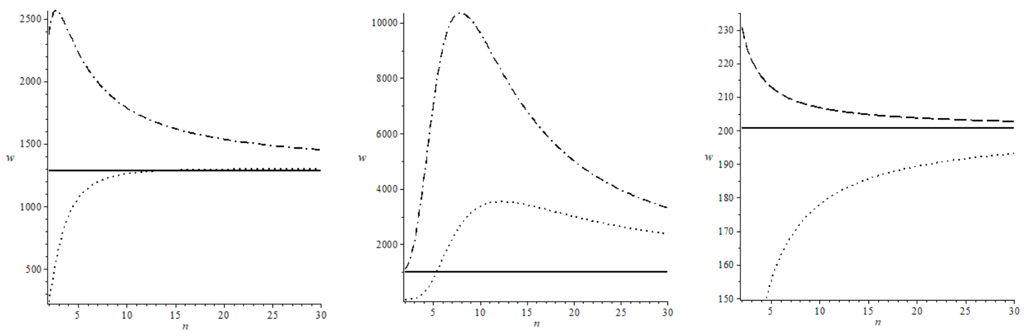
In all of the figures (Figures 7–10), we define the developments as follows:

- The solid line represents the capital intensity of a perfectly competitive economy.
- The dotted line describes the development in the economy with an oligopolistic market structure (domestic country) in the world economy.
- The dot-dash line describes the development of the economy with perfectly competitive markets (foreign country) in the world economy.
- The dashed line describes the evolution of the world capital intensity.



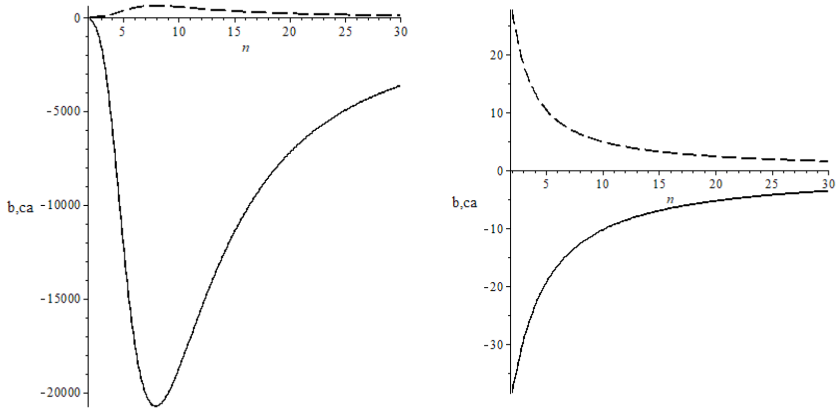
(**a**) (**b**) (**c**)

Figure 8. (**a**) $\alpha = 0.9$; (**b**) $\alpha = 0.7$; (**c**) $\alpha = 0.3$.



(**a**) (**b**) (**c**)

Figure 9. (**a**) $\alpha = 0.9$; (**b**) $\alpha = 0.7$; (**c**) $\alpha = 0.3$.



(**a**) (**b**)

Figure 10. (**a**) $\alpha = 0.9$; (**b**) $\alpha = 0.4$.

If the production elasticity of capital is relatively large, the courses of the three capital intensities exhibit inverted U-shapes, with their respective maxima not coinciding. However, if the production elasticity of capital is low, the capital intensity of the domestic country declines as market concentration increases, while the capital intensity increases in both the foreign country and the world economy. The corresponding evolution of the world interest factor is as follows:

The development of the world interest factor is u-shaped when the production elasticity of capital is large, and the interest rate continuously increases with increasing competition in the domestic country (Figure 8a). The solid line represents the world interest rate in a perfectly competitive world economy, which is always higher than in a world where one country has an oligopolistic market structure.

Figure 9a–c illustrates the development of the wage rates in both countries, as well as the wage rate in a perfectly competitive world economy.

Again, the influence of increasing market power in one country can have very different effects on the development of the wage rates. If the production elasticity of capital is relatively high, an increasing market power (declining number of firms) will lead to an increase in the wage rates, which is caused by the increasing capital stock in both countries. However, if the market concentration reaches a certain limit, the redistributional effect of income from workers to firm owners drastically increases, counteracting the positive impact of the higher capital intensity. Consequently, the wage rate in the domestic country will begin to decline. On the other hand, if the production elasticity of capital is relatively small, the wage rate in the domestic country decreases with increasing market concentration, while it increases in the foreign country.

Then, we consider the development of the trade balance and current account of the domestic country. Using the same parameters as above the following developments may occur subject to the value of the production elasticity of capital:

In Figure 10a,b, the solid line represents the per capita current account surplus of the domestic country, while the dashed line illustrates the development of the trade balance. Figure 10a,b depicts the evolution of the trade balance deficit and current account surplus of the home country within the global economy, where all steady-state equilibria exhibit dynamic efficiency. When the production elasticity of capital is very high, an increase in the number of firms, starting from a duopoly, initially leads to an increase in the trade balance deficit and current account surplus, reaching a minimum and maximum, respectively. However, a further increase in competition results in a reduction of both. If the elasticity is lower (Figure 10b), the current account surplus and trade balance deficit decrease as the number of firms increases.

Figure 11a,b illustrates a scenario where some steady-state equilibria are inefficient. In Figure 11a, the steady-state equilibria are inefficient (indicated by a positive trade balance) until the trade is (nearly) balanced ($n \sim 3$). If the number of firms continues to increase, the trade balance becomes negative. Additionally, the current account declines as the number of firms increases. This pattern also applies to Figure 11b, where the elasticity is very low, and all steady-state equilibria are inefficient. Similarly, the trade balance surplus decreases with an increasing number of firms.

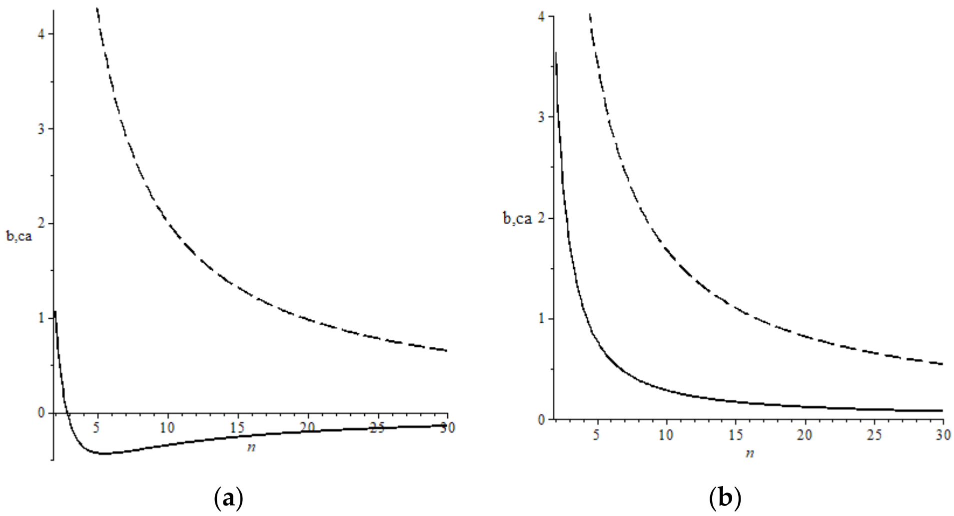


Figure 11. (**a**) $\alpha = 0.2$; (**b**) $\alpha = 0.15$.

6. Conclusions

Consistent with Buiter (1981), we analyze a two-country, one-good OLG model in which one economy exhibits an oligopolistic market structure while the other economy operates under perfect competition. Initially, considering the two economies in a state of autarky, we examine the implications of integrating their capital markets. The disparities in factor prices lead to substantial trade flows and consequent cross-border interest payments. The primary finding of our theoretical analysis is that the economy with an oligopolistic market structure will transition into a net exporter of capital, running a persistent current account surplus. Conversely, the competitive economy will become a capital importer, resulting in a permanent current account deficit. If the steady-state equilibrium is dynamically efficient, the competitive economy will also experience a permanent trade balance surplus.

Although we made simplifying assumptions regarding technology and utility functions, the impact of world market integration on welfare distribution remains uncertain. However, one thing is clear: a Pareto improvement will never be achieved. When considering the two types of economies, it becomes evident that both countries cannot simultaneously experience an improvement in steady-state welfare. However, the country with a competitive market structure will consistently benefit in terms of income due to substantial capital inflows from abroad, while the country with an oligopolistic market structure will face a decline in income.

One noticeable similarity to Buiter's (1981) findings is that the country with a higher savings rate (home country) will witness a decrease in the wage rate, an upturn in the interest rate, and eventually attain a persistent current account surplus in the long run. Similarly, the predictions regarding the country with a lower savings rate (foreign country) are also confirmed.

The assumption that the young generation owns the oligopolistic firms (d'Aspremont et al. 1995) allows for the possibility that an oligopolistic market structure may generate a higher level of welfare than an economy with perfectly competitive markets in a steady state. However, if only the old generation owns the firms, the competitive market structure is always superior in terms of welfare (Laitner 1982). While the assumption regarding ownership is restrictive, it cannot be disregarded that a significant portion of firms may be owned by the younger generation. Hence, our approach can be justified, and it provides valuable insights into wealth redistribution.

An important policy implication arises from this analysis: smaller countries, which often cannot escape oligopolistic structures, should consider implementing capital controls to prevent significant capital outflows. On the other hand, it can be argued that countries with highly competitive markets should be inclined to open their capital markets, as they are likely to benefit from capital inflows, despite the possibility of entering a dynamically inefficient steady state.

The analysis has certain limitations. For simplifications, the analysis assumes symmetry and considers simple forms of the utility and production functions. Moreover, the assumption that only intergenerational trade takes place can be highly restrictive. However, our primary intention was to demonstrate how differences in market structures between two countries influence intergenerational terms of trade, interest rates, wage rates, and profits in each country.

As an extension, our study can be neatly integrated with the approach developed by Farmer and Schelnast (2013), which considers intra-generational trade. Furthermore, incorporating international migration into our model could generate further insights.

Author Contributions: Methodology: P.J.S. and R.R.K.; formal analysis: P.J.S. and R.R.K.; writing—original draft preparation: P.J.S.; writing—review and editing: R.R.K. All authors have read and agreed to the published version of the manuscript.

Funding: Peter J. Stauvermann acknowledges thankfully the financial support of the Changwon National University 2023–2024.

Data Availability Statement: Not applicable.

Acknowledgments: We sincerely thank three anonymous reviewers for their useful suggestions and recommendations; all remaining errors are ours. Peter J. Stauvermann sincerely acknowledges the financial support of the Changwon National University 2023–2024.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Proof for $k \le k_{aut}$. This implies $k = \frac{1}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}[\Omega+\Omega^{*}\theta^{\alpha}]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \le k_{aut} = \left(\frac{s\Omega A}{(1+g_L)}\right)^{\frac{1}{1-\alpha}}$. After some reformulations, the inequality becomes: $\Omega^{*}\theta^{\alpha-1} \le \Omega$. Inserting the respective values for θ, Ω, and Ω^{*} from the main text leads to $\frac{1}{n} > 0$. In the case that n strives to infinity, the equality will hold.

Appendix B

Proof for $k^* \geq k^*_{aut}$. This implies: $k^* = \frac{\theta}{1+\theta}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}[\Omega+\Omega^*\theta^{\alpha}]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \geq k^*_{aut} = \left(\frac{s\Omega^* A}{(1+g_L)}\right)^{\frac{1}{1-\alpha}}$. After some reformulations, we obtain: $\theta^{1-\alpha}\Omega \geq \Omega^*$. Inserting the values of θ, Ω, and Ω^* and some more reformulations deliver $\frac{1}{n-1} \geq 0$. In the case that n strives to infinity, the equality will hold.

Appendix C

Proof for $k_{aut} + k^*_{aut} \geq k + k^*$. It is our aim to show that $k_{aut} + k^*_{aut} \geq k + k^*$, or, in other words, that $k^w_{aut} \geq k^w$. To express k^w_{aut} in useful way, we determine at first the steady-state ratio between foreign and domestic capital:

$$\frac{k^*_{aut}}{k_{aut}} = \theta_{aut} = \left(\frac{\Omega^*}{\Omega}\right)^{\frac{1}{1-\alpha}} = \left(\frac{(1-\alpha)n}{(n-1)(1-\alpha)+1}\right)^{\frac{1}{1-\alpha}} < 1$$

Now, we can write with the help of the equality $k^w_{aut} = \frac{k_{aut}+k^*_{aut}}{2}$,

$$k_{aut} = \frac{2k^w_{aut}}{1+\theta_{aut}}$$

and

$$k^*_{aut} = \frac{2\theta_{aut}k^w_{aut}}{1+\theta_{aut}}.$$

Although, there is no world capital market, we can virtually construct it by writing down the world capital market clearing equation as:

$$sA\left(\frac{2}{1+\theta_{aut}}\right)^{\alpha}\left[\left(\left(\frac{n-1}{n}\right)(1-\alpha)+\frac{1}{n}\right)+(1-\alpha)(\theta_{aut})^{\alpha}\right](k^w_{aut})^{\alpha} = 2(1+g_L)k^w_{aut}$$

Now, solving for k^w_{aut} delivers the world capital intensity in autarky:

$$k^w_{aut} = \frac{1}{2}\left(\frac{sA\left(\frac{1}{1+\theta_{aut}}\right)^{\alpha}\left[\Omega+\Omega^*(\theta_{aut})^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}}$$

Now, we show that $k^w_{aut} \geq k^w$,

$$\frac{1}{2}\left(\frac{sA\left(\frac{1}{1+\theta_{aut}}\right)^{\alpha}\left[\Omega+\Omega^*(\theta_{aut})^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}} \geq \frac{1}{2}\left(\frac{sA\left(\frac{1}{1+\theta}\right)^{\alpha}\left[\Omega+\Omega^*\theta^{\alpha}\right]}{(1+g_L)}\right)^{\frac{1}{1-\alpha}}$$

After a few simplifications, the inequality reduces to:

$$\left(\frac{1}{1+\theta_{aut}}\right)^{\alpha} - \left(\frac{1}{1+\theta}\right)^{\alpha} \geq (\theta_{aut})^{1-\alpha}\left(\left(\frac{\theta}{1+\theta}\right)^{\alpha} - \left(\frac{\theta_{aut}}{1+\theta_{aut}}\right)^{\alpha}\right) \text{ Q.E.D.}$$

In the case that n strives to infinity, the equality will hold.
To illustrate this, we define the inequality as a function $z(\alpha, n\ )$,

$$z(\alpha,n) = \left(\frac{1}{1+\theta_{aut}}\right)^{\alpha} - \left(\frac{1}{1+\theta}\right)^{\alpha} - (\theta_{aut})^{1-\alpha}\left(\left(\frac{\theta}{1+\theta}\right)^{\alpha} - \left(\frac{\theta_{aut}}{1+\theta_{aut}}\right)^{\alpha}\right) > 0$$

It is easy to show that: $\frac{\partial z(\alpha,n)}{\partial n} < 0$ and $\frac{\partial z(\alpha,n)}{\partial \alpha} > 0$, for $\alpha \in]0,1[$ and $n \geq 2$.

$$\lim_{\alpha \to 0} z(\alpha, n) = 0, \ \lim_{\alpha \to 1} z(\alpha, 2) = \frac{1}{2}, \ \lim_{n \to \infty} z(\alpha, n) = 0$$

To illustrate the function $z(\alpha, n)$, we calibrate Figure A1:

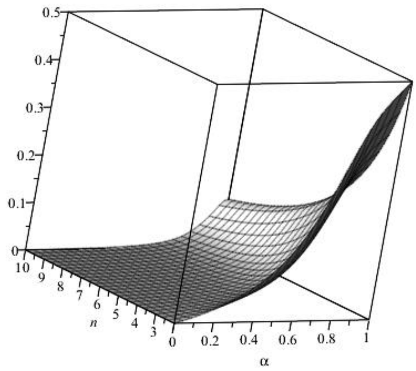


Figure A1. Representation of $z(\alpha, n)$.

Notes

1 In fact, we consider one final good in our model, which can be consumed or invested, and m intermediate goods, although the structure of the model is basically the same as the one of Diamond (1965) or Buiter (1981).

2 Regarding all the calibrations, we take the following values for the illustration: $A = 100, s = 0.2$, and $g_L = 0.2$.

References

Autor, David, David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen. 2020. The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics* 135: 645–709. [CrossRef]

Azar, Jose, and Xavier Vives. 2018. Oligopoly, Macroeconomic Performance, and Competition Policy. August 2. Available online: https://ssrn.com/abstract=3177079 (accessed on 24 July 2023).

Azar, Jose, and Xavier Vives. 2021. General equilibrium oligopoly and ownership structure. *Econometrica* 89: 999–1048. [CrossRef]

Barkai, Simcha. 2020. Declining Labor and Capital Shares. *The Journal of Finance* 75: 2421–63. [CrossRef]

Barkai, Simcha, and Seth G. Benzell. 2018. *70 Years of US Corporate Profits*. New Working Paper Series No. 22. Chicago: Stigler Center for the Study of the Economy and the State University of Chicago, Booth School of Business.

Barro, Robert J. 1974. Are Government Bonds Net Wealth? *Journal of Political Economy* 81: 1095–117. [CrossRef]

Buiter, Willem H. 1981. Time Preference and International Lending and Borrowing in an Overlapping-Generations Model. *Journal of Political Economy* 89: 769–97. [CrossRef]

Chen, Wenjie, Frederico Díez, Romain Duval, Callum Jones, and Carolina Villegas-Sánchez. 2019. Global Market Power and its Macroeconomic Implications. In *World Economic Outlook: Growth Slowdown, Precarious Recovery*. Geneva: IMF, chp. 2. pp. 55–76.

Crettez, Bertrand, Philippe Michel, and Jean-Pierre Vidal. 1996. Time preference and labour migration in an OLG model with land and capital. *Journal of Population Economics* 9: 387–403. [CrossRef]

Crettez, Bertrand, Philippe Michel, and Jean-Pierre Vidal. 1998. Time preference and capital mobility in an OLG model with land. *Journal of Population Economics* 11: 149–58. [CrossRef]

d'Aspremont, Claude, Rodolphe Dos Santos Ferreira, and Louis-Andre Gerard-Varet. 1995. Imperfect Competition in an Overlapping Generations Model: A Case for Fiscal Policy. *Annales D'Economie et de Statistique* 37/38: 531–55. [CrossRef]

Diamond, Peter A. 1965. National debt in a neoclassical growth model. *The American Economic Review* 55: 1126–50.

Díez, Frederico J., Daniel Leigh, and Suchanan Tambunlertchai. 2018. *Global Market Power and Its Macroeconomic Implications*. Working Paper WP/18/137. Geneva: IMF. [CrossRef]

Dixit, Avinash K., and Joseph E. Stiglitz. 1977. Monopolistic competition and optimum product diversity. *American Economic Review* 67: 297–308.

Eggertsson, Gauti B., Jacob A. Robbins, and Ella Getz Wold. 2021. Kaldor and Piketty's facts: The rise of monopoly power in the United States. *Journal of Monetary Economics* 124: S19–S38. [CrossRef]

Farmer, Karl. 2014. Financial Integration and EMU's External Imbalances in a Two-Country OLG Model. *International Advanced Economic Research* 20: 1–21. [CrossRef]

Farmer, Karl, and Bogdan Mihaiescu. 2015. *Pension Systems and Financial Constraints in a Three-Country OLG Model of Intra-EMU and Global Trade Imbalances*. Graz Economics Papers 2015-08. Graz: University of Graz, Department of Economics.

Farmer, Karl, and Matthias Schelnast. 2013. *Growth and International Trade: An Introduction to the Overlapping Generations Approach*. Berlin: Springer. [CrossRef]
Galor, Oded. 1986. Time preference and international labor migration. *Journal of Economic Theory* 38: 1–20. [CrossRef]
Galor, Oded. 1992. The choice of factor mobility in a dynamic world. *Journal of Population Economics* 5: 135–44. [CrossRef]
Haaparanta, Pertti. 1989. The intertemporal effects of international transfers. *Journal of International Economics* 26: 371–82. [CrossRef]
Hamada, Koichi. 1986. Strategic aspects of international fiscal interdependence. *Economics Studies Quarterly* 37: 167–80.
Hart, Oliver. 1982. A Model of Imperfect Competition with Keynesian Features. *Quarterly Journal of Economics* 97: 109–38. [CrossRef]
Hart, Oliver. 1985. Imperfect Competition in General Equilibrium: An Overview of Recent Work. In *Frontiers of Economics*. Edited by Kenneth Arrow and Seppo Honkapohja. Oxford: Basil Blackwell, pp. 100–50.
Homburg, Stefan. 1991. Interest and growth in an economy with land. *Canadian Journal of Economics/Revue Canadienne d'Economique* 24: 450–59. [CrossRef]
Homburg, Stefan. 1992. *Efficient Economic Growth*. Berlin: Springer. [CrossRef]
Karabarbounis, Loukas, and Brent Neiman. 2018. *Accounting for Factor-Less Income*. NBER Working Paper 24404. Cambridge: NBER. [CrossRef]
Kumar, Ronald R., and Peter J. Stauvermann. 2021. Revisited: Monopoly and Long-Run Capital Accumulation in Two-Sector Overlapping Generation Model. *Journal of Risk and Financial Management* 14: 304. [CrossRef]
Laitner, John. 1982. Monopoly and long-run capital accumulation. *Bell Journal of Economics* 13: 143–57. [CrossRef]
Melitz, Marc J., and Gianmarco I. P. Ottaviano. 2008. Market Size, Trade, and Productivity. *Review of Economic Studies* 75: 295–316. [CrossRef]
Michel, Philippe, and Jean-Pierre Vidal. 2000. Economic Integration and Growth under Intergenerational Financing of Human-Capital Formation. *Journal of Population Economics* 72: 275–94. [CrossRef]
Neary, J. Peter. 2002a. Competition, trade and wages. In *Trade, Migration, Investment and Labour Market Adjustment*. Edited by David Greenaway, Richard Upward and Katharine Wakelin. London: Macmillan, pp. 28–45. [CrossRef]
Neary, J. Peter. 2002b. Foreign competition and wage inequality. *Review of International Economics* 10: 680–93. [CrossRef]
Neary, J. Peter. 2002c. *The Road Less Travelled: Oligopoly and Competition Policy in General Equilibrium*. Centre for Economic Research Working Paper Series, No. WP02/22. Dublin: University College Dublin, Department of Economics. Available online: https://hdl.handle.net/10197/1259 (accessed on 24 July 2023).
Neary, J. Peter. 2003. The road less travelled: Oligopoly and competition policy in general equilibrium. *Journal of the European Economic Association* 1: 245–71. [CrossRef]
Neary, J. Peter. 2007. Cross-Border Mergers as Instruments of Comparative Advantage. *Review of Economic Studies* 74: 1229–57. [CrossRef]
Neary, J. Peter. 2010. Two and a Half Theories of Trade. *World Economy* 33: 1–19. [CrossRef]
Neary, J. Peter. 2016. International Trade in General Oligopolistic Equilibrium. *Review of International Economics* 24: 669–98. [CrossRef]
Persson, Torsten. 1985. Deficits and intergenerational welfare in open economies. *Journal of International Economics* 19: 67–84. [CrossRef]
Philippon, Thomas. 2019. *The Great Reversal: How America Gave Up on Free Markets*. Cambridge: Belknap Press. [CrossRef]
Romer, Paul M. 1990. Endogenous Technological Change. *Journal of Political Economy* 98: S71–S102. [CrossRef]
Stauvermann, Peter J., and Ronald R. Kumar. 2022. Does more market competition lead to higher income and utility in the long run? *Bulletin of Economic Research* 74: 761–82. [CrossRef]
Van Reenen, John. 2018. *Increasing Differences between Firms: Market Power and the Macro-Economy*. CEP Discussion Paper No. 1576. London: Centre for Economic Performance, London School of Economics and Political Science.
Van Reenen, John, and Christina Patterson. 2017. Research: The rise of superstar firms has been better for investors than for employees. *Harvard Business Review (Economics & Society)*, May 11.
Vidal, Jean-Pierre. 2000. Capital mobility in a dynastic framework. *Oxford Economic Papers* 52: 606–25. [CrossRef]
Wilson, John D. 1999. Theories of Tax Competition. *National Tax Journal* 52: 269–304. [CrossRef]
Zingales, Luigi. 2012. *A Capitalism for the People*. New York: Basic Books.
Zingales, Luigi. 2017. Towards a political theory of the firm. *Journal of Economic Perspectives* 31: 113–30. [CrossRef]