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The Impact of International Migration on the Economy with the Assumption of Labor Heterogeneity

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Abstract

This study investigated the effect of international labor migration on Iran's economy using a neo-classical growth model with the assumption of labor heterogeneity within the framework of dynamic stochastic general equilibrium model. After solving the model, the obtained equations were linearized and different values were assigned to the parameters according to Iran's economy information. The results indicated that emigration of skilled labor force reduced production, investment, and per capita consumption, increased skilled individuals' wages, and decreases wages for unskilled individuals; however, immigration enhanced labor force and population and reduced production, investment and per capita consumption. On the other hand, the labor force's wages also declined with an increase in unskilled labor force. Furthermore, a variation in the degree of substitution between unskilled labor and capital only changed the impact of the immigration momentum and had no impact on the type of relationship. If emigration consists of a combination of skilled and unskilled labor force, its effectiveness only changes.

Keywords: Migration, Brain Drain, Labor Market Heterogeneity, Dynamic Stochastic General Equilibrium.
JEL Classification: C60, J61, J01.

1. Introduction

International labor migration refers a move from one country to another in order to be employed in the destination country. International labor migration brings about different consequences for both the sending and host countries. Both decreased unemployment and the income that migrants send to their country are the main

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benefits of emigration for the country of origin. Immigrants can also acquire the updated knowledge in the destination countries, which would increase productivity in the country of origin when the emigrants return home. Some disadvantages of emigration also include the lack of social security support and the risk of abusing emigrants, particularly illegal ones, decreased specialized workforce in the country of origin, and family disintegration (Haghighi and Bahalou Horeh, 2013).

There is no accurate and coherent data regarding the impact of migration on Iran's economy. The World Bank's data, published every other five years, reveals that Iran is a pro-immigration country and that the immigration rate has been negative over the past three decades in average. On the other hand, Iran is one of the leading countries in terms of brain drain. Although the immigration rate in Iran's economy has been negative during this period, the labor forces entered into and exited from its economy have been unskilled labor and the ones with higher education, respectively. This research sought to investigate how immigration and emigration affect macroeconomic variables such as production, consumption, investment, and labor market variables.

In this study, a dynamic stochastic general equilibrium model was used. Such models are well-known due to both their potentials to satisfy a number of structural features and their predictive power. These models have become a major tool for macroeconomic modeling since they are not vulnerable to Lucas critique, are derived from optimization, and have macro-foundations. In this study, the impacts of immigration and emigration momentums on macroeconomic variables were examined separately in several scenarios and the findings would contribute to decision making.

The overall framework of the present study is as follows: The next section addresses the study foundations regarding the channels through which migration affects economy. Section three presents the research model and section four covers the model valuing and simulating as well as data analysis. In the fifth section, the study is concluded.

2. Theoretical Foundations

According to previous studies, migration affects the economies of the countries of origin and destination in three ways:

1. Migration of labor force can affect the low-skilled and skilled individuals' relative wages as well as the income gap between immigrants and the indigenous. The effects depend on the degree of substitution among different types of labor force[1]. The economy literature shows that the effect of increased demand of immigrants on indigenous wages is associated with the distribution of the skills of immigrants and indigenous individuals and the degree of substitution and complementarity between the groups. When immigrant's skill distribution is similar to that of the indigenous and capital is used flexibly, immigration is not expected to affect wage since there is no change in the level of skills, and growth in the labor force supply occurs through expansion in the economy scale. However, if immigrants' skill distribution is not similar to that of the indigenous, the migration will change the composition of labor skills in the labor market. If indigenous workers are replaced by the immigrants, the increased skill supply at a certain level will result in extra labor force and thus decreased wages.

Relevantly, empirical studies with the assumption of skill differences (skill division) have come up with different findings. The findings of some studies[2] show that immigration lowers the wages of unskilled and low-educated labor force, even though, there are also studies[3] indicating no significant relationship between the wages for unskilled labor force and migration. To justify this controversy, Peri and Asarber (2009) argue that individuals possess different skills (physical and communication skills) and increased immigration enhances the indigenous individuals' tendency for professions in need of communication skills, so this comparative advantage compensates to some extent for the impact of immigration on the wages of the low-skilled indigenous.

Structural approaches in this field claim that the labor market is not homogeneous, and it is divided into sectors with some barriers to entry (Weber, 1987). If this comes true and some businesses have barriers to

1. For additional information, see these references: Ottaviano and Peri, 2012; Borjas, 2013; Docquier et al., 2014; Battisti et al., 2014

2. For example, Orrenius and Zavodny, 2007; Borjas, 2003; Borjas and Katz, 2007; Orrenius and Zavodny, 2007; Haghighi and Bahalou, 2013; Heidari et al., 2016.

3. For example, Lewis, 2005; Card and Lewis, 2007; Card, 2001, 2005; Chasmboli and Palios, 2014; Mornogalipas and Tritah, 2016.

entry limiting the free flow of workers, the division of the labor market by employment will probably provide a remarkable insight regarding the relationship between immigration and the indigenous people's wages. In this case, the members of disadvantaged groups (including immigrants) are employed in low-paid jobs because of barriers to entry into high-income businesses (Weeden, 2002; Parkin, 1979). In particular, dual labor market theory and signaling theory suggest that immigrants engage in low-paid job with no causality for indigenous wages. According to these theories, immigrants are usually employed in low-income jobs and the need for communication skills in high-paid jobs prevents the integration of immigrants. This may hinder their direct competition with the indigenous and eliminate the negative consequences of increased labor supply for the indigenous. Other structural approaches, such as devaluation theories and crowding theory, propose that the arrival of the members of heterogeneous groups into different jobs reduces indigenous wages (Bergmann, 1971; England et al., 2000).

2. Emigration of skilled individuals, known as brain drain, can affect the speed of knowledge and innovation accumulation and cause sustained effects on total productivity. In general, the costs of losing the best trainees are imposed on the sending countries. Meanwhile, some economists found that from a global perspective, international constraint on labor moves was one of the most expensive economic distortions (Iranzou and Peri, 2009).

There are two approaches to the brain drain. The traditional approach largely focuses on the role and negative effects of brain drain on the labor market, human capital and the whole economy of the country of origin. From this perspective, brain drain is seen as an outflow of skilled and professional labor force, resulting in a reduction in human capital and, consequently, a decline in economic growth. In contrast, in the modern approach, the brain drain and the emigration of educated and skilled labor force to provide services in the foreign markets and to gain more returns abroad not only increases the expected returns to education and the human capital stock in the country of origin but also enhances the general level of education and skills in the country of origin as all individuals would not succeed in leaving the country and reaching the foreign markets.

3. Labor force mobility affects the geographical distribution of workers and the total demand for household goods, which modifies a number of existing products for consumption. In a diversity-friendly environment, such a modification directly affects individuals' wellbeing. Iranzou and Peri (2009) studied the Western and Eastern Europe and found that migration would increase the wellbeing of the migrants and the remaining workers via the benefits resulting from business. Di Giovanni et al. (2014) noted that the status of the indigenous in pro-immigration countries such as Canada or Australia can be improved over the long term due to the variety of consumer products as intermediate inputs.

In general, it can be expressed that immigration has a vague effect on the wage of labor. This ambiguity will be due to the distribution of skills of immigrants (occupational and communication skills) and their degree of succession to the natives. Based on which If migrants are a simple workforce, simple labor can be reduced. Immigration abroad can have negative consequences for the country of origin. . Although there are different perspectives on this issue, empirical studies have shown that brain drain has a negative effect on economic growth in Iran.

3. Empirical foundations

Shahabadi and Pouran (2009) examined the migration of the brains to Iran's economic growth during the period from 1338 to 1385 using the statistics of brain migration from Iran to the United States. Their results indicate that this type of migration plays an extremely important and negative role in the production and economic growth of Iran.

Asgari and Taghavi (2010) analyzed the effect of brain drain on human capital accumulation in developing countries. The results of this study indicate that the brain drain from developing countries to the sixteen OECD countries has a positive and significant impact on human capital accumulation in all developing countries with different levels of income.

Haqiqi and Bahaloo Horeh (2015), using a generalized computable equilibrium model, show that the effects of the unskilled labor force and the skilled labor force extinction lead to a reduction in the production and increase of the wage of skilled labor.

Horry et al. (2015) investigate the effect of brain drain on Iran's foreign trade and production using a general equilibrium model (GTAP). Using two negative shock scenarios, the supply of specialist force as a direct effect of brain drain and negative impact of total factor productivity as the indirect effect of brain drain, elaborates the effect of the labor force migration on the variables of production, exports, imports, and trade balance The results indicate that brain drain either directly or through reduced productivity in general has negative effects on the production, export, import and trade balance of the country.

Rahmani and Mazaheri Marbori (2014) using inter-panel panel data, examined the effect of brain drain on the accumulation of human capital and economic growth in developing countries between 1975 and 2000. The results of the research show that the migration perspective has a positive and significant effect on the accumulation of human capital, but actual migration in each period has a negative effect on the accumulation of human capital. Also, the effect of migratory brain drain on the country's economic growth is negative.

Heidari et al. (2017), using generalized computable equilibrium models, investigated the migration of labor and non-specialist specialists to economic variables. The results of their study showed that labor force migration, both skilled and unskilled, would reduce economic growth, investment and return on capital at macro level. It also reduces the production of various economic sectors. On the one hand, the increase in the skilled labor force increases the level of wage labor in general and, on the contrary, reduces the price of capital, which includes physical capital, natural resources, and land.

Chassamboulli and Palivos (2014) examined the impact of immigration on labor remuneration in Greece for the period 2000-2007. The results of their study indicate that skilled native workers, who supplement immigrants in production, receive employment and receive higher wages. But the effects of immigration on no specialist indigenous workers, who compete with immigrants, are ambiguous.

Iftikhar and Zaharieva (2018) examined the effect of increased immigration in the period 2012-2016 using a search and matching model for Germany. Their results indicate that recent immigration to Germany, including refugees, has had a negative effect on the welfare

of low-skilled workers, but has increased the welfare of the rest of the labor groups.

4. Research Model

To investigate the effects of migration, a neoclassical growth model within the framework of dynamic stochastic general equilibrium model was used based on Kiguchi et al.'s (2013) model, which included household and firm sectors. Since Iran is a pro-immigration country with unskilled labor immigrants and one of the leading countries with regard to brain drain, the labor market was considered to be heterogeneous in this study. The difference between this model and the model used by Kiguchi et al. is to consider the immigration of unskilled labor force and the emigration of skilled labor. As a result, the households offer a combination of unskilled and skilled labor force. In each period, the immigration of unskilled labor force increases the unskilled labor force and the emigration of the skilled labor force decreases their number in the country. Another difference is the model of this research with the Kiguchi et al.'s in the dynamics of the workforce. On the other hand, part of the unskilled labor force in each period becomes skilled. In the production sector, the unskilled labor and physical capital can be substituted; however, the skilled labor is complementary.

The households maximize their lifetime utility function as follows:

$$E_0 \sum_{t=0}^{\infty} \beta^t N_t U_t \tag{1}$$

where $\beta \in (0,1)$ is the discount factor and N_t is the number of household. Households chooses the consumption and labor supply. According to Uhlig (2010), the utility function is introduced as follows:

$$U_t = \frac{(c_t \phi(\mathrm{l}_t))^{1-\eta} - 1}{1-\eta} \tag{2}$$

where, c_t is per capita consumption, l_t is per capita labor supply, $\frac{1}{\eta}$ is intertemporal substitution elasticity, and $\phi(\mathrm{l}_t)$ is a declining, concave, and differentiable function. The labor supply function is

assumed to be with constant Frisch elasticity to wages. The household offers two types of unskilled labor (l_t^u) and skilled labor (l_t^s). The ratio of skilled labor to the total population per household is assumed to be equal to this ratio in the whole economy and is $\lambda_t^s = N_t^s / N_t$. Similarly, the ratio of the unskilled labor force to the total population per household is $\lambda_t^u = N_t^u / N_t$. Consequently, the ratio in each period is $N_t = N_t^s + N_t^u$. It is assumed that a fraction of the unskilled labor force ρ^u in each period becomes skilled, though, a fraction of the skilled labor force also emigrates during each period; hence, the whole skilled population is as follows:

$$N_t^s = (1 - mig_t^{ou}) N_{t-1}^s + \rho^u N_{t-1}^u \tag{3}$$

Where, mig_t^{ou} is the migration rate and is assumed to follow the below process in a linear-logarithmic mode:

$$mig_t^{ou} = \rho^{mig^{ou}} mig_{t-1}^{ou} + \varepsilon_t^{mig^{ou}} \tag{4}$$

The unskilled labor force in each period is equal to the unskilled labor force of the previous period and the immigration of the unskilled labor force mig_t^{in}.

$$N_t^u = \rho^u N_{t-1}^u + mig_t^{in} \tag{5}$$

$$mig_t^{in} = \rho^{mig^{in}} mig_{t-1}^{in} + \varepsilon_t^{mig^{in}} \tag{6}$$

The wages in each period are determined by the weights of the unskilled and skilled labor forces so we will have:

$$w_t = \lambda_t^s w_t^s + \lambda_t^u w_t^u \tag{7}$$

The household budget constraints will be as follows:

$$c_t N_t + i_t N_t \le w_t l_t N_t + r_t^k k_t N_t \tag{8}$$

where, we have i_t as per capita investment, k_t as per capita capital,

and r_t^k as rental rate of capital. The capital flow equation will be as follows:

$$k_{t+1}N_{t+1} = (1-\delta)k_t N_t + i_t N_t \tag{9}$$

By maximizing the household utility function relative to the budget constraints, the first-order conditions will be obtained as follows:

$$\ell = E_0 \sum_{t=0}^{\infty} \beta^t \left[N_t \frac{(c_t \phi(l_t))^{1-\eta} - 1}{1-\eta} - \lambda_t \left(c_t N_t + k_{t+1} N_{t+1} - (1-\delta) k_t N_t - w_t l_t N_t - r_t^k k_t N_t \right) \right]$$

$$\lambda_t = c_t^{-\eta} (\phi(l_t))^{1-\eta} \tag{10}$$

$$c_t^{1-\eta} (\phi(l_t))^{-\eta} \phi'(l_t) + \lambda_t w_t = 0 \tag{11}$$

$$E_t \left[\beta \left(\frac{\lambda_{t+1}}{\lambda_t} \right) (1 - r_{t+1}^k - \delta) \right] = 1 \tag{12}$$

where, λ_t is the Lagrange coefficient optimizing the household behavior. Production takes place in full competition conditions using capital services, skilled and unskilled labor force. It is assumed that unskilled labor can be a substitute for capital; however, it is complementary to the skilled labor force. The fact that capital and skilled labor are complementary is well-documented in the literature, even though, the substitution of unskilled labor for capital is less common. According to Kiguchi (2014), the production function of CES with constant returns to scale will be as follows:

$$y_t = \left[\alpha \left(\frac{k_t}{k} \right)^{\frac{\sigma-1}{\sigma}} + (1-\alpha) \left(\frac{\lambda_t^u l_t}{\lambda l} \right)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\theta\sigma}{\sigma-1}} \left(\frac{\lambda_t^s l_t}{\lambda l} \right)^{1-\theta} \tag{13}$$

where $y_t = {Y_t}/{N_t}$, and $\sigma = (0, \infty)$ are the degree of substitution between capital and unskilled labor force. If $\sigma = 0$, the unskilled labor force and capital will be complementary. If $\sigma \to \infty$, they will be full

substitutes, and if $\sigma = 1$, they will become the Cobb-Douglas function. As the price of the production factors is determined by their final production, we will have:

$$r_t = \frac{y_t}{k_t} \frac{\theta\alpha\left(k_t / k\right)^{\frac{\sigma-1}{\sigma}}}{\left[\alpha\left(k_t / k\right)^{\frac{\sigma-1}{\sigma}} + (1-\alpha)\left(l_t \lambda_t^u / l\lambda\right)^{\frac{\sigma-1}{\sigma}}\right]} \quad (14)$$

$$w_t^u = \theta \frac{y_t}{l_t \lambda_t^u} \frac{(1-\alpha)\left(l_t \lambda_t^u / l\lambda\right)^{\frac{\sigma-1}{\sigma}}}{\left[\alpha\left(k_t / k\right)^{\frac{\sigma-1}{\sigma}} + (1-\alpha)\left(l_t \lambda_t^u / l\lambda\right)^{\frac{\sigma-1}{\sigma}}\right]} \quad (15)$$

$$w_t^s = (1-\theta)\frac{y_t}{l_t \lambda_t^s} \quad (16)$$

To settle the market of goods and services, the total supply should be equal to the total demand (i.e., consumption plus investment).

$$y_t = c_t + i_t \quad (17)$$

Population growth is also defined as follows:

$$\zeta_t^N = \frac{N_{t+1}}{N_t} \quad (18)$$

5. Parameterization and Analysis of the Results

After solving the model and meeting the first-order conditions, the resulting equations were logarithmically linearized, and then they were assigned different values. In valuing some coefficients such as a number of ratios in a uniform equilibrium using the annual data of Iran's economy based on the maximum information available, the Hodrick–Prescott filter was employed to calculate the process and other coefficients were either extracted from other studies or were assigned values in such a way that the maximum adaptation between the momentums of the developed model and real-world data are achieved. Then, the momentums of the model's endogenous variables

were compared with the real-world data momentums, and the success of this model in simulating the economic realities of the variables in question was evaluated. After that, the Impulse Response Functions (IRF) of the concerned variables against different momentums were examined. Table 1 represents the parameters and calibrated ratios.

Table 1: Parameter Values

Household	
discount factor	$\beta = 0/98$
capital depreciation rate	$\delta = 0/014$
intertemporal elasticity of substitution	$\frac{1}{\eta} = 0/5$
Population growth rate In steady state	$\zeta^{N} = 1/02$
The conversion rate of unskilled labor force to skilled	$\rho^{u} = 0/1$
Firm	
degree of substitutability between capital and unskilled labor	$\sigma = 0.5$
capital share	$\alpha = 0.42$
The share of simple labor and capital from produc	$\theta = 0.7$
Steady State Properties	
Consumption-GDP	$c/y = 0.66$
Investment-GDP	$\frac{i}{y} = 0.34$
Proportion of skilled immigrants to all skilled populations	$\frac{migou}{N^{s}} = 0.02$
Proportion of unskilled immigrants to all unskilled populations	$\frac{migin}{N^{u}} = 0.1$
Proportion of skilled population to total population	$\frac{N^{s}}{N} = 0.61$

5.1 An Examination of the Model's Momentums

The results of the comparison between the momentums obtained from the model and the Irans economy data are shown in Table (2), indicating the relative success of the model in simulating Iran's economic realities.

Table 2: Standard Deviations: Model vs Data

Relative Standard Deviations		Standard Deviations		
Model	**Data**	**Model**	**Data**	
1	1	0.056	0.058	**production**
1.03	0.75	0.058	0.044	**consumption**
1.46	1.6	0.082	0.095	**investment**

5.2 An Examination of Impulse Response Functions

Impulse response functions show the dynamic behavior of the model variables over time, when a momentum as large as a standard deviation comes on each variable. We examined the impacts of the concerned momentums on labor market variables.

Figure (1) shows the impulse response functions of the emigration momentum (the emigrants were assumed to be skilled and educated). The number of skilled people decreases with emigration, and their proportion to the total population also decreases. Since skilled labor is one of the productive inputs, especially in the industrial sector, and has higher productivity, its reduction decreases production, investment, and,

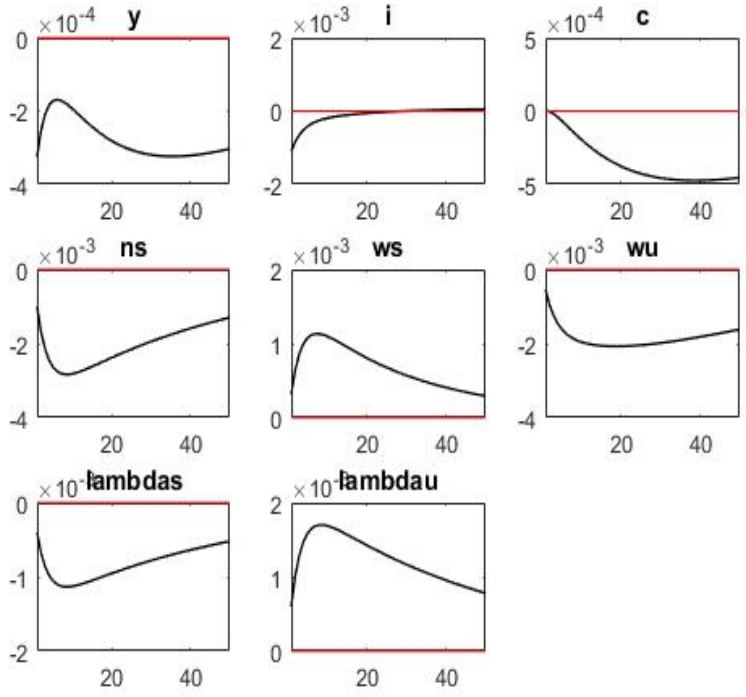

Figure 1: Impulse Responses to Emigration Shock

consequently, per capita consumption. Regarding the effect of this momentum on wages, it increases the wages of skilled individuals (reduced skilled labor supply) and lowers the unskilled labor's wages. This finding is consistent with the findings of Haqiqi and Bahaloo Horeh (2015), Heydari et al.'s (2016) and Iftikhar and Zaharieva (2018).

Figure (2) presents the impulse response functions of the immigration shock (the immigrants were assumed to be unskilled). The number of unskilled labor and population increased with immigration. As shown in this figure, per capita production and consumption also declined. Reduced per capita production can be attributed to the variation in production technology and to the greater use of unskilled labor force with low productivity. Since capital can be substituted by unskilled labor, per capita investment also declined. As unskilled labor force increased, their wages also declined. This finding is in line with Heydari et al.'s (2016) study.

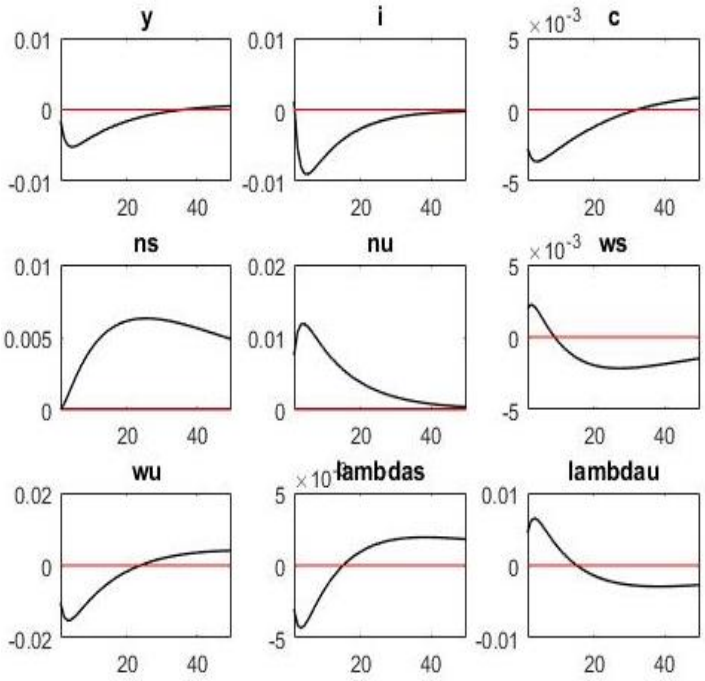

Figure 2: Impulse Responses to Immigration Shock

5.3 Sensitivity Analysis

The impact of emigration and immigration depends on the degree of substitution for unskilled labor force and capital, the intensity of

capital use, and the distribution of unskilled and skilled labor. In particular, if the parameter σ, which indicates the degree of substitution for capital and unskilled labor, goes toward zero, unskilled labor and capital become complementary, and if it inclines toward infinity, they will be considered to be close substitutes. In order to have more accurate analysis, we considered three values for σ and examined the impulse response functions.

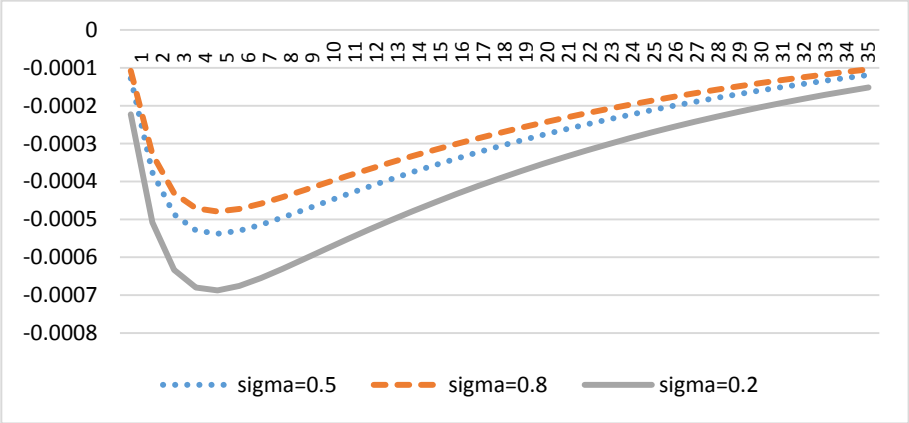

Figure 3: Production Response to Immigration Shock

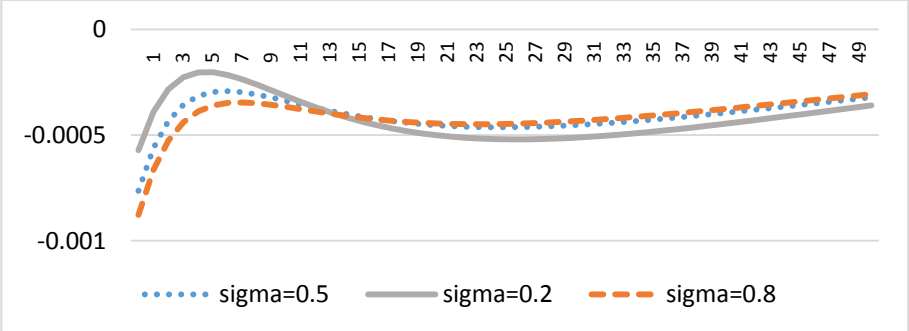

Figure 4: Production Response to Emigration Shock

Figures (3) and (4) show the production response to the emigration and immigration momentums in three cases: (a) Unskilled labor and capital are relatively complementary (sigma = 0.2); (b) Unskilled labor and capital are relative substitutes (sigma = 0.8); and the basic mode (sigma = 0.5). As it is shown in the figures, the results of the model did not change, and the severity of its impact only changed. In other words, the production response to the migration momentums

(both emigration and immigration) is negative in all three cases; however, this impact is intensified when capital and unskilled labor complement each other. This can be justified as this effect in complementary mode is exacerbated due to maintaining the ratio of unskilled labor and capital to the skilled labor force. The production response to emigration momentum is slightly different as production in the short run produces more response in the substitution mode; however, if the relationship is complementary, the production response becomes more intense. An important point is that production in all the three scenarios has a negative impact on migration momentums, which indicates the strength of the results.

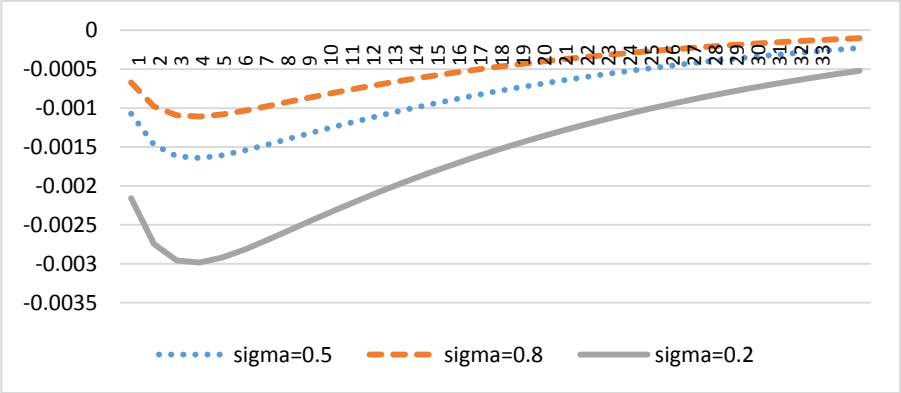

Figure 5: Unskilled Labor's Wage Response to Immigration Shock

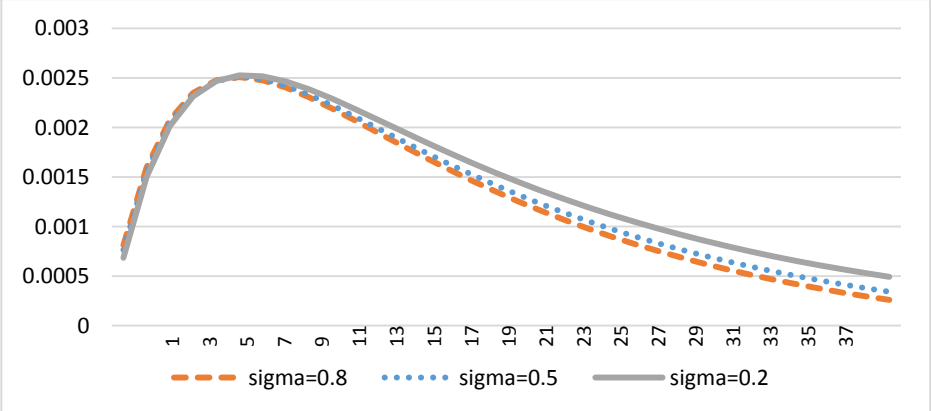

Figure 6: Skilled Labor's Wage Response to Emigration Shock

Figures (5) and (6) represent the responses of skilled and unskilled labor's wage in the three scenarios. As it can be observed in the

figures, the emigration momentum enhanced the skilled labor's wages, and this effect was similar in the three scenarios; however, the response of the unskilled labor's wage to immigration shock was more intense than when the relationship was defined to be complementary.

5.4 An Examination of Emigration Momentum When the Emigrants Include Skilled and Unskilled Labor Force

As discussed in the literature, even if the immigrants are considered to be a combination of unskilled and skilled labor, since the immigrant labor force is engaged only in simple jobs due to their poor communication skills, they can be regarded as unskilled labor force. However, if the emigrants are both unskilled and skilled labor force, the consequences may vary. In this case, it can be assumed that the emigration momentum influences the skilled and unskilled population.

$$N_t^s = N_{t-1}^s + \rho^u N_{t-1}^u - mig_t^{ou} N_t^s \tag{20}$$

$$N_t^u = (1-\rho^u) N_{t-1}^u + mig_t^{in} - mig_t^{ou} N_t^u \tag{21}$$

where mig_t^{ou} is the migration rate, and it as a linear logarithm is supposed to follow of the below process.

$$mig_t^{ou} = \rho^{mig^{ou}} mig_{t-1}^{ou} + \varepsilon_t^{mig^{ou}} \tag{22}$$

Figure 7 shows the impulse response functions, assuming that the emigrants are a combination of unskilled and skilled labor. As it can be observed, production and investment decreased. This is because of the fact that production and investment decrease with the emigration of the skilled labor force with a higher productivity. Since a majority of Iran's labor force are skilled, a greater number of skilled labor emigrates and its proportion to the total population declines. Hence, it is worth noting that the results did not change with the variations in the composition of the emigrant labor force. The only difference was that the effectiveness decreased. This finding is in accordance with Heydari et al.'s (2016) study.

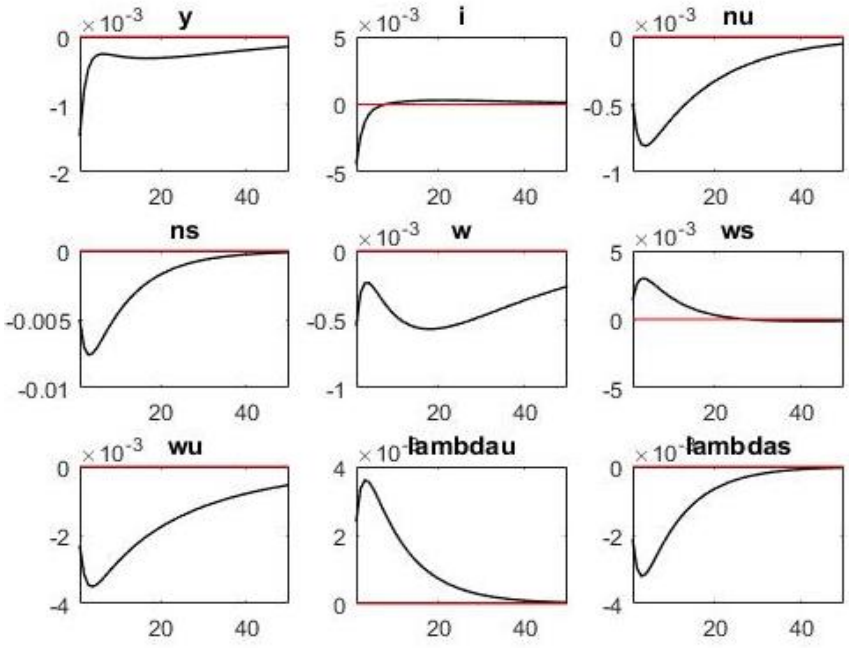

Figure 7: Impulse Responses with Assuming that the Emigrants are a Combination of Unskilled and Skilled Labor

6. Conclusion

International labor migration brings about different consequences for both the sending and host countries. Since Iran is a pro-immigrant country and the immigration rate has been negative over the past decades and given that Iran is one of the leading countries in terms of brain drain, it is of essence to examine the impact of migration (both immigration and emigration). This study used a neoclassical model within the framework of a dynamic stochastic general equilibrium model to examine the effect of unskilled labor immigration and skilled labor emigration. After solving the model, the obtained equations were linearized and different values were assigned to their parameters according to Iran's economy information. Comparison of the momentums resulting from the model and the data momentums in the real world indicates the relative success of the model in simulating Iran's economic reality. An examination of the impulse response functions shows that:

Emigration momentum reduces the number of skilled individuals and lowers its proportion to the total population. In response to this

momentum, production, investment, and per capita consumption decline. Regarding the effect of this momentum on wages, it increases the wages of skilled individuals and decreases the wages of unskilled individuals due to reduced production.

Immigration momentum increases unskilled labor force and population and reduces production, investment, and per capita consumption. On the other hand, with an increase in the unskilled labor force, their wages also decline.

To test the strength of the findings, the degree of substitution between the unskilled labor force and capital was changed, and the results indicated that the variation of this parameter only changed the effectiveness of immigration momentum, but not the type of relationship. Considering that emigration is a combination of skilled and unskilled labor force, changes in the composition of the emigrant labor force did not change the results and only the effectiveness decreased.

Finally, out of the results of this study, it can be concluded that labor migration has harmful effects on the country. Therefore, policymakers should place the specialist and elite forces in the top priority of policy goals.

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