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RESEARCH PAPER

An Analysis of the Relationship between Bilateral Trade and Labor Force Immigration Considering the Role of Financial Crises (Banking and Sovereign Debt Crises)

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Abstract
Economists have always noticed the immigration of laborers since it can change the economy of countries. In the literature of international economics, labor force immigration is studied by the mobility of factors of production and trade. In this case, empirical studies have found substitutive and complementary relationships between the two, which necessitate consideration of other elements influencing this relationship. One of the phenomena that can affect both labor force immigration and bilateral trade is the countries' financial crises. Therefore, this study analyzes the parametric effect of bilateral trade and the nonparametric impact of economic crises on labor force immigration in the Middle East and OECD countries from 1995 to 2017. For this purpose, two indices of banking market pressure and debt market pressure have been used to study financial crises such as banking crises and sovereign debt crises, and the semi-parametric gravity model of immigration has been estimated by using random effects. The estimation results show a substitution relationship between bilateral trade and labor force immigration, and both types of mentioned financial crises have a nonparametric impact on immigration. So that the effect of these two types of economic crises on labor force immigration has been upward for some periods and downward for other periods. Moreover, these financial crises have reduced the labor force immigration among business partners. In other words, there has been a nonlinear relationship between the two financial crises.
Keywords: Banking Financial Crises, Bilateral Trade, Labor Force Immigration, Semi-Parametric Analysis, Sovereign Debt Crises.
JEL Classification: C14, F22, F17, G01.

Introduction

Many researchers and policymakers have cited trade and immigration as essential elements of economic growth. However, their complex interrelationships are still debated. It is necessary to look at this issue, and it is crucial in terms of time. On the one hand, trade is expanding in response to globalization and the growth of developing countries. On the other hand, globalization affects migration (Ghani et al., 2019). Increasing trade, labor, and capital displacement have been significant issues in economic globalization that can be essential factors in providing opportunities, raising people's standard of living, and society's access to more types of products.

According to the World Migration Report (2020) provided by the International Organization for Migration (IOM), in 2019, the total number of immigrants in the world is estimated at 272 million (3.5% of the global population), which is estimated to be about two-

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thirds of them are migrant labor. This figure indicates an increase of 14 million immigrants compared to 2015 and an increase of 23 million compared to 2010. According to these statistics, the number of immigrants and their percentage has exceeded the estimates made by this organization in 2003 for 2050 (230 million people and 2.3% of the total population which means that it is challenging to predict the scale and speed of international migration.

Many studies, including Steingress (2018); Bratti et al. (2014); Genc et al. (2012); Peri and Requena-Silvente (2010); Faini (2003); Ehrlich and Canavire (2006); and Mundra (2005) have examined the relationship between trade and migration from the perspective of the impact of migration on trade. Among these studies, there are several standard features. First, they implicitly assume that migration affects trade, not the other way around. Second, their studies focus on the host country. These studies have reached both conclusions about the complementary and substitution relationship between trade and migration, which are contradictory.

Could causality exist in another direction? Can trade change the relative price of goods and services and, consequently, the final demand for labor and increase or decrease migration? On the other hand, changes in income due to changes in trade volume can make migration easier or more difficult because migrants can (cannot) bear the transfer costs more quickly due to changes in trade volume (Bin, 2014). So can the expansion of trade volume affect the mobility of factors of production, especially labor in the form of migration?

On the other hand, a major structural problem has emerged in the global economy, and that is the dominance of the share of financial exchanges over the share of real exchanges, that is, financial transactions far beyond the exchanges based on goods and services. Because of this significant imbalance, global financial markets are constantly exposed to large and small crises (IMF, 2007). Thus, financial crises have caused different countries to react differently depending on the type of interaction and their relationship with the global economy (Zimmermann, 1995). Therefore, another question that this study seeks to answer is how financial crises have affected immigration patterns and policies.

The remainder of this paper is organized as follows. Section 2 discusses the theoretical foundations of the mobility of production, international trade, and financial crises, and reviews the literature related to the subject matter. Section 3 presents the study model, and Section 4 describes how to estimate the model. Finally, Section 5 concludes the paper and outlines the proposed policies.

Theoretical Discussion

Relationship between Mobility of Production Factors and International Trade

In the classical Heckscher-Ohlin trade model, all factors of production are considered fixed and immobile among countries. In this regard, Mundell (1957) showed that by assuming other conditions (the Heckscher-Ohlin model) and allowing the factors of production (either capital or labor) to be traded, factors trading could be replaced by goods trading. Hence, the transfer of capital or labor replaces the transfer of goods. In other words, he believed that countries could export labor-intensive goods, and at the same time, their labor force could move to the destination country to produce these kinds of goods.

Modern theories of trade show that the relation of factors of production mobility with international trade can be complementary too (Campaniello, 2014). If trade increases as the flow of migration increases, this connection is complementary (Ghani et al., 2019). If the trade-in goods is assumed a way of exchanging the services of the agents embodied in those goods, the removal of trade barriers is likely to reduce the incentive for the agents of

production to move. Thus, free trade agreements between developing and developed countries are designed to encourage and further develop the regional economy and reduce uncontrolled migration. Thus, trade liberalization was used to reduce the immigration pressure (Ghani et al., 2020).

In this regard, several theoretical research (i.e., Mundell, 1957; Markusen, 1983; Wong, 1986; Martin, 2001; Bruder, 2004; Bettin et al., 2010; Campanillo, 2014) set aside some of the basic assumptions of Heckscher-Ohlin (e.g., different technologies or scale effects in production), and examined the relationship between trade and the mobility of production factors. Many analysts have used the Jones (1971) model, assuming the international mobility of capital in a particular sector and the existence of a substitution relationship between trade and labor force immigration. Aguiar et al. (2007) Believe that the two factors substitute for each other if a negative relationship exists between trade and immigration. In other words, more immigration can reduce trade. Also, the positive relationship between immigration and trade means that the relationship is complementary.

In Martin's (2001) model, where trade is based on differences in technology, trade and immigration are complementary. It is argued, for example, that the corn production in Mexico with labor-intensive methods has less productivity than that in the United States, which utilizes more sophisticated capital and technology inputs, and it makes the sale of corn by the US to Mexico at a lower price and the migration of Mexican farmers to the United States, which probably enhancing American farmers' expertise in corn production and leading to more trade. Aroca et al. (2005) have had a unique look at the mobility of the Mexican labor force after the NAFTA Agreement. They also argued that increased immigration might expand the trade relationship between the source country and the target country.

Uprety (2017) also states that the idea behind Stalper-Samuelson (S-S) theory based on the Hexcher-Ohlin (H-O) model is as follows: Developed countries have a large number of skilled labor, their exports will tend to be intensive in skilled labor, and the skilled labor will gain from more trade. On the other hand, developing countries are unskilled labor abundant. Their exports will be intensive in unskilled labor, so highly skilled labor will be the loser, and unskilled labor will gain the most trade. OECD countries with relatively high-skilled labor have exports of qualified labor-intensive goods such as electronics, automobiles, and pharmaceuticals, and developing countries import these goods with shortages of skilled labor. With more trade between developing and developed countries, skilled-intensive industries are expanding in developed countries, leading to higher wages for skilled labor, while it depresses in developing countries. Wage differentials of skilled labor between developed and developing countries are widening. Thus, skilled labor in developing countries is highly motivated to migrate to developed countries, whereas it is not for unskilled labor (Uprety, 2017).

In general, there is no agreement at the theoretical level on the type of relationship between trade and immigration. Bowen and Wu (2005) have suggested that the type and quality of employment of immigrants may influence the substitutive and complementarity relationship between trade and immigration. They developed a simple model for a free economy in which two international trade goods (X export goods and M import-competing goods) and one non-traded goods (N) such as services are produced. There are also three factors of production, including capital (k), domestic labor (d), and immigrant labor (i).

All markets are perfectly competitive. Capital and domestic labor (k and d) are freely mobile across all sectors whereas immigrant labor is specific to the non-traded sector. We emphasize that "immigrant" labor refers here only to those non-native workers who are specific to the non-traded sector; it does not refer to all non-native workers, some of which, like native workers, are movable between all three sectors (Bowen and Wu, 2013).

Let V_z denote the constant supply of domestic production factors within z (z=d, k, i), Q_j the production of the sector (j=x, m, n) j, and a_{zj} the amount of factor "z" used to produce one unit of output in sector "j". With full employment conditions, equations (1) to (3) specify the supply of production factors:

$$V_d = a_{dx}Q_x + a_{dm}Q_m + a_{dn}Q_n \quad (1)$$

$$V_k = a_{kx}Q_x + a_{hm}Q_m + a_{kn}Q_n \quad (2)$$

$$V_i = a_{in}Q_n \quad (3)$$

By writing these equations in the form of a matrix, Equation (4) is obtained:

$$\begin{pmatrix} a_{dx} & a_{dm} & a_{dn} \\ a_{kx} & a_{km} & a_{kn} \\ 0 & 0 & a_{in} \end{pmatrix} * \begin{pmatrix} Q_x \\ Q_m \\ Q_n \end{pmatrix} = \begin{pmatrix} V_d \\ V_k \\ V_i \end{pmatrix} \quad (4)$$

or

$$AQ = V \quad (5)$$

If the production of export good (X) and import-competing good (M) is assumed to respectively be capital-intensive and domestic labor-intensive, and the production of non-traded good (N), is the most labor-intensive in terms of total labor employed per unit of capital, capital-labor ratios across all three sectors is defined to be:

$$\frac{a_{kx}}{a_{dx}} > \frac{a_{km}}{a_{dm}} > \frac{a_{kn}}{(a_{dn} + a_{in})} \quad (6)$$

Besides, the non-traded sector is assumed the most labor-intensive sector among all of the three sectors. Therefore:

$$\frac{a_{kx}}{a_{dx}} > \frac{a_{km}}{a_{dm}} > \frac{a_{kn}}{a_{dn}} > \frac{a_{kn}}{a_{in}} > \frac{a_{kn}}{(a_{dn} + a_{in})} \quad (7)$$

To measure the number of changes in outputs and consequently the changes in immigration-related trade, one can differentiate equations (1) to (3) and solve the resulting changes in outputs in terms of changes in the supply of factors. Then, in the form of the matrix (8), the results can be shown:

$$\begin{pmatrix} dQ_x \\ dQ_m \\ dQ_n \end{pmatrix} = \begin{pmatrix} \frac{a_{km}a_{in}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} & \frac{-a_{dm}a_{in}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} & \frac{a_{dm}a_{kn} - a_{km}a_{dn}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} \\ \frac{-a_{in}a_{kx}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} & \frac{a_{in}a_{dx}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} & \frac{a_{dn}a_{kx} - a_{kn}a_{dx}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} \\ 0 & 0 & \frac{a_{km}a_{dx} - a_{dm}a_{kx}}{a_{in}a_{km}a_{dx} - a_{in}a_{kx}a_{dm}} \end{pmatrix} * \begin{pmatrix} dV_d \\ dV_k \\ dV_i \end{pmatrix} \quad (8)$$

To model immigration, the number of incoming foreign laborers in a country, it is assumed that the fraction λ is a proportion of the incoming foreign labors that will have the status of domestic labor, and therefore be freely movable between all three sectors and 1- λ

percent of new labors will dedicate to the non-traded service sector. Thus an inflow of "I" new foreign labors increases the mobility of the domestic laborers as much as $dV_d = \lambda I$, and increases the index of sector-specific immigrant labors as much as $dV_i = (1-\lambda)I$. By putting these changes of factors supply into equation (8), and by assuming without loss of generality I=1, the following equations are obtained for the changes of each sector output:

$$\frac{dQ_x}{dV_i} = \frac{(a_{dm}a_{kn} - a_{km}a_{dn}) + \lambda(a_{km}a_{in} + a_{kn}a_{dn} - a_{dm}a_{kn})}{a_{in}(a_{km}a_{dx} - a_{kx}a_{dm})} \tag{9}$$

$$\frac{dQ_m}{dV_i} = \frac{(a_{dm}a_{kx} - a_{kn}a_{dx}) + \lambda(-a_{in}a_{kx} - a_{dn}a_{kx} + a_{kn}a_{dx})}{a_{in}(a_{km}a_{dx} - a_{kx}a_{dm})} \tag{10}$$

$$\frac{dQ_n}{dV_i} = \frac{(1-\lambda)(a_{km}a_{dx} - a_{kx}a_{dm})}{a_{in}(a_{km}a_{dx} - a_{kx}a_{dm})} \tag{11}$$

The denominator in Equation (9) to (11) is $|A| = a_{in}(a_{km}a_{dx} - a_{kx}a_{dm})$, which should be non-zero. To this end, the ratio of capital to labor of the export and import-competing sectors should be unequal ($\frac{a_{kx}}{a_{dx}} \neq \frac{a_{km}}{a_{dm}}$). If the export sector, as we assume, is assumed to be more capital-intensive than the import-competing sector, that is $\frac{a_{kx}}{a_{dx}} > \frac{a_{km}}{a_{dm}}$, the numeric value of $|A|$ will be negative (this assumption is more applicable to industrialized countries). The effect of immigration on the production of export goods is obtained by the sign of the numerator in Equation (9), which is written as Equation (12):

$$(a_{in} + a_{dn})a_{dm}(1-\lambda)k_m\left[\left(\frac{s}{(1-\lambda)}\right) - 1 - \left(\frac{k_n}{k_m}\right)\right] \tag{12}$$

where $k_n = \frac{a_{kn}}{(a_{dn} + a_{in})}$ and $k_m = \frac{a_{km}}{a_{dm}}$ are the ratios of capital to the labor of non-traded and import-competing sectors, and $s = \frac{a_{in}}{(a_{dn} + a_{in})}$ is the primary share of the immigrant labors in total labors employed in the production of the non-traded sector. The sign of Equation (12) depends on the relationship between the variables within the bracket. If $\lambda = 0$, that is all new incoming immigrants are dedicated to the non-traded sector, Equation (12) will be designated by the sign of Equation (13):

$$-\left[\frac{k_n}{(1-s)} - k_m\right] \tag{13}$$

where $\frac{k_n}{(1-s)} = \frac{a_{kn}}{a_{dn}}$ denotes the ratio of capital to domestic labor employed in the non-traded sector. Given the assumption of Equation (7), where the export sector is more capital-intensive than the other sectors, that is $\frac{a_{km}}{a_{dm}} > \frac{a_{kn}}{a_{dn}}$, the bracket sign of Equation (13) is

negative, and therefore, the sign of Equation (9) is positive. ($\frac{dQ_X}{dV_i} > 0$).That is, if all new immigrants are dedicated to the non-traded sector, there will be a complementary relationship between trade and immigration. In the more general case, if $0 < \lambda < 1$, that is a part of the immigrant labors join the non-traded sector and partially into export and import-competing sectors, the relationship between immigration and export sector depends on the bracket sign of Equation (12) in a more complex way than before (Bowen and Wu, 2013). It is noteworthy that by the assumption of Equation (7) $\frac{a_{km}}{a_{dm}} > \frac{a_{kn}}{(a_{dn} + a_{in})}$, the ratio of $\frac{k_n}{k_m} < 1$ is less than one, that is, $1 - \left(\frac{k_n}{k_m}\right)$ is positive and less than one in Equation (12). So, one can write:

$$\begin{cases} \frac{dQ_x}{dV_i} < 0 if \ \frac{s}{(1-\lambda)} \geq 1 \\ \frac{dQ_x}{dV_i} < 0 if \ \frac{s}{(1-\lambda)} > \left(1 - \frac{k_n}{k_m}\right) \\ \frac{dQ_x}{dV_i} > 0 if \ \frac{s}{(1-\lambda)} < \left(1 - \frac{k_n}{k_m}\right) \end{cases} \quad (14)$$

$$\frac{dQ_x}{dV_i} > 0 \ (< 0) if \ \ [\frac{k_n}{(1 - s)} - k_m \ \ ] < 0 \ (> 0) \quad (15)$$

In Equations (14) and (15), where $\frac{dQ_x}{dV_i} < 0$, the relationship between immigration and trade is a substitution relationship, and where $\frac{dQ_x}{dV_i} > 0$, their relationship is complementary (Because, as mentioned, in this case, with the increase of migration, the production of export goods and therefore exports also increased, and this means a complementary or positive relationship between trade and migration).

Thus, in general, there is no theoretical consensus that the relationship between trade and labor force immigration is substitutive or complementary, and one of the aims of this study is to examine this point.

Crises, Immigration, and Trade

Any phenomenon that involves a dangerously unstable situation and affects individuals, groups and the whole community is called crises (Tayebi et al., 2011). Situations, often known as financial crises, include stock market crashes, financial bubbles bursting, monetary crises, and sovereign default (Kindleberger and Aliber, 2005; Leaven and Valencia, 2008). Therefore, financial crises are divided into several categories, including banking crises, sovereign debt crises, monetary crises, speculative bubbles, and stock market crashes. Meanwhile, banking crises, speculative bubbles, and stock market crashes have initially been national in scope and may have transnational and international dimensions. However, monetary crises and sovereign debt crises have been global and international since the beginning (Kindleberger and Aliber, 2005; Leaven and Valencia, 2008).

Banking crises as a type of financial crises refer to a situation where several banks are simultaneously under pressure and may have to default (Moshiri and Nadeali, 2013). Thus, a

bank run causes banks to go bankrupt, and as a result, many depositors lose their savings unless they use insurance deposits. A situation where the bank run extends is referred to as a systematic banking crises or banking panic (Mitroff, 2005). In addition, monetary crises are also regarded as speculative attacks on the value of a currency in foreign markets that cause a sharp depreciation of that currency in the foreign exchange market, forcing monetary authorities to support that currency through the sale of foreign reserves or lead to an increase in the domestic interest rates (Glick and Hutchison, 2011). The sovereign debt crises also refers to situations in which the country faces difficulties in repaying the government's and state's debt. If lenders or purchasers of government bonds are suspicious of government debt repayment, they will demand a higher interest rate than the default risk of the government, and this may cause fears that the government may have problems with repaying their debts. This is known as the sovereign debt crisis that one of the main reasons for which, according to Hollo et al. (2012), is the increase in the international risk factor. In the case of speculative bubbles and the stock market crashes, economists argue that when the price of financial assets exceeds the present value of future earnings of those assets (interest or dividend to which it is credited at maturity), it means that the asset has been bubbled (Brunnermeier, 2008).

Such crises in countries will cause problems, e.g., declining production, rising unemployment, and severe inflation (Nasrollahi et al., 2013). For example, Carbaugh (2013) showed that the currency crises had a diminishing effect on a country's GDP growth rate and acted as a loss of one or two years of economic growth in most countries. There is also the possibility of crises spreading to other countries and devastating their economies. Thus, the crises can be considered as a factor that affects the decision to emigrate from crises areas.

There have been studies of the direct effect of financial crises on immigration (Beets, 2009; Koehler et al., 2010; Papademetriou, 2010; Kuptsch, 2012; Lindley, 2014; Hatton, 2014; Roos and Zaun, 2016). Most of these studies have empirically investigated the relationship between financial crises and immigration, paying little attention to its theoretical aspect. For example, comparing the economic crises of the 1930s, 1970s, and 2010s in Australia, Canada, and the United States, Hutton (2014) showed that financial crises had direct and significant effects on immigration flows. In addition, Kuptsch (2012) argued that countries such as the United States, Spain, and the Czech Republic that adopted the open-door policy on immigration in the 2000s have relied on financial crises to make restrictive policy changes on immigration.

The related literature has stated that immigration is influenced by factors known as pull and push (e.g., Ravenstein, 1889; Lee, 1966; Castles and Miller, 2013). This literature has raised the question of what makes people accept the risk of immigration and then provides explanations based on the classical–rational economic models (Roos and Zaun, 2016). Push factors are those that lead people to leave the source country may include high population growth, low income, lack of economic opportunities, lack of positive economic prospects, natural disasters, political repression, etc. (Castles and Miller, 2013; Castelli, 2018; Nguyen et al., 2019). Therefore, pull factors attract immigrants to certain countries, including demand for the labor force, access to land, good economic opportunities, political freedom at the destination, etc. (Castles and Miller, 2013). While the gravity model is often criticized for disregarding structural (Massey et al., 1998) and historical (Castles and Miller, 2013) factors, it has provided some evidence by focusing on individual migrants' rational decisions. It suggests that immigrants really decide to emigrate with economic incentives (Cornelius & Rosenblum, 2005). For example, Hanson and Spilimbergo (1999) showed that the wage gap in the United States and Mexico was a significant determinant of the immigration flow from Mexico to the United States. Yet, Beets and Willekens (2009) believe that low wages, as a push resulting from a financial crisis, cannot be the only factor motivating people to leave the

source country. Because the total wages are not what they calculate, but the relative wages compared to that in other countries.

Thus, the global economic crisis can be expected to make significant changes in the configuration of both pulls and push factors in both the origin and host countries. In particular, financial crises affect economic opportunities and labor demand in both the origin and host countries. However, if a host country is mainly affected by the crises, it can reduce the mobility of immigrants to that country and alter their destination (Roos and Zaun, 2016). As unemployment rises, demand for labor in countries in crises declines. Thus, a significant pull factor for immigrants eliminates, and fewer immigrants choose this country as a destination (McCormick, 2012). In addition, it can be expected that countries that have already attracted many immigrants will become migrant-sending during the crises. Because immigrants who have already migrated to these countries will leave these countries and return to the origin country. In general, financial crises can be a turning point for migration to a range of countries, which trade factor (labor/capital) intensive products.

In addition to the harmful effects of the crisis on labor migration, justifications and interpretations of the lack of negative impact of the crisis on migration, first and foremost related to the fact that the economic crisis may affect both the destination and origin of migrants and even the possibility of effects. Countries of origin have more severe negatives (Lintner, 2019). For this reason, immigrants who perceive a negative situation in their home country are more likely to stay in their destination country (Moser and Horn, 2015).

Second, because the people of the country of origin depend on remittances and support from relatives living abroad, immigrants tend to cope with the crisis in the destination country (Castles and Miller, 2010; Zufferet et al., 2020). Therefore, instead of returning, they choose a range of different strategies to increase income, such as getting multiple jobs, reducing costs by reducing remittances or moving to cheaper homes (Datta, 2011), or entrepreneurship in the destination country (Lintner, 2019). On the other hand, knowing the economic conditions in the countries of origin and destination, some immigrants decide to migrate to more affluent countries that have been less affected by the crisis (McIlwaine, 2011; Schuster, 2005).

Third, social factors can influence immigrants' decisions to return to their country of origin in times of economic crisis. If immigrants "have a long stay and strong family ties" have invested in education and housing and are able to benefit from welfare payments, they are more likely to endure the crisis instead of accepting the risk of returning to their country of origin. They cope in the destination country (Castles and Vezzoli, 2009; Espinosa et al., 2019).

Studies of the relationship between financial crises and international trade have focused more on the ways of transmitting the crises through trade (Krugman, 1979; Masson, 1998; Taimur and Goldfajn, 1998; Eichengreen and Rose, 1999; Glick and Rose, 1999; Forbes, 2000; Zhou and Yang, 2004), which ignore the important reverse question: How do financial crises affect international trade?

One of the essential and practical consequences of financial crises on labor migration is the collapse of international trade flows due to a lack of trade finance and reduced economic growth and labor demand. There are two main channels through which financial (banking) crises affect trade flow: supply-side shocks and demand-side shocks. The first is the credit crunch channel, which shows that the banking crisis, by reducing the availability of external financial resources, disproportionately hurts firms usually dependent on external financial resources for production. This is especially true in the export-oriented sectors. The second is that banking crises generally lead to slow economic growth, which in turn leads to a fall in aggregate demand. In particular, imports are relatively more affected by these crises (Kiendrebeogo, 2020).

Literature Review

In their study, Ghani et al. (2020) investigated the effect of trade on migration using gravity model estimation. For this purpose, they used data from 248 countries from 1990 to 2010 and concluded that trade is a significant driver of migration. This means that if the trade flow from country i to country j increases by 10%, the migration flow will increase by 11.3%.

Acharyya et al. (2019), in their study entitled Trade, Migration Costs and Asymmetric Migration Patterns, examine how the general pattern of trade-migration is formed according to the types of skills and seek to answer the question of whether the relationship between trade and migration is symmetrical? They discuss a standard production technology for a developing country, which uses skilled and unskilled labor and capital for the competitive export and import sectors. Then, through wage effects, they derive general reaction functions on how experienced people migrate under the influence of unskilled people and vice versa. Examining the trade liberalization policy, they have concluded that reducing the tariff rate increases the migration rate of skilled workers and reduces the migration rate of unskilled workers in this context.

In his study, Uprety (2019) examined the impact of trade on migration based on skill level and gender. For this purpose, he has used dynamic panel data models and data from 1980-2010 in OECD countries. The results of his study indicate that imports and total trade were positively correlated with the skilled migrant's index. At the same time, exports are negatively related to the index of unskilled immigrants. The results were not significant for medium-skilled immigrants. He argues that according to the Heckscher-Ohlin model, in developing countries with an abundance of unskilled labor, there is a tendency to export Low-skilled-intensive goods and import High-skilled-intensive goods. Thus, an increase in imports leads to a reduction in payments to skilled people and thus an increase in their incentive to emigrate. Conversely, an increase in exports reduces the migration of unskilled people. The results of his study also show that the impact of trade on the migration of skilled women is greater than that of skilled men.

Focusing on the European crises and immigration to Germany, Bertoli et al. (2016) estimated the gravity model by using monthly data on bilateral immigration over the period from 2006:7 to 2014:9, and showed that expectations for future economic conditions in the source country, unemployment rate changes, and immigration policy during this period had a considerable effect on immigration to Germany. Specifically, a 10% increase in the unemployment rate in the source country was accompanied by a 5.4% increase in the bilateral immigration rate. In comparison, Germany's accession to the EU and the termination of its transitional arrangements in the seventh year to the new EU member states have increased bilateral immigration by almost 183%.

Campaniello (2014) studied the random effects of trade on immigration according to the European-Mediterranean countries corporation. She applied a bilateral immigration gravity model to migrate from Mediterranean third countries (South) to the European Union countries (North) using data with different characteristics from 1970 to 2000. Results of her study showed that there was a significant positive correlation (complementary relationship) between trade and immigration from south to north. According to the estimation results obtained by OLS and 2SLS models, trade liberalization in the Mediterranean-EU partner areas is not an appropriate policy, at least in the short term, to reduce the flow of immigration.

Bai (2012) studied the effect of the global financial crises on Chinese exports to its major trading partners, including the United States, Hong Kong, Japan, Korea, Germany, the Netherlands, the United Kingdom, Singapore, India, and Italy. To do this, he used the data of

the 2001–2011 period in the gravity model and showed that the real economic sector and financial conditions deteriorated during this period, and as a result, the financial crises led to a decline in Chinese export to these countries.

Akkoyunlu and Siliverstovs (2009), using the data of the 1963–2004 period, studied the immigration of individuals from Turkey to Germany and showed that immigration and trade had a complementary relationship in these two countries. However, Bruder (2004) investigated the "north to north" trade and labor force immigration between Germany and the rest of the European countries. The empirical results suggested a substitution relationship between trade and labor immigration, especially during the time of the global financial crises.

Mckibbin and Stoeckel (2009) suggested that financial crises were ground for impulses in global financial markets and increased corporations' risk. They showed that the shocks observed on world markets could be the basis for countries' economic solid integration into international trade in 2009. They also indicated that the significant difference between the production and trade of durable and non-durable goods plays an essential role in the more considerable integration of bilateral trade in many countries.

Horri et al. (2015) studied the effect of brain drain on Iran's production and foreign trade, using a computable general equilibrium model. In addition, they measured the effect of expert immigration on the variables of production, export, import, and trade balance, using the two negative shock scenarios of expert supply as the direct effect of brain drain and the negative shock of total factor productivity as the indirect effect of brain drain. Results showed that brain drain either directly or through reduced productivity had a negative effect on production, export, import, and trade balance.

Torki et al. (2014) studied the dynamics of Iran's trade balance and its ten trading partners concerning exchange rate changes according to the financial crises. Using the time-series data of the 1981–1999 period for Iran and its ten trading partners, they indicated the effect of the financial crises index on the trade balance by using the impulse reaction functions in the autoregressive distributed lag (ARDL) and error correction model (ECM). The real exchange rate weakening effect process on the trade balance only confirmed the bilateral trade balance of Iran's economy with China and Italy and rejected it for the other countries under study.

Zamani and Vaez Barzani (2011) studied the effect of the 2008 financial crises on bilateral trade in developing and developed countries using the gravity model from 1998 to 2010 and found that the crises had a significant effect on reducing the export volume of the countries under study, especially the developing countries, such as Iran, India, Turkey, China, and Indonesia.

Azerbaijani et al. (2009), using a gravity model, studied the relationship between Iranian labor force immigration, the foreign trade volume, and other factors affecting immigration to the five sample OECD member states (USA, Canada, England, the Netherlands, and Sweden) over the period 1992–2004 through panel data. The empirical results showed that there was a complementary relationship between trade volume and labor force immigration in the above-mentioned countries, so increasing trade volume resulted in increased labor force immigration flows.

It is therefore clear from the literature that most studies have focused on the empirical relationship between bilateral trade and international immigration, and the theoretical aspect of the subject remains relatively neglected in these studies. In addition to the fact that various studies have yielded sometimes-different results on this relationship, they have less addressed the important influencing factor in the relationship, which is the role of financial crises in this relationship has been studied less theoretically and empirically. In particular, many of the countries in which the labor force is exchanged have bilateral trade relationships that have been altered by a variety of financial crises, affecting their labor market, people's decision to immigrate, and, consequently, their immigration laws and policies. Thus, in addition to

indexing the financial crises, this study explores the financial crises (banking crises and sovereign debt crises) effects on labor immigration and the relationship between international trade and labor force immigration.

The Research Method

This paper attempts to analyze the effect of bilateral trade on international labor immigration, considering the role of financial crises through applying a nonparametric model in the form of the gravity model of immigration. The first to incorporate this model into the immigration field were Loowry (1966), Lee (1966), and Niedercorn and Bechdolt (1969). At least in the last half-century, the gravity model has been the most common way to study gross immigration flows between countries (Ramoos et al., 2016; Poot et al., 2016; Bertoli et al., 2016; Campaniello, 2014; Adsera and Pytlikova, 2012; Beine et al., 2011; Clark et al., 2007; Grogger and Hanson, 2011; Llull, 2011; Mayda, 2007; Pedersen et al., 2006). The success of this model is because of 1- compatibility with immigration theories, 2- the ease of estimation in its simplest form, and 3- good applicability in most applications (Poot et al., 2016). In the simplest form of gravity immigration models, bilateral immigration relates to the relative size of the source and host countries and their geographical distance. This is reflected in Equation (16) (Anderson and Van, 2003):

$$M_{ij} = \frac{G(GDP_i - GDP_j)}{D_{ij}^2} \tag{16}$$

where, according to the pull and push theory, there are other factors that can affect the immigration flow, and ignoring them may cause bias in the model. Therefore, gravity models are extended with variables known as pull and push factors. In the gravity model of immigration, the immigration rate between the two countries is considered as a linear-logarithmic function in its parametric state, in the form of Equation 17. Thus:

$$\begin{aligned} LM_{ijt} &= \mu_{jt} + area_{jt} + \beta_1 LM_{ijt\text{-}1} + \beta_2 LTRADE_{ijt} + \beta_3 area_{jt} * LTRADE_{ijt} + \\ &\beta_4 LGU_{it} + \beta_5 LGU_{jt} + \beta_6 LGP_{it} + \beta_7 LGP_{jt} + \beta_8 LRCGDP_{it} + \beta_9 LRCGDP_{jt} + \\ &\beta_{10} LRGDPPW_{it} + \beta_{11} LRGDPPW_{jt} + \beta_{12} DIST_{ijt} + \beta_{13} LFCI_{jt} * TRADE_{ijt} + \varepsilon_{jt} \end{aligned} \tag{17}$$

where, LM_{ijt} is the logarithm of the labor immigration flow from country *i* to country j, $LM_{ijt\text{-}1}$ is the logarithm of the information network of the immigrants (lag of migration), $area_{jt}$ is the dummy variable (1 for Middle-East countries and 0 for OECD countries) $LTRADE_{ijt}$ is the logarithm of the bilateral trade rate between country *i* and country j, LGU_{it} and LGU_{jt} are the unemployment growth rates in the origin and host countries respectively, LGP_{it} and LGP_{jt} are the population growth rates in the origin and host countries respectively, $LRCGDP_{it}$ and $LRCGDP_{jt}$ are the real wage of labor in the origin and host countries respectively (GDP per capita), $LRGDPPW_{it}$ and $LRGDPPW_{jt}$ are the productivity level in the source and destination countries respectively (Output per worker), $DIST_{ijt}$ is the geographical distance between the capitals of the two countries, and $LFCI_{jt}$ is a proxy for measuring the financial crises of the host country.

In the parametric form of regression analysis, it is assumed that the functional form is fully described by a feasible set of variables. The feasibility of presenting a regression curve according to the parametric model, or at least the small and mild notion that the approximate biased value is better than the best parametric estimation, is the implicit assumption of this approach (Ohadi Isfahani et al., 2016). The nonparametric unification approach proposes a flexible tool for analyzing unknown regression relationships, so the nonparametric term refers to methods regardless of distribution. In the nonparametric model, the distribution of errors and the functional form of the mean are unspecified. (Hardle and Linton, 1994).

The parametric approach is based on the knowledge of past information about the functional form of the relationship. If this knowledge is valid, the parametric method can correctly model most of the data. However, if the Equation form is incorrect based on past information, the result will have a significant bias compared to alternative models (Fan and Yao, 2003). Parametric linear models as a kind of parametric regression are often used to describe the relationship between explanatory variables and the dependent variable. However, nonparametric regression analysis sets aside the assumption of linearity in regression analysis and gives the model more flexibility (Fattahi, 2011). In addition, these models do not need to specify a functional form for the item to be estimated. This method is a core one. Such methods are increasingly known as appropriate for empirical data analysis and are the most applicable approach for large data sets. The tendency to use nonparametric methods is because these methods release the parametric assumptions imposed on the data generation process and allow the data to determine the appropriate model (Racine, 2008).

In principle, the purpose of regression analysis is to provide a rational analysis of the unknown response of function *m* when for *n* data (x_i and y_i), the relationship can be modeled as Equation (18):

$$y = \mu(x) + \varepsilon \tag{18}$$

Despite the parametric view where function *m* is fully explained by a finite parameter set, the nonparametric model adopts a highly flexible form of the regression curve (Racine and Li, 2004).

Now considering that financial crises are based on different aspects with uncertain resources and changes, the effect of financial assets fluctuation, the relationship with banking panic, stock market crashes, financial bubbles bursting, monetary crises, and sovereign default cannot be assessed by a single parametric equation because these issues cover an ample space that does not have a specific functional form. Accordingly, the nonparametric methods that do not need the parametric structure specifications for functions and distributions in a model will be appropriate (Durlauf and Blume, 2010) to identify any relationship between immigration flows and financial crises.

Given that there are no tangible implications for financial crises, this paper investigates the financial crises effect on labor force immigration as a nonparametric one. Because in this case, without a functional form predetermined, it can be seen how it affects the variable of labor force immigration. On the other hand, within the framework of the gravity model of immigration, there are factors such as the geographical distance that are parametric, and they have been extensively studied in the literature. Hence, the purpose of this study is to investigate this issue in a semi-parametric framework, considering financial crises and international trade and their relationship to immigration. Therefore, the gravity model of immigration is defined as Equation 19 in the form of a semi-parametric model:

$$M_{ijt} = B(z) + m(w) \tag{19}$$

where:

$$B(z) = z(LTRADE_{ijt}, area_{jt}, LGU_{it}, LGU_{jt}, LGP_{it}, LGP_{jt}, LRCGDP_{it}, LRCGDP_{jt}, LRGDPPW_{it}, LRGDPPW_{jt}, DIST_{ijt}, LFCI_{jt} * TRADE_{ijt}, LM_{ijt\text{-}1}) \quad (20)$$

$$m(w) = W_i(LFCI_{jt}) \quad (21)$$

Accordingly, B*(z)* is a part of Equation 19 defined as the gravity model based on the parametric approach, and *m(w)* is the nonparametric part of the model that contains a set of proxies for the financial crises (banking and sovereign debt crises).

To measure both types of banking crises and debt crises, two market pressure indices have been used following Eichengreen et al. (1996). These two indices include the variables affecting the market pressure in each of the types of financial crises, including the banking crises and the sovereign debt crises, and each of them is obtained from the weighted average of the variables changes presented in Table 1[1]:

Table 1. The Measurement of Market Pressure Indices Caused by Financial Crises

Index	Developed by	Calculating each index
Banking market pressure ($BMPI_{jt}$)	Jing et al. (2015)	$BMPI_i = \frac{\Delta\gamma_t}{\sigma_{\gamma_t}} + \frac{\Delta r_t}{\sigma_{r_t}}$ $\Delta\gamma_t$: Changes in the ratio of the central bank reserve rate to total bank deposits σ_{γ_t} : the standard deviations of γ_t Δr_t : Short-term interest rate changes σ_{r_t} : the standard deviations of r_t
Debt market pressure ($DMPI_{jt}$)	Boonman, Jacobs and Kuper (2015)	$DMPI_i = \frac{\Delta x1_t}{\sigma_{x1_t}} + \frac{\Delta r_t}{\sigma_{r_t}} + \frac{\Delta x3_t}{\sigma_{x3_t}}$ $\Delta x1_t$: The ratio of debt changes to GDP σ_{x1_t} : the standard deviations of $x1_t$ Δr_t : Short-term interest rate changes σ_{r_t} : the standard deviations of r_t $\Delta x3_t$: Changes in the ratio of export to import rates σ_{x3_t} : the standard deviations of $x3_t$

Based on the assumptions and the relationship framework presented in Table 1, the changes in the central bank reserves to the total deposits of the banking network have been used in indexing the banking crisis. When there is high tension in the money market, this goes up for two reasons. One is to make additional reserves available to the banking network by the central bank, and the other is to respond quickly to the withdrawal of funds from banks by depositors. During this period, due to the increase in bank loans, the decrease in liquidity in the banking sector has increased, and the demand for reserves by banks to maintain liquidity has increased. Therefore, the central bank, as the sole monopoly supplier of bank

1. In this table, σ is the standard deviation of the variable.

reserves, can respond to the increase in demand for reserves. First, if bank reserves are the operational target of monetary policy, they keep the supply of total bank reserves stable and respond by raising short-term interest rates. Second, if the operational goal of monetary policy is short-term interest rates, then the central bank must inject additional reserves into the banking system through open market operations or through cheap lending, so the banking crisis can be sharpened by a sharp rise in short-term interest rates. The volume of central bank lending to the Incas, or a combination of these two factors, is determined (Von Hagen and Ho, 2007).

Empirical studies on sovereign debt suggest that the debt-to-GDP ratio is a strong indicator of sovereign defaults, especially in emerging economies (Manasse and Roubini, 2009; Furceri and Zdzienicki, 2012; Catão and Milesi-Ferretti, 2014; Reinhart and Rogoff (2010)) have stated that government debt increases as debt defaults and GDP shrink. Borensztein and Panizza (2009) observed that credit ratings and rising interest rates increase government debt. In addition, the current account is usually reversed at the time of debt, and the export-to-import ratio is used to index the governing debt crisis (Aguiar and Gopinath, 2006)

According to Table 1, these two indices ($BMPI_{jt}$ and $DMPI_{jt}$) are used separately in estimating Equation 19 as the proxies for the financial crises. The required data for this study from 1995 to 2017 on OECD countries and the Middle East have been obtained through the World Bank's[1] and the IMF[2], the UN Comtrade Database[3] and the United Nations, Department of Economic and Social Affairs[4].

The Empirical Results

The results of estimating the research model are presented in Tables 2 and 3, which in Table 2, the results of estimating the model using the banking crisis index, and in Table3, using the sovereign debt crisis index are presented. The results were obtained by the use of the random effects approach using SAS 9.4 software. Such findings are based on employing gravity variables to show the parametric part of the model as well as two different proxies of the financial crises (banking and the sovereign debt crises).

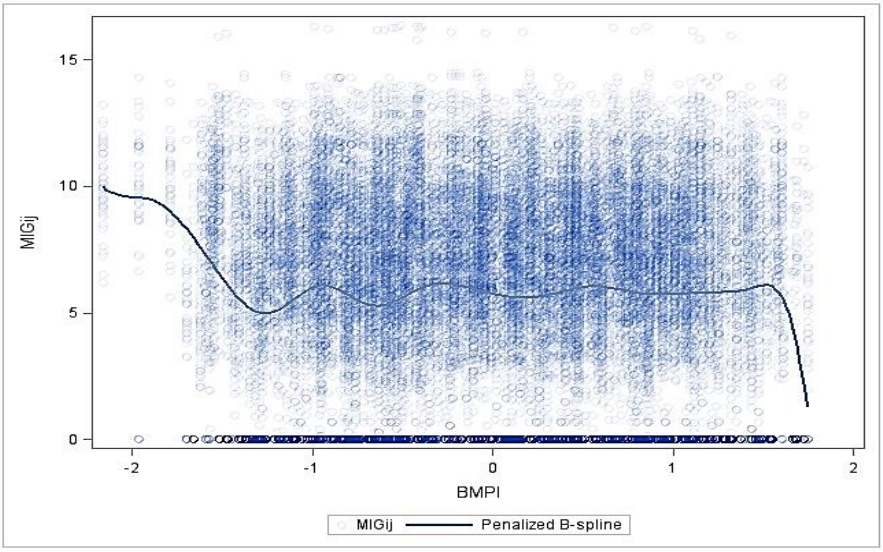
Table 2. Empirical the Results of the Semi-Parametric Gravity Model of Immigration Flows: The Effect of Banking Crisis (Model 1)

The Effect of Banking Crises Index of $BMPI_{jt}$

Variable	Coefficient value	Standard deviation	T-Statistic	Pr > |t|
Intercept	0.2433	0.05423	4.49	0.0001
$LTRADE_{ijt}$	-0.0039	0.0008	-4.81	0.0001
$area_{jt}$	-0.0634	0.00811	-7.82	0.0001
$area_{jt} * LTRADE_{ijt}$	0.00607	0.00135	4.49	0.0001
LGU_{it}	0.00195	0.01043	0.19	0.8516
LGU_{jt}	0.04472	0.01051	4.26	0.0001
$DIST_{ijt}$	-0.0127	0.00143	-8.85	0.0001
$LRGDPPW_{t}$	-0.0041	0.00647	-0.63	0.5287
$LRGDPPW_{jt}$	-0.0053	0.00699	-0.76	0.4487

1. https://data.worldbank.org/
2. http://data.imf.org
3. https://comtrade.un.org/
4. https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates19.asp

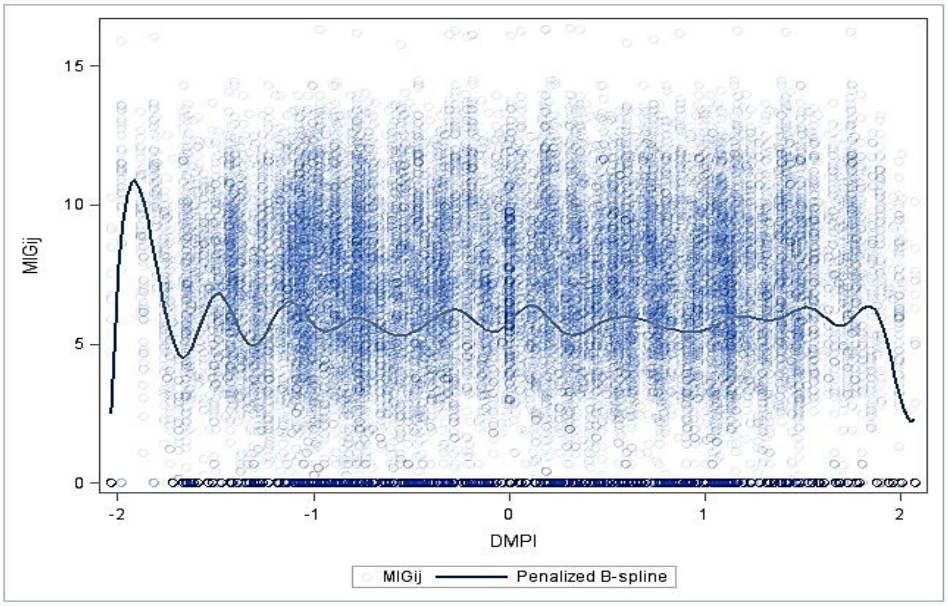
The Effect of Banking Crises Index of $BMPI_{jt}$				
Variable	**Coefficient value**	**Standard deviation**	**T-Statistic**	**Pr > |t|**
LGP_{it}	0.12	0.05803	2.07	.0386
LGP_{jt}	-0.2909	0.05981	-4.86	0.0001
$LRCGDP_{it}$	-0.0063	0.00524	-1.2	0.2289
$LRCGDP_{jt}$	0.00979	0.00566	1.73	0.0834
$LBMPI_{jt} * TRADE_{ijt}$	0.00135	0.00042	3.24	0.0012
$LM_{ijt\text{-}1}$	0.9972	0.00055	1809.9	0.0001
$LBMPI_{jt}$	-0.0138	0.00331	-4.16	0.0001



Source: Research finding.

Table 3. Empirical the Results of the Semi-Parametric Gravity Model of Immigration Flows: The Effect of Sovereign Debt Crises (Model 2)

The Effect of Sovereign Debt Crises Index of $DMPI_{jt}$				
Variable	**Coefficient value**	**Standard deviation**	**T-Statistic**	**Pr > |t|**
Intercept	0.2451	0.05421	-7.64	0.0001
$LTRADE_{ijt}$	-0.0037	0.0008	4.39	0.0001
$area_{jt}$	-0.062	0.00811	0.5	0.0001
$area_{jt} * LTRADE_{ijt}$	0.00594	0.00135	5.28	0.0001
LGU_{it}	0.0052	0.01045	-8.86	0.6186
LGU_{jt}	0.05723	0.01085	-0.64	0.0001
$DIST_{ijt}$	-0.0127	0.00143	-0.88	0.0001
$LRGDPPW_{it}$	-0.0041	0.00647	2.07	0.5238
$LRGDPPW_{jt}$	-0.0062	0.00699	-4.84	0.3775
LGP_{it}	0.1199	0.05802	-1.17	0.0388
LGP_{jt}	-0.2894	0.05981	1.83	0.0001
$LRCGDP_{it}$	-0.0061	0.00523	0.33	0.2409
$LRCGDP_{jt}$	0.01035	0.00566	1810.2	0.0672
$LDMPI_{jt} * TRADE_{ijt}$	0.00014	0.00042	-2.82	0.7378
$LM_{ijt\text{-}1}$	0.9972	0.00055	-7.64	0.0001
$LDMPI_{jt}$	-0.0086	0.00303	4.39	0.0048



Source: Research finding.

According to the results of Tables 2 and 3, bilateral trade ($LTRADE_{ijt}$) has had a statistically significant effect on immigration flows between countries under consideration at the 5% significance level. This indicates the substitution relationship between bilateral trade and bilateral immigration, confirming the results of Aguiar et al. (2007), Jut (2015), and Bruder (2004). In other words, more trade in country *i* with its trading partner *j* reduces the flow of labor force immigration from country *i* to country *j*. This indicates that by increasing trade and then increasing production, the level of employment and the level of labor force income raises, and the labor force in deciding between immigration and non-immigration chooses non-immigration. Also, the multiplicative effect of this variable on the virtual variable of the region ($area_{jt}$) has a positive and statistically significant impact on 95% confidence level on bilateral migration, which indicates that in the Middle East, there has been a complementary effect between bilateral trade and bilateral migration.

The unemployment growth variable in both country i (LGU_{it}) and country j (LGU_{jt}) has had a positive effect in both models, but this effect has been non-significant and significant at 95% confidence level, respectively. The first variable's sign of the effect is expected but not significant. While unemployment growth at the destination does not have the expected sign. The geographic distance variable ($DIST_{ijt}$) has had a significant negative effect on bilateral immigration of countries at 95% confidence level. The negative sign of this variable effect on immigration indicates the effect of immigration costs on the immigration rate, which is consistent with expectations. Productivity level in the source ($LRGDPPW_{jt}$) and origin country ($LRGDPPW_{it}$) has had a negative but non-significant effect at 95% confidence level. This result indicates that by increasing the labor force productivity and skill in the destination country, there is no demand for the unskilled labor force. In addition, population growth in the source country (LGP_{it}) and in the destination country (LGP_{jt}) has had a positive and negative significant effect, respectively, on bilateral immigration at 95% confidence level. This result is consistent with reality, and suggests that with increasing population in the source country and consequently decreasing employment opportunities and social welfare, especially in developing countries, individuals decide to immigrate to find job opportunities and enhance their quality of life. Increasing population in the destination country can also be

considered as an anti-pull factor for immigrants due to the priority of each country's citizen to the immigrants by the governments. In this case, citizens may consider immigrants as aliens to deprive them of their rights, and engage in discriminatory and restrictive treatment of immigrants.

The variable of the real wage of the labor force at source country ($LRCGDP_{it}$) and destination country ($LRCGDP_{jt}$) also has had a no significant and positive significant effect on bilateral immigration at 90% confidence level, respectively. As expected, rising wages in the destination country are a strong pull factor for the labor force and have a positive effect on their decision to emigrate. Finally, the variable of interruption of immigration or immigrant information network ($LM_{ijt\text{-}1}$) has a significant positive effect on the immigration flow, indicating the fact that increased immigration in previous years plays an important role in reducing indirect immigration costs for new immigrants through solving problems with basic housing, employment, etc.

The effect of bank crises and sovereign debt crises indices in both models in the parametric part of the model is negative and significant at 90% and 95% confidence levels. Their effect on the nonparametric part of the model is shown in the chart below each table. According to the results of both models, at some intervals, the financial crises (both banking crises and sovereign debt crises) have a positive effect on bilateral immigration. At some intervals, it has a negative effect on bilateral immigration, indicating the nonlinearity of its impact. At times when there is a financial crisis in the destination country, due to a negative attitude to the destination country and calculating the cost-benefit of immigration, the labor force may conclude that by immigration, they impose more costs to their life. Thus, they may give up immigration. However, if the source country is more affected by the crises than the destination country, the best decision for the labor force will be to immigrate. In fact, by the crises escalating, Even though pull factors in the destination have lost their effectiveness and even change to push, the push factors in the source are so significant that they stimulate immigration. In other words, the loss of job opportunities in a stagnant economy intensifies competition to occupy scarce jobs. Therefore, competitive threat theory suggests that the risk of competing with immigrants in a stagnant economy is likely to increase unfavorable attitudes toward immigrants, and this can lead to making stricter immigration policies (Kwak and Wallace, 2018). This is why the effect of this variable on immigration is nonlinear and nonparametric.

Conclusions and Recommendations

The purpose of this study was to analyze the effect of bilateral trade on bilateral immigration flow considering the role of crises for a selection of OECD countries and the Middle East over the period 1995–2017 using a semi-parametric gravity model. Whereas there are few studies on the effect of bilateral trade on bilateral immigration, most of which have investigated the reverse effects finding conflicting results, also regarding the fact that the effect of the financial crises on bilateral immigration has been studied by few external research only historically and empirically (not theoretically), the present paper attempted, as applied research, to study the effect of bilateral trade on immigration considering the financial crises in the form of a nonparametric gravity model. On the one hand, due to the multiple financial crises indices, the majority of which are virtual variables and the lack of a single index to measure financial crises, on the other hand, due to the many limitations of the parametric model and the high ability of the nonparametric model to reflect the economic effects, we have used the nonparametric model and a newly created index for the financial crisis in this model.

According to the empirical results, bilateral trade has a negative effect on bilateral immigration and suggests a substitution relationship between the two. In addition, the financial crises (both the banking crises and the sovereign debt crises) have had a nonparametric effect on bilateral immigration. Accordingly, in order to prevent the labor force—in particular the skilled labor force - to immigrate, countries can provide employment, develop trade, and reduce wage differentials. In addition, by recognizing domestic production opportunities commensurate with the country's competitive advantage, increasing production, and thus increasing international trade, the country can turn push factors of immigration into pull factors. At the same time, by increasing domestic product diversification, and in particular by reducing dependence on foreign exchange earnings (especially in countries such as Iran), countries, by preventing financial crises establish conditions of, can minimize their disadvantages, and avoid immigration of their labor force.

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