

DOI: 10.52547/jep.3.2.51

Free Trade and Inflation Nexus in Eight Precursor's Economy of East Asia

Azim Nazari¹, Farshid Pourshahabi², Majid Dashtban Faroji³, Zohreh Asadi⁴

ARTICLE INFO

Article history:

Date of submission: 08-12-2021

Date of acceptance: 06-07-2022

JEL Classification:

C23

E61

Keywords:

Free Trade

Inflation

Panel data

East Asia

ABSTRACT

In this study, we are surveyed the effect of trade liberalization on the inflation of eight precursor's economy of East Asia during 1990-2018. The main purpose of this research is to test the Romer (1993) Hypothesis for aforementioned countries. He says that there is a negative relationship between inflation and trade openness. For testing this subject, we are used the Britong (2000) unit root test for panel data and, the kao (1999) co-integration test for panel data. Notice to existence of nonstationary variables in the estimated model, we need to use the Kao (1999) co-integration test, and as a result of this test, there is a long run relationship between the variables of the model. The results show that the Romer (1993) hypothesis is confirmed for these countries and free trade reducing the inflation in these countries. Also, the effect of income per capita is negative but the liquidity volume coefficient shows the positive effect of this variable on inflation in these set of countries. In consequence, trade liberalization policy can suggest as a policy to declining inflation in these set of countries.

1. Introduction

In neoclassical growth patterns it is assumed that changes in exogenous technology are not affected by the trade policies of countries (Solow, 1957).

1. Assistant Professor of Economics, University of Bojnord, Bojnord, Iran.,
Email: Az.nazari61@gmail.com

2. Assistant Professor of Economics, University of Bojnord, Bojnord, Iran. (Corresponding Author),
Email: pourshahabi.f@gmail.com

3. Assistant Professor of Economics, University of Bojnord, Bojnord, Iran.
Email: majiddashtbanf@gmail.com

4. Ph.D. Student of Economics, Technology University of Sharif, Tehran, Iran.
Email: zohreh.asadi@gsm.sharif.edu

Recent changes in the growth patterns, which Lucas (1988) and Romer (1986) are pioneer, are technological changes in the pattern of growth as endogenous. People such as Grossman and Helpman (1991) and Romer (1992) in their studies state that technological change can be affected by the degree of economic openness of a country in the world. The effect of the degree of openness of a country's trade in world trade is that technology with the openness of an economy to the global economy should be technologically improved. Otherwise, they will not be able to compete with foreign products in terms of price and quality, and will be eliminated from the global market. Technological improvements can be made by domestic research and development (R&D), the digitization of technology from foreign-owned goods and the liberalization of foreign direct investment (FDI). Consequently, one can expect an open economy in the world to experience higher economic growth than a closed or supported economy. In a wide range of studies of recent decades, the degree of trade openness and its effects on different countries has been studied. Almost most of these studies have examined the effects of the degree of trade openness among different countries. One of the issues raised in this regard is the degree of openness of trade and the level of inflation, which is of prime importance in international trade. And it raises the question of whether openness is linked to lower prices. Or is the policy of encouraging and supporting domestic industries inflationary?.

In the applied literature, the easiest way to measure the degree of openness is equal to the ratio of tradeable goods to the actual production of each country. The criterion used to calculate the degree of openness of the economy is the ratio of total imports and exports to gross national product, the main advantage of which is the simplicity of its calculation and the availability of necessary data from different countries to calculate it in inter-country studies. The disadvantage of this indicator is that it is an imperfect representative for commercial policy, because in addition to the type of business policy chosen, other factors such as the area of the country, inventory of resources and inputs, the distance between countries and global

markets also affect the level of trade in a country and the amount of trade intensity index. For example, wider countries (due to large domestic markets) usually have a smaller commercial share than smaller ones. Also, the degree of openness of the economy based on capital account criteria is the ratio of capital outflows to gross national product. The more open the economy, the greater the benefits of trading and the better allocation of resources. There are many benefits to the degree of openness of the economy that can be mentioned: According to economic theories, free trade leads to the optimal distribution of factors of production and thereby maximizes growth. Also, in an open economy, since firms have access to wider markets, they will have the incentive and opportunity to apply innovations and inventions as well as to benefit from mass production. This will lead to an increase in investment and, consequently, an increase in the growth of gross domestic product and the welfare of the community. Increasing the degree of trade openness makes it possible for firms in one country to gain access to knowledge and technology of other countries and to exploit them in order to increase the productivity of production. Other advantages of the degree of openness of the economy can be pointed to improving the management status of countries, because in a state of open economy, country leaders will have to pursue more ambitious macroeconomic policies in order to boost domestic enterprises more and more competitive in global markets. As it increases the company's competitive power and lower costs and achieves higher technology, it can lead to a reduction in prices, which can attract and increase domestic investment and provide a framework for price adjustments.

The present study is structured in six sections: the second part deals with the literature and research background, the third part examines theoretical foundations, the fourth part to the methodology of research, the fifth part to the empirical results and the sixth section to conclude and policy.

2. Literature Review

Romer (1993) states that there is an inverse relationship between the degree of trade openness and inflation, which is explained by the effect of the degree of trade openness on the incentives of policy makers to pursue expanding policies. A different mechanism through which openness to trade may influence policy-maker incentives and inflation volatility outcomes is the slope of the output-inflation trade-off. Romer (1993) famously demonstrated that greater openness can reduce the trade-off (steepen the short-run Phillips curve) such that the incentive for surprise policy expansions is mitigated. According to this hypothesis, central banks have a smaller incentive to engineer surprise inflations in economies that are more open because the Phillips curve is steeper. He also states that developing countries with a higher degree of openness are less likely to develop a surprisingly monetary policy, and in such a situation, the inflation rate is reduced. The results of the study by Romer (1993) show that the central bank's lack of independence is related to the average inflation. He states that the relationship between the degree of openness of the economy and inflation in countries with higher central bank independence is stronger. Romer also said that inflation rates are higher in closed economies.

In the New-Keynesian framework, the sensitivity of domestic inflation to changes in domestic economic activity depends on two factors: the elasticity of inflation with regard to real marginal cost and the sensitivity of real marginal cost to changes in the output gap. The elasticity of inflation with regard to real marginal cost in turn depends on the frequency of price adjustment, which reflects the degree of nominal price rigidity, and on the responsiveness of firms' profit-maximizing price to changes in real marginal cost, which is determined by the degree of real price rigidity. Previous studies examining the effects of trade openness on the inflation–output trade-off based on structural macroeconomic models with staggered price setting focus either on the impact of trade integration on the sensitivity of marginal cost to the output gap (e.g. Pickering and Valle, 2012; Woodford, 2010).

Iyoha (1973) explores the relationship between the degree of trade openness and inflation in less developed countries for annual data and the five-year average of 1960s to 1964-1964. His study results suggest that there is a negative relationship between the degree of trade openness and inflation in this set of countries. He points out that, according to the results, increasing the degree of trade openness leads to an increase in capital accumulation by adjusting inflation and encouraging the accumulation of domestic capital.

Singh (1995) analyzes the success factors of the newly industrialized countries of the East Asian region. He believes that the factors affecting the rapid growth and development of these countries are: relatively high rates of investment and savings, the openness of the economy and the strategic integration of these economies in the international economy, the high growth of labor productivity, Adopt efficient industrial development policies, in particular the export expansion strategy, the establishment and expansion of a national technology system for the development of domestic technology capabilities, the existence of a relatively adequate infrastructural and institutional structure, and a fairly equitable distribution of income and wealth.

Hobday (1995) refers in his study to some of the important areas for the success of the newly industrialized East Asian countries, including macroeconomic policies and the strategies and strategies for industrial and technological development adopted in these countries. He believes that the adoption of the export expansion strategy in these countries has accelerated the acquisition and attraction of foreign technology, improving their productivity and competition in the international market.

Terra (1998) argues that the negative relationship between the degree of trade openness and inflation in the countries of the developing countries is the severity of the debt of Latin American countries. He argues that Romer's discussion of the negative relationship between the degree of openness of the economy and inflation is due to the debt crisis of the 1980s. he said that a country with a lower openness would lead to a devaluation of the real

currency, which would be accompanied by greater pressure on governments and, consequently, greater inflationary pressures. As a result, this reflects a negative relationship.

Batra (2001) states that tariffs are not at least the cause of inflation in the United States. He was argued that the difference between wages in the unskilled (agricultural) and skilled (non-agricultural) sectors plays a crucial role in explaining the negative relationship between tariffs and living costs. The huge difference in wages between these two sectors explains the positive relationship between the degree of openness of the economy and inflation.

Sachsida et al. (2003) tested the hypothesis of a negative relationship between the degree of openness of the economy and inflation for the countries of Africa, the North and the center of America, South America and Europe. The results of the study confirmed the negative relationship between the degree of openness of the economy and inflation. Also, the results indicate that this relationship is not specific to a set of countries for a specific time period. Therefore, in countries where the degree of openness of their economy is increasing, inflation has been reduced. Thus, in countries where the degree of openness has increased its economy, inflation has been reduced.

Kim and Blaadi (2005) also examined the relationship between openness and inflation in 62 countries. Their study indicates that there is a negative relationship between the degree of openness of the economy and inflation in developing countries. While the relationship is positive in developed countries, including the United States, Belgium and Ireland, it confirms the hypothesis that the relationship between inflation and openness is positive. They stated that the strong or weak independence of the central bank plays no significant role in explaining the negative or positive relationship between the degree of openness of the economy and inflation.

Jin (2006) seeks to answer the question that the degree of openness of the machine economy is driving the rate of growth and inflation? He did his

study for Japan and Korea. In both of these countries, open trade shocks have had a significant and negative impact on economic growth and inflation in these countries in the short term. However, its long-term effect on these variables has not been observed.

Mukhtar (2010) to testing the applicability of Romer's hypothesis for Pakistan during 1960–2007, have used multivariate cointegration and a vector error correction model. The empirical findings under the cointegration test show that there is a significant negative long-run relationship between inflation and trade openness, which confirms the Romer's hypothesis.

Jafari Samimi et al. (2011) provided evidence on the impact of openness on the inflation in Iran. They apply a bounds test approach to the level relationship within the autoregressive lag (ARDL) model. Their results showed that openness has a negative and significant effect on inflation in the short run but its effect in the long run is not significant.

Samimi et al. (2012) for the developed and developing countries during 1990–9 and 2000–9 have shown regarding the traditional measure of trade openness indicates a positive and significant association between trade openness and inflation which opposes the view of the Romer (1993) hypothesis. In contrast, the estimation results regarding a new economic globalization index (the KOF¹ index) suggest that higher economic globalization will decrease inflation.

Lin et al. (2017) estimated the effect of openness to international trade on inflation with panel data from Sub-Saharan Africa during the period 1985–2012. Employing instrumental variable techniques that correct for endogeneity bias of trade openness, the empirical evidence suggests that within-country variations in trade openness restrict inflation: a 1 percentage point increase in the ratio of trade over gross domestic product is associated with a decrease in inflation of approximately 0.08 percentage points per

1 . The KOF index of globalization was introduced in 2002 and is updated and described in detail in Dreher et al. (2008).

year. Also, Kwark, N., Lim, H., (2020), shows that free trade agreements have a significant negative effect on the Consumer Price Index inflation

Bowdler & Malik (2017) using a dynamic panel model that controls for the endogeneity of openness and the effects of both average inflation and the exchange rate regime, offer one explanation for the recent decline in inflation volatility observed in many countries. The relationship is shown to be strongest amongst developing and emerging market economies. Also their result argue that the mechanisms linking openness and inflation volatility are likely to be strongest amongst this group of countries. Also, Bowdler (2009) reports evidence of a negative openness effect on the trade-off, consistent with the original Romer hypothesis.

Lin et al. (2020) using an endogenous switching regression model to a sample of 64 countries, investigated whether the effect of trade openness on inflation is influenced by the adoption of inflation targeting. The outcome indicates that, while there exists a significant and negative impact of trade openness on inflation in the non- inflation targeting countries with flexible exchange rate system, the effect is negligible in the inflation targeting economies. In addition, the above differential inflation effect of trade openness across inflation targeting and non- inflation targeting regimes is only present in the developing subsample with flexible exchange rate system, but not the developed counterpart. Instead of inflation, further results show that trade openness lowers inflation volatility both in developing and developed countries not adopting inflation targeting, yet the impact is smaller in developed country group. However, no such statistically significant link is found in developing and developed countries that adopt inflation targeting.

Motaghi e al. (2021) investigated the relationship between trade openness and inflation in selected developed and developing countries during the period 1990-2017 using a Panel data approach for testing Romer's hypothesis of relationship between inflation index and Trade Openness. Their results show that the Romer hypothesis is rejected in both the selected

developed and developing countries. The results showed that the effect of trade openness on inflation rate was positive and significant in both groups. But the impact of trade openness on inflation has been greater in developing countries.

In turn, opponents (using the cost push hypothesis) argue that trade openness does not necessarily reduce inflation; rather it increases inflation. Evans (2007) argues that the positive effect of openness on inflation is driven by the fact that the monetary authority enjoys a degree of monopoly power in international markets. Cooke (2010) developed a two-country general equilibrium model in order to analyze the optimal rate of inflation under discretion. He documented a greater degree of openness may lead the policy maker to exploit the short-run Phillips curve more aggressively, even if it involves a smaller shortrun benefit. Then inflation can be higher in a more open economy. Also, Zakaria (2010) examined the relationship between trade openness and inflation in Pakistan using annual time-series data during 1947–2007. The empirical analysis showed that a positive relation holds between trade openness and inflation in Pakistan.

Cavelaars (2009) shows that the effect of increased openness on policy-maker incentives is more complicated. When openness is driven by reductions in technologically determined iceberg trade costs, greater policy discipline can arise. In contrast, rises in openness driven by decreases in import tariffs can undermine policy discipline. The reason is that declines in revenues from import tariffs (from the expenditure switching effect of currency depreciations) serve as a deterrent to monetary policy expansions. If greater openness is associated with the elimination of tariffs, this deterrent to discretionary policy interventions is weakened, such that the conduct of monetary policy is less disciplined and inflation volatility rises.

3. Data & Methodology

The countries used in this study are eight leading Asian economies (Indonesia, Thailand, China, Japan, the Philippines, South Korea, Malaysia

and Hong Kong), which have high commercial openness among Asian countries. The study period is from 1990 to 2018, and the source of data used in this study is World Bank Indicator (WDI). The reason for choosing the beginning of 1990 is the lack of data from some of the variables in the selected countries in the years before 1990. The existence of random processes can make it difficult to interpret econometric results, choose the method of estimation and validate predictions made by the model. Stuck and Watson, by modulating the least squares method, have proposed a method for estimating the relationship between variables with random trends, and they call it the Dynamic ordinary squares (DOLS).

The purpose of being dynamic is that in this method, the time pattern of the reaction of a dependent variable to changes in the independent variables has abnormal distribution, and therefore the calculated t statistic can be misleading (Stock and Watson, 1993). Kao and Chiang (2000) have shown using the Monte Carlo method that DOLS is a suitable method for correction of endogenous problem and self-correlation. The DOLS estimator also allows for the estimation of convergence vectors including collective variables with different coexistence ratios (Pedroni, 2004). In this study, the conventional model used by Romer (1993), Sachsida (2003) and Kim and Blaadi (2005) is used. The estimated model is:

$$\ln\pi_t = \alpha + \beta_1 \text{openness} + Z_t + e_t \quad (1)$$

In this case, t represents time. $\ln\pi$ is logarithm of GDP deflator. Proxy openness is the degree of commercial openness. In this equation, the Z represents a set of control variables that are included in the model for considering the variables determining the steady state of inflation. According to the study by Kim and Blundy (2005), the following model has been used in this study:

$$\ln p_{it} = C + \beta_1 \text{openness}_{it} + \beta_2 \ln M_{it} + \beta_3 \ln Y_{it} + \beta_4 r_{it} + e_{it} \quad (2)$$

Openness is the Proxy of degree of trade openness, which is calculated from: 1- the import ratio to gross domestic product, 2- the export ratio to gross domestic product and 3- the import plus export ratio to gross domestic

product. $\ln Y_{it}$ is logarithm of per capita income, $\ln M_{it}$ is logarithm of money supply and r_{it} is interest rate.

4. Empirical Results

The results of the root tests indicate that there are nonstationary variables in the model, so to ensure that the relationship between the variables is not false and also to ensure that the t, F statistics are correct and to test the existence, it is attempted to test the existence of a long-term relationship between the model variables using the Kao Coagulation Test. The root test of the unit used in this study is the root test of the panel unit provided by Breitung. The reason for using this method is that the recent study by Hlouskova and Wagner using the Monte Carlo simulation shows that the unit root test of the Breitung generally has high power for panel data and it has the smallest amount of deviation from each elementary unit root tests of the panel data

Table 1. The results of Breitung unit root test

Variables	Statistics t	Prob
$\ln \pi$	0.8	0.79
D($\ln \pi$)	-9.92	0.00*
TR	1.39	0.9
D(TR)	-9.29	0.00*
IM	0.25	0.6
D(IM)	-10.8	0.00*
EX	1.79	0.96
D(EX)	-8.4	0.00*
$\ln M$	5.2	1.00
D($\ln M$)	-1.9	0.03*
$\ln y$	2.6	0.99
D($\ln y$)	-4.5	0.00*
r	-3.35	0.0004*

* Reject the zero hypothesis at 95% confidence level

According to table (1), the results of the unit root test of the Britung (2000) indicate that the variables within the pattern have a unit root and are nonstationary. All variables are also matched with a differential load, and at 95% confidence level, they are integrated from first degree. Consequently, the long-term relationship between the variables must be ensured before the estimate. Therefore, the co-integration of variables has been tested using Kao's Co-integration test (1999), based on the Engle and Granger method.

Table 2. The results of Kao Co-integration test

H0: No co-integration	Statistics t	Prob
Model: Trade	-9.1	0.000*
Model: Export	-8.9	0.000*
Model: Import	-9.2	0.00*

* Reject the zero hypothesis at 95% confidence level

The results of the Kao Co-integration test presented in Table (2) show that the zero hypothesis of this test is based on the absence of a long-term relationship between the variables of the model rejected. As a result, a long-term relationship between the model variables is accepted and Models can be estimated.

Table 3. The results of model estimation using DOLS

Dependent variable: lnP	Model with Trade	Model with Export	Model with Import
openness	-0.0045 (-2.67)*	-0.009 *(-6.04)	-0.005 *(-2.03)
lnM	0.6 *(7.75)	0.52 *(14.14)	0.69 *(15.56)
lnY	-0.79 *(-4.9)	-0.63 *(-8.7)	-0.96 *(-10.50)
R	0.002 (0.86)	0.007 (1.68)	0.005 (1.23)
R-squared	0.99	0.99	0.99
Total observation	232	232	232

* Reject the zero hypothesis at 95% confidence level

The results of Table 3 show that there is an inverse relationship between inflation and the degree of trade openness in the eight East Asian economies using all three degrees of openness trading. This confirms the hypothesis of Romer (1993), which states that the relationship between the inflation level and the degree of trade openness is inversely proportional to the three degrees of trade openness and consistent with the results of Lin (1997) and Sachsida et al. (2003). It follows from the results that the policy of commercial liberalization, in addition to the effects on the economic growth of these countries, leads to an economic growth without inflation in this set of countries.

The coefficient of the logarithm of per capita income, which has been introduced to take into account the level of development of countries in the model, reflects the inverse relationship between economic growth and inflation in this set of countries and is consistent with Fisher's (1993) results. This coefficient corresponds to the theoretical expectations; as a result of the economic growth more than the growth of the population will lead to a reduction in the level of inflation in this set of countries.

Also, the money supply coefficient suggests that a 1% increase in money supply would lead to an increase of 0.6% at the price level of the countries. This sign is consistent with monetary theory, which states that money supply and prices are directly related. The rate of interest rate also indicates that interest rates in these countries did not have a significant effect on the level of prices.

5. Conclusion and Policy Implication

This study examines the relationship between the general level of prices and the degree of trade openness in the eight East Asian economies in the last two decades. To evaluate this relationship, three different variables have been used to calculate the degree of trade openness in three estimation models. These variables include: 1. Trade to GDP ratio 2. Export to GDP ratio 3. Import ratio to GDP. Based on all three estimation models, the same

results have been obtained using the combination data technique. The results of the estimated panel pattern for the eight countries studied show that the hypothesis presented by Romer (1993 and 1998) is accepted in this set of countries. Therefore, there is an inverse relationship between inflation and the degree of openness in this set of countries. These countries seem to be able to pursue a policy of Commercial liberalization for growth without inflation. Also, the results of the estimated pattern have confirmed the negative effect of per capita income on inflation in the above countries, indicating that GDP growth above population growth could reduce the general level of prices in these countries. in the following, the direct relationship between money supply and price level is also confirmed. As a result, a Quantity Theory of Money is accepted into this set of countries, which shows a direct relationship between money supply and the general level of prices. Also, there is no significant relationship between inflation and interest rates in the studied countries

References

- Batra, R. (2001). Are tariffs inflationary?. *Review of International Economics*, 9(3), 373-382.
- Bowdler, C., & Malik, A. (2017). Openness and inflation volatility: Panel data evidence. *The North American Journal of Economics and Finance*, 41: 57-69.
- Cavelaars, P. (2009). Does globalisation discipline monetary policymakers?. *Journal of International Money and Finance*, 28(3): 392-405.
- Cooke, D. (2010). Openness and inflation. *Journal of Money, Credit and Banking*, 42(2-3): 267-287.
- Evans, R. W. (2007). Is openness inflationary? Imperfect competition and monetary market power. *Globalization and Monetary Policy Institute, Federal Reserve Bank of Dallas, GMPI Working Paper*, (1).

- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of monetary economics*, 32(3), 485-512.
- Grossman, G. M., & Helpman, E. (1993). *Innovation and growth in the global economy*. MIT press.
- Hobday, M. (1995). Innovation in East Asia. *Books*.
- Iyoha, M. A. (1973). Inflation and "Openness" in Less Developed Economies: A Cross-County Analysis. *Economic Development and Cultural Change*, 22(1): 31.
- Jafari Samimi, A., Ghaderi, S., & Sanginabadi, B. (2011). Openness and inflation in Iran.
- Jin, J. C. (2006). Can openness be an engine of sustained high growth rates and inflation?: Evidence from Japan and Korea. *International Review of Economics & Finance*, 15(2): 228-240.
- Kao, C., & Chiang, M. H. (2001). On the estimation and inference of a cointegrated regression in panel data. In *Nonstationary panels, panel cointegration, and dynamic panels*. Emerald Group Publishing Limited.
- Kao, C., & Chiang, M. H. (2001). On the estimation and inference of a cointegrated regression in panel data. In *Nonstationary panels, panel cointegration, and dynamic panels*. Emerald Group Publishing Limited.
- Kao, C. & Chiang, M. H. (2000). On the estimation and inference of a cointegrated regression in panel data, *Advances in Econometrics*, 15: 179-222.
- Kwark, N. S., & Lim, H. (2020). Have the free trade agreements reduced inflation rates?. *Economics Letters*, 189: 109054.
- Kim, M., & Beladi, H. (2005). Is free trade deflationary?. *Economics Letters*, 89(3), 343-349.
- Lane, P. R. (1997). Inflation in open economies. *Journal of international Economics*, 42(3-4): 327-347.
- Lin, F., Mei, D., Wang, H., & Yao, X. (2017). Romer was right on openness and inflation: Evidence from Sub-Saharan Africa. *Journal of applied economics*, 20(1): 121-140.

- Lin, P. C., Huang, H. C., & Liu, X. (2020). Openness-inflation Nexus in alternative monetary regimes. *Studies in Nonlinear Dynamics & Econometrics*.
- Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22(1): 3-42.
- Motaghi, S., Saifi, A., & Ebrahimi, S. (2021). The Relationship between Trade Openness and Inflation in Selected Developing and Developing Countries.
- Mukhtar, T. (2010). Does Trade Openness Reduce Inflation? Empirical Evidence from Pakistan. *Lahore Journal of Economics*, 15(2): 35-50.
- Pedroni, P. (2004). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric theory*, 20(3): 597-625.
- Pickering, A., & Valle, H. A. (2012). Openness, imported commodities and the sacrifice ratio. *The BE Journal of Macroeconomics*, 12(1): 1-26.
- Romer, D. (1993). Openness and inflation: theory and evidence. *The quarterly journal of economics*, 108(4): 869-903.
- Romer, D. (1998). A new assessment of openness and inflation: reply. *The Quarterly Journal of Economics*, 113(2): 649-652.
- Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, 94(5): 1002-1037.
- Romer, P. M. (1992). Two strategies for economic development: using ideas and producing ideas. *The World Bank Economic Review*, 6(1): 63-91.
- Sachsida, A., Carneiro, F. G., & Loureiro, P. R. (2003). Does greater trade openness reduce inflation? Further evidence using panel data techniques. *Economics Letters*, 81(3): 315-319.
- Samimi, A. J., Ghaderi, S., Hosseinzadeh, R., & Nademi, Y. (2012). Openness and inflation: New empirical panel data evidence. *Economics Letters*, 117(3): 573-577.
- Singh, A. (1995). The causes of fast economic growth in East Asia. *UNCTAD Review*, 91-127.

- Solow, R. M. (1957). Technical change and the aggregate production function. *The review of Economics and Statistics*, 39 (3): 312-320.
- Stock, J. H., & Watson, M. W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica: journal of the Econometric Society*, 61 (4): 783-820.
- Terra, C. T. (1998). Openness and inflation: a new assessment. *The Quarterly Journal of Economics*, 113(2): 641-648.
- Woodford, M. (2007). Globalization and monetary control.
- Zakaria, M. (2010). Openness and inflation: evidence from time series data. *Doğuş Üniversitesi Dergisi*, 11(2): 313-322.