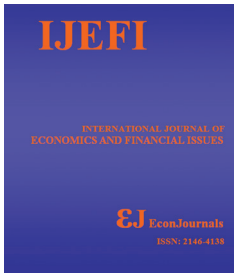

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Relationship Between Domestic Production in Agricultural and Industrial Sectors and Purchasing Power by Controlling for International Trade Variables (Iran)

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ABSTRACT

Foreign trade is one of the important subjects in any economy. Due to the close relationship between economy, technology, culture, and governance, business has a significant effect on economies. This study analyses the relationship between domestic production and purchasing power which is proxied by inflation rate by considering certain indexes of intranational trade. Our targeted country is Iran and data are between 1973 and 2013. Because of limited access to data our sample size was small which motivate us to use auto-regressive distributed lag (ARDL) technique that is appropriate for the small sample size analysis. The estimated coefficient of gross domestic product, value-added agriculture and industry were negative and significant. Therefore, it was claimed that there is a negative and significant relationship between domestic production and purchasing power which is proxied by inflation rate by controlling for certain variables of international trade.

Keywords: International Trade, Inflation Rate, Purchasing Power
JEL Classifications: E31, F40

1. INTRODUCTION

These days, international trade is one of the most important economic activities in most developing countries. Recent experience has shown that only those countries with a certain long-term plan regarding their socio-economic goals can succeed in this action. It means, remaining in competitive market plays an important role for improving trades and achieving long term relationship is essential (Khorasani, 2014). Countries that could adopt suitable policies for foreign trade have prevented different crises such as the crisis in the balance of payments and used their resources for development goals. Identifying import and export policies are critical for experiencing successful international trade policy.

Theories of growth based on international trade stress that international trade influences economic growth by improving the allocation of resources, providing better technology and intermediate goods, using economies of scale in production, increasing domestic competition and improving total factor productivity (TFP). Moradi and Mahdizadeh (2005) simultaneous consideration of import and export is necessary for examining growth process. There is a vast body of literature that analyses the correlation between international trade, import and export and their influences in countries who are engaged in trade. According to the hypothesis presented by Porter (1996), the degree of competition in domestic markets is positively related to performance in international markets. Farhadi (2005) argued that import can affect domestic economic prosperity through more competition in both quality and price of goods. In Iran's international trade sector, import plays crucial roles especially in the prosperity of industrial sector. However, excessive imports of final goods instead of intermediate goods and capital can hurt the domestic economy and reduce production. Due to economic sanctions against Iran in recent years, import inflation is an ominous phenomenon which Iran's economy is experiencing which leads to loss of competitive advantage in the industrial sector. Hence, the role of import management policies has been highlighted in controlling inflation and supporting production. Thus, this study tests whether domestic production in agricultural and industrial sector in Iran has any correlation with purchasing power by controlling for international trade variables.

Since mentioned factors have a significant effect on the economy, real exchange rate plays an important role both theoretically and practically. There are different definitions for real exchange rate, which in most cases can be classified into three basic groups. The first group is related to single price law; the second group is closely related with purchasing power parity and the third group is associated with the difference in exchange and non-exchange goods. Although these definitions are consistent in some cases, different results are observed in most cases (Yavari, 2011).

On the other hand, exports in developing countries serve as a production input; thus, capital and intermediate goods formed the major share of imports in these countries. Moreover, these imports are financed by export revenues. Instability of export revenues causes problems in imports and influences economic growth. Instability in export prices causes inflation at a time when prices are sticky downwards. Because there is a positive correlation between instability of export revenues and budget deficit, increased volatility of export revenues exacerbated budget deficit. This problem is more severe in those countries which are dependent on export revenues of natural resources such as oil because the crude oil price is highly volatile and being strongly dependendent on foreign exchange revenues of natural resources such as crude oil or gas. Furthermore, this has a negative effect on the economic performance of countries (Yavari, 2012).

2. THEORETICAL FRAMEWORK

The existence of an efficient monetary, fiscal decision-making institutions and also an effective monitoring system which influence economic relations are vital for countries to experience a sustainable and growing gross domestic product (GDP). Dargahi (2004) argued that existence of powerful institutions to protect property rights and enforcement of contracts can be considered as the most important factor for expanding and increasing the efficiency of investments and also providing proper supports for a different factor of productions (labor and capital). It should be mentioned that macroeconomic indicators such as GDP growth rate, inflation rate, unemployment rate, export and balance of payment, are the most reliable and applicable indexes which help the government to evaluate past performances and predict future trends. Moreover, by considering the information which these indexes deliver, government try to reach their economic goals such as full employment, inflation control, fair distribution of income and increasing the total welfare of the society. Controlling inflation in order to prevent the harmful effects of it, such as redistribution of income in favour of capital owners and at the expense of workers, more economic instability, reduction in the long-term investment rate (Komeyjani, 2006) is a fiscal and monetary policy priority for each government.

Changes in different political, economic and social conditions such as fluctuation in oil prices, more political tensions in the region, and new economic policies such as targeted subsidies have provided new opportunities for economic activities. Considering the role of liquidity management in preventing harmful effects of import inflation on international trade, following hypothesises can be raised:

Hypothesis 1: There is a significant relationship between domestic production and purchasing power by controlling for international trade variables.

Although there is a general agreement among economists for a single and unique definition of inflation, there appears to not exist an agreement on its main causes. The basic definition of inflation is a sustained increase in the general price level. This phenomenon can come from both the demand and supply side of an economy. By reviewing available literature three different categories can be introduced as the main reasons for inflation:

1. Cost-push inflation: Cost-push inflation happens when the price level is pushed up by a rise in the cost of production like increasing the price of raw materials.
2. Demand- pull inflation: Demand pull inflation happens when the price is increased by an excess demand for certain products in the goods market.
3. Monetary inflation: Monetary inflation is a form of demand-pull inflation.

According to some economists, weakness in agriculture and foreign trade are the main source of inflation. Therefore, the following hypotheses can be raised:

Hypothesis 2: There is a significant relationship between domestic production in agricultural sector and purchasing power by controlling for international trade variables.

Hypothesis 3: There is a significant relationship between domestic production in industrial sector and purchasing power by controlling for international trade variables.

Hence, international trade has become more important to the modern economy; the principles related to its effect on production growth originated with the classical school. According to this school of thought, positive trade balance results in economic prosperity and growth. Neoclassical theory was the next presented theory in favour of positive effect of trade on economic growth (Tahmasb et al., 2014). According to Smith's (1817) concept of "absolute advantage," it was impossible for all the nations to become reach at the same time without engaging in international trade which is against the mercantilist ideas. He argued that the export of one nation is the import of the other nation and all the nations would gain at the same time if they participate in free trade and specialized in accordance with their absolute advantage. Developing from the theory of "absolute advantage," following Ricardo's theory of "comparative advantage," countries engage in international trade, even one country is more competitive in (Ricardo,1821). In fact, these two theories argued that benefits of foreign trade of a country do not cause loss to another country (in contrast to mercantilism) and both parties who are engaged in free trade can benefit from this new deal. Overall, they believed that expansion of foreign trade increased labor, capital, and productivity and improved efficiency of capital and labor, and finally contributed to the development of domestic product market (Azarbayjani et al., 2013).

Assuming identical production technologies and perfect competition in commodity and factor markets for both countries

engaging in the foreign trade, the Heckscher-Ohlin theory relies on the difference in resource endowments as the most important determinants of foreign trade. The Heckscher-Ohlin theorem claims that a country will export goods that are produced by a relatively abundant and inexpensive factor and will import goods which are produced by a relatively scarce and expensive factor. Based on this theory, some countries have a large population which equipped them with large labor resources, while the other countries have a large amount of capital but less labor resources. A country with a large labor source will be able to produce those commodities at a lower cost that involve the labor intensive mode of production. A country with a large source of capital will be able to produce those goods at a lower cost that involve the capital-intensive mode of production. After the trade, both parties will have both types of commodities at the lower cost. Factor price equalization which is, in fact, a corollary of the Heckscher-Ohlin theorem claims that foreign trade will reduce the difference in relative and absolute prices of the factor existed before the trade between countries (Appleyard et al., 1998).

The relationship between economic openness and foreign development is challenging. Some economists, such as (Baltagi et al., 2007;Greenway et al., 1994) assert that economic openness (financial and commercial) leads to better performance of macroeconomic factors and faster economic development. Many theoretical frameworks support this idea. Moreover, international institutions such as the World Bank and the International Monetary Fund suggest that liberalization of trade and foreign investment positively influence economic development and competitiveness of the industry (Greenaway et al., 2002).

Another discussion regarding economic openness is that foreign development not only improves national income but also increases investments. This will accelerate the accumulation of wealth and thus faster economic growth. Moreover, more open economy creates a situation for more effective movement of factors of production and thereby achieves an optimal combination of labor and capital based on comparative advantage.

Foreign direct investment plays a decisive role in financing mega-projects or knowledge-based projects in each country. International transfer of capital, transfer of technology and management skills to developing countries are known as advantages of foreign direct investment which can lead to increase in production, a higher growth rate of national income and finally more rapid economic development. According to Baltagi et al. (2008), the degree of economic openness matter. He argued that more dynamic economies increase economic interactions of a country that helps it to take advantage of technology acquired from the other countries, motivate domestic investments and also increase the rate of wealth accumulation by increasing productivity, which finally leads to financial development. Moreover, international trade is an important tool for transferring technology. Thus, trade expansion enables oil-dependent countries to achieve greater productivity in other non-oil sectors. There are many factors which expand international trade and consequently provide technology transfer. First, international trade opens the borders of the country and create a proper environment to communicate and share new ideas and technical knowledge. Second, more flexible policies regarding international trade increase the access of domestic producers to raw material or even intermediaries goods by supporting import of capital goods and consequently help assembly industry in the country to grow faster. Both mechanisms propose that transfer of technology and increase TFP in a specific sector strongly depend on foreign trade in goods and engineering services within the same sector, such as industry or the agricultural sector.

There is another possibility as well. According to Azarbayjani et al. (2013) foreign trade in one sector could increases productivity in another sector through output-input relationship.

However, an important subject in business and macroeconomic policies is liquidity. If total demand for foreign currency for covering the cost of international trade in a country exceeds its total foreign currency revenues from its international deals, then exchange rate must be changed to balance total foreign currency demand and supply. If modification or variation of exchange rates is not allowed, commercial banks have to borrow from the central bank. In this case, the central bank acts as the final lender and solves this problem; thus, foreign exchange reserves are reduced, resulting in a deficit in the balance of payments. On the other hand, excess supply of foreign currency leads to expand the size of foreign exchange reserves which is the same as surplus in the balance of payments. Tahmasb et al. (2014) Therefore, any change in real exchange rate leads to fluctuations in the short-term capital flow which consequently influences foreign assets of the Central Bank. Any variation in net foreign assets causes a change in domestic currency and affect the other side of the balance sheet, i.e. debts. Thus, variation in currency leads to control of fluctuations in liquidity through resources of the central bank and achieving its ultimate goal, i.e. stabilization of currency (Tahmasb et al., 2014).

3. LITERATURE REVIEW

Many studies have been emphasizing the important role of international trade on economic growth. Several influential studies like Greenaway and Winters (1994), Winters (2004), Wagner (2007) Giles and Williams (2000), and Singh et al. (2010) have reviewed the macroeconomic and microeconomic facts on the relationship between international trade and economic growth, and reinforced the theoretically mixed and time inconsistent support for the gains from trade. Some of the available studies support the important role of export-led hypothesis. In contrast, the others highlight the important role of the import-led hypothesis. The direction of the relationship between economic growth and foreign trade is not clear (Balaguer and Cantavella-Jorda, 2002). By reviewing more than 150 scientific papers, Giles and Williams (2000) argued that there is no clear agreement to whether the causality dictates export led-growth or growth-led exports. According to Wernerheim (2000), a bidirectional causality between economic growth and export is possible. Dritsaki et al. (2004) analysis of the Greece economy showed a bidirectional causality between real GDP and real export. Study of Turkey's economy by Alici and Ucal (2003) showed only unidirectional causality from export to output. Cuadros et al. (2004) studied Mexico, Brazil,

and Argentina at the same time and realized that while Mexico and Argentina show unidirectional causalities from real export to real GDP, Brazil shows unidirectional causality from real GDP to real exports.

Different studies, such as Bahmani-Oskooee (1993), Chow (1987), Marin (1992), Wei (1996), have argued that international trade is crucial for economic growth for different countries. Dollar (1992), Frankel and Romer (1999), and Dollar and Kaaray (2001) argued that trade openness creates economic growth. According to Proudman and Redding (1998), international trade uses two different channels for influencing economic growth. The first one is about its effect on the rate of innovation and the second one is about its effect on the adoption rate of technologies from more advanced countries which leads to a higher TFP growth rate. Using panel data of 57 countries during 1979-1989, Alesina and Wacziarg (1998) argued that trade openness has a significant positive effect on economic growth.

Soderbom and Teal (2003) studied the effect of foreign trade and human capital on economic growth for 93 developed and developing countries over the period 1970-2000. Using panel data regression, they developed a model involving real economic growth as dependent variable and sum of exports and imports of those countries as a percentage of GDP as independent variables. Their results showed that increased exports had a positive and significant effect on economic growth; thus, this conclude that increased foreign trade leads to more productivity and economic growth of countries. While Frankel and Romer (1996) argued that trade openness has a large and significant positive impact on income, Beck (2002) argued that both financial development and international trade are considered as macroeconomic indexes which show a high correlation with economic growth in different countries. According to a model presented by Kletzer and Bardhan (1987), financial sector development gives countries a comparative advantage in those sectors which depend more on external financing. According to Çiftçioğlu and Almasifard (2015), the nature of the results are (in general) mixed and contradictory suggesting that the macroeconomic effects of financial development can vary across countries and the sample period chosen Almasifard and Saeeidi (2017).

Miller and Upadhyay (2000) studied outcomes of economic openness, trade policies and human capital on TFP using panel data for a sample of developed and developing countries. The results suggest that the degree of economic openness has a significant and positive impact on TFP. They explained that the goods produced in countries with high economic openness are supplied in the totally competitive market; under these circumstances, only extremely efficient products which use the optimal combination of product factors can be purchased in the market. Moreover, the effect of human capital on productivity is associated with economic openness in low-income countries. As they explained, this effect is negative for poor countries with low economic openness and positive for poor countries with the more open economy. They argued that economic openness in a country provides the opportunity for foreign investors to invest into that country. This leads to a more efficient combination of capital and trained labor force for increasing the productivity of the country by assistant gain from the new technologies.

In the other study Isaksson (2002) concluded the mutual effect of human capital and foreign trade on economic growth of 23 developing countries during 1960-1994. Soderbom and Teal (2003) also used panel data regression based on real economic growth as a dependent variable and sum of exports and imports in the discussed countries as a percentage of GDP and variables representing the quantity of human force as independent variables. Their results showed that there is a positive and significant correlation between human capital and economic growth. However, the effectiveness of international trade on economic growth of these countries is influenced by available human capital. He argued that one possible reason for the dependence of international trade's effect on available human capital is an essential prerequisite for an efficient combination of production factors. By studying the service regulations and growth in the Organisation for Economic Co-Operation and Development (OECD) countries, Barone and Cingano (2011) determined whether OECD countries with less anti-competitive regulations have higher performance in manufacturing industries. Using the panel data model, they evaluated the effect of legislation on import and export on economic growth of selected countries. Their study explained how regulations relating to the supply of services influence economic performance of downstream manufacturing industries. Similarly, fewer regulations have a positive effect on value added, productivity and export growth rate. An important reason which can be presented for explaining the effect of regulations on foreign trade is about the quality of regulations and holistic approach to filling the legal gaps. According to their explanation, restricting tariff regulations will reduce the competitiveness of different industries and as a result, less productivity and export can be observed.

Ahmed et al. (2014) used panel data regression to study paradox of export growth and weak governance; they found that stable economy and the government which is committed to not interfere in export processes can lead to strong export performance. They claimed that four main factors increase or decrease competitive advantage of a country: Economic resources and basic factors of production, demand conditions, related and supporting industries and type of strategy, where domestic companies compete. For example, they argue that foreign investor feels secure and motivated to invest more in a country under stable and reliable legislation and also the arrival of more capital goods will increase the level of technology in the country.

Gani and Prasad (2006) studied institutional quality and trade in Pacific island countries over the period 1990-2004 and evaluated the effect of determinants of exports, imports and total trade using the equations adjusted and focusing on institutional factors, such as government effectiveness, rule of law, quality of law and control of corruption, their findings suggest that improvement in the quality of institutional factors is very important to expand trade. The results show that while the increased value of money does not significantly harm exports, the progress in technology is considered as important factors for business development.

4. METHOD AND PROCEDURE

For testing the presented hypotheses in the previous section, we use auto-regressive distributed lag (ARDL) technique. Our targeted country is Iran and our time-series data cover the period 1973-2013. Data are derived from various resources such as Dataset of Central Bank, Statistical Center of Iran and dataset of the World Bank. To test the first hypothesis, Model (1) was developed as follows:

$$INF_t = \alpha_1 GDP_t + \alpha_2 PIM_t + \alpha_3 EXCH_t + \alpha_4 M_t + \alpha_5 INF(-1) + \alpha_6 INF(-2) + \alpha_7 GDP(-1) + \alpha_8 GDP(-2) + \alpha_9 GDP(-3) + \alpha_{10} GDP(-4) + \alpha_{11} PIM(-1) + \alpha_{12} PIM(-2) + \alpha_{13} PIM(-3) + \alpha_{14} \varepsilon_t \quad (1)$$

To test the second hypothesis, Model (2) was used:

$$INF_t = \alpha_1 AP_t + \alpha_2 PIM_t + \alpha_3 EXCH_t + \alpha_4 M_t + \alpha_5 INF(-1) + \alpha_6 INF(-2) + \alpha_7 AP(-1) + \alpha_8 AP(-2) + \alpha_9 AP(-3) + \alpha_{10} AP(-4) + \alpha_{11} PIM(-1) + \alpha_{12} PIM(-2) + \alpha_{13} PIM(-3) + \alpha_{14} \varepsilon_t \quad (2)$$

To test the third hypothesis, Model (3) was used:

$$INF_t = \alpha_1 IP_t + \alpha_2 PIM_t + \alpha_3 EXCH_t + \alpha_4 M_t + \alpha_5 INF(-1) + \alpha_6 INF(-2) + \alpha_7 IP(-1) + \alpha_8 IP(-2) + \alpha_9 IP(-3) + \alpha_{10} IP(-4) + \alpha_{11} PIM(-1) + \alpha_{12} PIM(-2) + \alpha_{13} PIM(-3) + \alpha_{14} \varepsilon_t \quad (3)$$

Where,

INF_t is inflation rate;
GDP_t is GDP growth rate;
PIM_t is growth rate of price of imported goods;
$EXCH_t$ is exchange rate;
AP_t is agricultural production growth rate;
IP_t is industrial production growth rate;
M_t is liquidity growth rate;
$INF(-1)$ is 1 year lag value for inflation rate;
$INF(-2)$ is 2 year lag value for inflation rate;
$GDP(-1)$ is 1 year lag value of GDP growth rate;
$GDP(-2)$ is 2 year lag value of GDP growth rate;
$GDP(-3)$ is 3 year lag value of GDP growth rate;
$GDP(-4)$ is 4 year lag value of GDP growth rate;
$AP(-1)$ is 1 year lag value of agricultural production growth rate;
$AP(-2)$ is 2 year lag value of agricultural production growth rate;
$AP(-3)$ is 3 year lag value of agricultural production growth rate;
$AP(-4)$ is 4 year lag value of agricultural production growth rate;
$PIM(-1)$ is 1 year lag value of industrial production growth rate;
$PIM(-2)$ is 2 year lag value of industrial production growth rate;
$PIM(-3)$ is 3 year lag value of industrial production growth rate;
$PIM(-4)$ is 4 year lag value of industrial production growth rate.

5. DATA ANALYSIS

One of the criteria required for regression estimation is stationarity of time series. According to Johanson (1998) and Pesaran-Shin (1995), if all variables are stationary at zero or one and at least one co-integration vector can be found between them, then least-squares techniques can be used in advanced methods such as ARDL. Therefore, Table 1 shows stationarity of variables.

As shown in Table 1, all variables are stationary at zero or one. Therefore, least square analysis can be used for ARDL if at least one co-integration vector is found between them. Results of the co-integration test are shown in Table 2.

5.1. Numbers Indicate Probability for Rejecting Null Hypothesis (Critical Value = 0.05)

As shown in Table 2, Johansen co-integration test supported the assumption related to the existence of at most three equations and rejected the assumption related to the existence of no equation. Therefore, it could be ensured that there is at least one co-integration equation. As noted earlier, this result is important because it can be used to decide whether least squares technique can be used in ARDL estimation.

The model was estimated by ARDL. Moreover, this study used Pesaran-Shin (1995) technique to estimate ARDL; for this purpose, a maximum number of lags of variables was selected. Since governments are replaced every 4 years, a maximum number of lags was set at 4. This estimation was used because data size was smaller than 100 observations; this estimation is more efficient than Engle and Granger (1987) technique. Unlike Johansen-Juselius (1990) technique, the degree of co-integration is not important in this technique. Therefore, it is not required to determine co-integration of variables by using Dickey-Fuller test and Phillips-Perron test and existence of

Table 1: Stationarity of variables

Variable	Unit root test	T-value (P-value)	Result
INF	Levin, Lin and Chu t	−3.212846 (0.0269)	I(0) - stationary
GDP	Levin, Lin and Chu t	−4.357626 (0.0018)	I(0) - stationary
AP	Levin, Lin and Chu t	−4.357626 (0.0018)	I(0) - stationary
IP	Levin, Lin and Chu t	−4.357626 (0.0018)	I(0) - stationary
PIM	Levin, Lin and Chu t	−4.682251 (0.0005)	I(0) - stationary
EXCH	Levin, Lin and Chu t	−6.082298 (0.0000)	I(0) - stationary
M	Levin, Lin and Chu t	−11.10551 (0.0000)	I(0) - stationary

Table 2: Co-integration test results

Value of co-integration equations found	Johansen co-integration test for variables
	P-value
There is no equation	76.97277 0.0000
There is at most one equation	54.07904 0.0006
There is at most two equations	35.19275 0.0388
There is at most three equations	20.26184 0.1393
There is at most four equations	9.164506 0.2834

at least a co-integration vector is enough. Once models are estimated by Microfit software, the software reports the optimal state among available states based on AIC, SBC, and HQC criteria. According to Persaran-Shin, if stationarity exists at zero or one and at least one co-integration vector is found, the best model can be selected among three criteria noted above based on convergence and coefficient of determination (Pesaran-Shin, 1995).

An important fact regarding the convergence of ARDL model is that when dynamic relations of variables are reported based on their lags, the dynamic model will approach long-term equilibrium model if the sum of coefficients of the lagged variables related to dependent variable is smaller than one (Pesaran-Shin, 1995).

6. RESULTS

6.1. First Hypothesis

First hypothesis assumes that there is a significant relationship between domestic production and purchasing power by controlling for international trade variables. Accordingly, Table 3 lists the results of dynamic model (1) estimated by ARDL with at most 4 lags.

As shown in Table 3, sum of coefficients of the lagged variables related to dependent variable is smaller than one; therefore, the above dynamic model converges to long-term model. It is noteworthy that the above dynamic model has no problem with Durbin-Watson statistic and regression F-value test. Therefore, other tests including disturbing term non-correlation test, disturbing term normality test and non-heteroskedasticity test can be used to evaluate precision of estimation. In all tests, null hypothesis was accepted. Therefore, the estimated regression has no problem in these tests and it is reliable. Table 4 lists results of Microfit calculations for these tests.

Table 3: Results of estimating Model (1)

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	**Coefficient**	**T-ratio**	**P**
INF(−1)	0.84684	6.0799	0.000
INF(−2)	−0.84240	−4.7599	0.000
GDP	−0.14396	−3.0193	0.006
GDP(−1)	0.10319	1.1363	0.268
GDP(−2)	−0.27137	−3.2081	0.004
GDP(−3)	0.23894	3.7181	0.001
GDP(−4)	−0.25956	−4.3585	0.000
PIM	0.14166	1.956	0.063
PIM(-1)	0.11185	1.8937	0.071
PIM(-2)	−0.2049	−3.2264	0.004
PIM(-3)	0.11577	1.9821	0.06
EXCH	0.052421	2.9389	0.007
M	−0.04008	−0.28828	0.776
X^2	0.80033		
Durbin-Watson	2.0845		
F-value (P)	7.6827 (0.000)		

ARDL: Auto-regressive distributed lag

Once ARDL dynamic model is estimated, long-term coefficients of the model can be estimated, as shown in Table 5.

As shown in Table 5, the estimated coefficient of GDP is negative and significant. Therefore, the first hypothesis can be accepted and it can be claimed that there is a negative and significant relationship between domestic production and purchasing power by controlling for international trade variables. Table 6 lists estimates of short-term error correction model (ECM).

As shown in Table 6, ECM estimates show −0.99, which indicates modification of variance in purchasing power due to variance in independent variables in 12 months.

6.2. Second Hypothesis

Second hypothesis assumes that there is a significant relationship between domestic production in agricultural sector and purchasing power by controlling for international trade variables. Accordingly, Table 7 lists the results of dynamic model (2) estimated by ARDL with at most 4 lags.

As shown in Table 7, sum of coefficients of the lagged variables related to dependent variable is smaller than one; therefore, the above dynamic model converges to long-term model. It is noteworthy that the above dynamic model has no problem with Durbin-Watson statistic and regression F-value test. Therefore, other tests including disturbing term non-correlation test, disturbing term normality test and non-heteroskedasticity test can be used to evaluate precision of estimation. In all tests, null hypothesis was accepted. Therefore, the estimated regression has no problem in these tests and it is reliable. Table 8 lists results of Microfit calculations for these tests.

Once ARDL dynamic model is estimated, long-term coefficients of the model can be estimated, as shown in Table 9.

As shown in Table 9, the estimated coefficient of AP is negative and significant. Therefore, the second hypothesis can be accepted and it can be claimed that there is a negative and significant relationship between domestic production in agricultural sector and purchasing power which was proxied by inflation rate. Table 10 lists estimates of short-term ECM.

Table 4: Estimation precision tests

Test	Null hypothesis	Critical value	Probability to reject null hypothesis
Consecutive correlation	Lack of consecutive correlation of disturbing term	0.44789	0.503
Correctness of functional form	Correctness of regression functional form	0.14820	0.700
Normality	Disturbing term is normal	1.8145	0.404
Heteroskedasticity	Lack of heteroskedasticity	0.075313	0.784

As shown in Table 10, ECM estimates show −1.0814, which indicates modification of variance in inflation variable due to variance in independent variables in 12.5 months.

Table 5: Estimates of long-term coefficients

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
GDP	−0.33425	−6.3757	0.000
PIM	0.16510	1.7009	0.102
EXCH	0.05266	4.1675	0.000
M	−0.040259	−0.29257	0.772

ARDL: Auto-regressive distributed lag

Table 6: Short-term ECM estimates

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
D(INF(−1))	0.84240	4.7599	0.000
D(GDP)	−0.14396	−3.0193	0.006
D(GDP(−1))	0.29199	3.7989	0.001
D(GDP(−2))	0.020618	0.32078	0.751
D(GDP(−3))	0.25956	4.3585	0.000
D(PIM)	0.14166	1.9560	0.062
D(PIM(−1))	0.089136	1.1052	0.280
D(PIM(−2))	−0.11577	−1.9821	0.059
D(EXCH)	0.052421	2.9389	0.007
D(M)	−0.040081	−0.2888	0.776
ECM(−1)	−0.99556	−5.6229	0.000
X^2	0.79910		
Durbin-Watson	2.0845		
F-value (P)	9.1485 (0.000)		

ARDL: Auto-regressive distributed lag

Table 7: Results of estimating Model (2)

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
INF(−1)	0.65471	4.5857	0.000
INF(−2)	−0.73615	−4.4772	0.000
AP	−0.16821	−2.5074	0.020
AP(−1)	−0.017115	−0.1334	0.895
AP(−2)	−0.23362	−1.9862	0.059
AP(−3)	0.28907	3.1601	0.004
AP(−4)	−0.38546	−4.7078	0.000
PIM	0.12259	1.8573	0.076
PIM(−1)	0.11657	2.1748	0.040
PIM(−2)	−0.24227	−4.1606	0.000
PIM(−3)	0.094203	1.7159	0.1
EXCH	0.06864	4.106	0.000
M	−0.062009	−0.4865	0.631
X^2	0.79053		
Durbin-Watson	1.9573		
F-value (P)	7.2334 (0.000)		

ARDL: Auto-regressive distributed lag

6.3. Third Hypothesis

Third hypothesis assumes that there is a significant relationship between domestic production in industrial sector and purchasing power by controlling for international trade variables. Accordingly, Table 11 lists the results of dynamic model (3) estimated by ARDL with at most 4 lags.

As shown in Table 11, sum of coefficients of the lagged variables related to dependent variable is smaller than one; therefore, the above dynamic model converges to long-term model. It is noteworthy that the above dynamic model has no problem with Durbin-Watson statistic and regression F-value test. Therefore, other tests including disturbing term non-correlation test, disturbing term normality test and non-heteroskedasticity test can be used to evaluate precision of estimation. In all tests, null hypothesis was accepted. Therefore, the estimated regression has no problem in these tests and it is reliable. Table 12 lists results of Microfit calculations for these tests.

Once ARDL dynamic model is estimated, long-term coefficients of the model can be estimated, as shown in Table 13.

As shown in Table 13, the estimated coefficient of IP is negative and significant. Therefore, the third hypothesis can be accepted and it can be claimed that there is a negative and significant relationship between domestic production in industrial sector and purchasing power which is proxied by inflation rate by controlling for international trade variables. Table 14 lists estimates of short-term ECM.

As shown in Table 14, ECM estimates show −1.0814, which indicates modification of variance in inflation rate due to variance in independent variables in 12.5 months.

7. CONCLUSION

First hypothesis assumes a significant relationship between domestic production and purchasing power which is proxied with inflation rate by controlling for certain international trade variables. Estimates show that the estimated coefficient of GDP is negative and significant. Thus, the first hypothesis is accepted and it can be claimed that there is a negative and significant relationship between domestic production and purchasing power. Thus, import management plays a significant role in reducing inflation through production growth. This finding is consistent with Sadeghi et al.(2008) and Azarbayjani et al. (2013). They claimed that import management and prevented importation of goods which are produced domestically are effective in reducing exchange rate, resulting in liquidity control and reduced inflation.

Table 8: Estimation precision tests

Test	Null hypothesis	Critical value	Probability to reject null hypothesis
Consecutive correlation	Lack of consecutive correlation of disturbing term	0.9354	0.992
Correctness of functional form	Correctness of regression functional form	0.40609	0.524
Normality	Disturbing term is normal	0.81848	0.664
Heteroskedasticity	Lack of heteroskedasticity	0.26768	0.605

Table 9: Estimates of long-term coefficients

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
AP	−0.47653	−6.7427	0.000
PIM	0.084242	1.0227	0.317
EXCH	0.063471	6.2956	0.000
M	−0.057339	−0.49481	0.625

ARDL: Auto-regressive distributed lag

Table 10: Short-term ECM estimates

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
D(INF(−1))	0.73615	4.4772	0.000
D(AP)	−0.16821	−2.5074	0.019
D(AP(−1))	0.33001	3.0757	0.005
D(AP(−2))	0.096391	1.0329	0.312
D(AP(−3))	0.38546	4.7078	0.000
D(PIM)	0.12259	1.8573	0.075
D(PIM(−1))	0.14806	2.0442	0.052
D(PIM(−2))	−0.094203	−1.7159	0.099
D(EXCH)	0.068639	4.1060	0.000
D(M)	−0.062009	−0.48645	0.631
ECM(−1)	−1.0814	−6.3574	0.000
X^2	0.79845		
Durbin-Watson	1.9573		
F-value (P)	9.1113 (0.000)		

ARDL: Auto-regressive distributed lag

Table 11: Results of estimating Model (3)

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
INF(−1)	0.65471	4.5857	0.000
INF(−2)	−0.73615	−4.4772	0.000
IP	−0.14775	−2.5074	0.02
IP(−1)	−0.015033	−0.13336	0.895
IP(−2)	−0.20521	−1.9862	0.059
IP(−3)	0.25391	3.1601	0.004
IP(−4)	−0.33858	−4.7078	0.000
PIM	0.12259	1.8573	0.076
PIM(−1)	0.11657	2.1748	0.040
PIM(−2)	−0.24227	−4.1606	0.000
PIM(−3)	0.094203	1.7159	0.100
EXCH	0.068639	4.1060	0.000
M	−0.062009	−0.48645	0.631
X^2	0.79053		
Durbin-Watson	1.9573		
F-value (P)	7.2334 (0.000)		

ARDL: Auto-regressive distributed lag

Second hypothesis assumes a significant relationship between domestic production in agricultural sector and inflation rate by controlling for certain indicators of international trade. The estimated coefficient of agricultural sector value-added is negative and significant. Thus, the second hypothesis is accepted and it can be claimed that there is a negative and significant relationship between domestic agricultural production and inflation rate. Third hypothesis assumes a significant relationship between domestic production in industrial sector and purchasing power which is

Table 12: Estimation precision tests

Test	Null hypothesis	Critical value	Probability to reject null hypothesis
Consecutive correlation	Lack of consecutive correlation of disturbing term	0.9354	0.992
Correctness of functional form	Correctness of regression functional form	0.40609	0.524
Normality	Disturbing term is normal	0.81848	0.664
Heteroskedasticity	Lack of heteroskedasticity	0.26768	0.605

Table 13: Estimates of long-term coefficients

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
IP	−0.47653	−6.7427	0.000
PIM	0.084242	1.0227	0.317
EXCH	0.063471	6.2956	0.000
M	−0.057339	−0.49481	0.625

ARDL: Auto-regressive distributed lag

Table 14: Short-term ECM estimates

Dependent variable (INF)	The model ARDL (2, 4, 3, 0, 0) using SBC		
Independent variable	Coefficient	T-ratio	P
D(INF(−1))	0.73615	4.4772	0.000
D(IP)	−0.14775	−2.5074	0.019
D(IP(−1))	0.28988	3.0757	0.005
D(IP(−2))	0.084668	1.0329	0.312
D(IP(−3))	0.33858	4.7078	0.000
D(PIM)	0.12259	1.8573	0.075
D(PIM(−1))	0.14806	2.0442	0.052
D(PIM(−2))	−0.094203	−1.7159	0.099
D(EXCH)	0.068639	4.1060	0.000
D(M)	−0.062009	−0.48645	0.631
ECM(−1)	−1.0814	−6.3574	0.000
X^2	0.79845		
Durbin-Watson	1.9573		
F-value (P)	9.1113 (0.000)		

ARDL: Auto-regressive distributed lag

proxied by inflation rate by controlling for certain indicators of international trade. The estimated coefficient of IP is negative and significant. Thus, the third hypothesis is accepted and it can be claimed that there is a negative and significant relationship between domestic industrial production inflation rate. These findings are consistent with Barone and Cingano (2011). They claimed that import management has a positive effect on value-added, productivity and export growth rate through restrictive regulations.

Following suggestions are made based on current results for increasing purchasing power by controlling for international trade variables:

1. Provide better regulations for import and fill legal gaps by the governance;
2. Model successful countries in setting policies required for

managing import and increasing quality of regulations;
3. Greater reliance on private sector and provide export-facilitating regulations and focus on free exchange rate to prevent money printing caused by fixed exchange rate system requirements;
4. Tariff reductions and greater reliance on e-government to facilitate customs and trade;
5. Reduce charge of government in import and export and avoid liquidation of foreign exchange reserves by the central bank.

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