Trade Openness and Inflation. Evidence from MENA Region Countries

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Abstract

The mechanism of trade openness and inflation rate is a matter that many papers have ever attempted to verify. Providing evidence from different countries, negative and positive effects of openness on the inflation rate have been discovered. This paper examines the answer by applying an unbalanced static panel data method of estimation for Middle East and North African countries in the period of 1990- 2010. In contrast to Romer (1993) which presents a negative correlation between them, this paper explores that countries with more open degree of international trade are exposed to higher rate of inflation.

Key words: *trade openness, inflation, panel data, MENA region countries*

JEL Classification: *C23, E31, F41*

Introduction

The 1990s probably will be remembered as the decade in which average inflation came under control around the world. According to the IMF, average inflation in industrialized economies between 1982 and 1991 was 4.9%; at the end of 1999, it was 0.8% as measured by the GDP deflator. More remarkably, average inflation in developing countries dropped from 45.1% between 1982 and 1991 to 6.9% in 1999. The 1990s will also be remembered as the "globalization" decade. Trade of goods as a percentage of PPP GDP went from 21.2% in 1988 to 28.3% in 1998. The obvious question then is: are these events related? (Alfaro, 2002). The experience of Latin American countries in economic crisis in 1980s and 1990s as well as the experience of foreign exchange and financial crisis of East Asian countries, such as Indonesia, Thailand and South Korea in 1997/1998 were due to capital reversal. Economic crisis due to foreign exchange as occurred in the East Asian countries has caused considerable economic contraction, high inflation rate, as well as the increase of unemployment and poverty. From a social point of view, the crisis has created social unrest and political instability especially in Indonesia. Development in the countries experiencing economic crisis showed that openness was not always beneficial to a country. The incapability of a country to control external shock will aggravate the economic condition of the country (Simorangkir, 2006).

In 2010, the major exporters of commercial services were the European Union, the United States, Japan, China and India, which together represented around two-thirds of the world exports (WTO, 2011). The share of developing countries remained low, although the performance of some countries was significantly improved in many directions. For instance, in some Middle East and North Africa (MENA) countries, trade in services, rather than trade in

goods, appears as the core of their development strategies. Countries of the Gulf Cooperation Council (GCC) have heavily invested in services to reduce their dependence on oil and further diversify their economy and exports. The Emirates of Dubai promoted tourism, which now contributes more than oil to the Emirates' GDP, as well as exports in information and communication technology, and media. Non-GCC countries are also performing well. For example, Morocco is becoming an important off-shoring center for high-tech enterprises. Besides, the service sector has been an important source of value added growth and job creation in MENA countries during the latter half of the 2000s, irrespective of whether the country was an oil exporter or importer (World Bank, 2011).

Romer (1993) argues that greater openness effectively steepens the Phillips curve by exposing a nation to a larger negative terms-of-trade effect generated by an expansion of domestic output (Daniels and VanHoose, 2005). In recent decades, efforts to join the World Trade Organization have taken all over the world. On the basis of this fact, it is expected that opening trade in different countries and unequal distributing of income highly affect the economic variables in the developing countries. Rogoff (2003) suggests that globalization makes the Phillips curve steeper; inflation rises more for a given rise in output. The reason is that global competition makes wages and prices more flexible. A steeper Phillips curve makes expansionary policy less tempting for the central bank, reducing equilibrium inflation.

McCulloch et al. (2001) claim that greater economic openness causes the price of traded goods and services to change. These price changes affect households as consumers and income earners, which in turn may generate inequalities. The impact of price changes on poverty and inequality will depend on whether poor people are net consumers or net producers of the goods in question. However, it is worth noting that in developing countries price changes may or may not be transmitted to poor people, depending on the existence of adequate physical and facilitating marketing infrastructures, market information, and households' behavior.

Different schools of thought have provided significant contributions to what they believe are responsible for causing inflationary pressures. Monetarists argued that inflation is mainly influenced by how fast the money supply grows or falls, thus being a monetary phenomenon. On the other hand, Keynesian economic theory identified demand push and cost pull factors as the main reasons for inflation. Generally, some economists agree that the growth in money supply have greater influence in the long-run while supply and demand pressures tend to affect short to medium term inflation levels (Thomas, 2012).

Trade openness that as Squalli and Wilson (2006) define is popularly measured as (X+M)/GDP, appears with the implementation of policies to remove trade barriers and also free movement of goods and services between countries. These policies include the elimination of tariff and non-tariff barriers and import quotas and taxes on export. Based on proponents of the positive relationship between trade openness and inflation as Neiss (2001), greater openness to trade intensifies market competition and reduces the pricing power of firms, thereby dampening inflation. Stronger market competition also influences policy incentives and makes monetary policy more prudent and less inflationary (Binici, 2012). According to Keller (2004) in Eaton and Kortum's model, trade augments a country's production possibilities for the classic Ricardian reason: trade gives access to foreign goods or, implicitly, technologies. By specializing in their respective comparative advantage goods, countries can gain from trade in the sense that given a country's resources, the efficient level of output with trade is higher than without trade.

Moreover, as Evan (2007) states first, raising openness reduces the burden of the inflation tax borne by the citizens of the inflating country in that they spend a larger portion of their currency holdings on foreign goods. Second, inflation causes the terms of trade to appreciate in favor of the home country that is the price of exports increases in relation to the price of imports. These

two benefits working together result in a country's real wage increasing in response to higher home inflation levels.

Researchers such as Bhattacharya and Wolde (2009) believe that prevailing volumes of trade of countries in the Middle East and North Africa (MENA) region are much below their potential. Iqbal and Nabli (2007) argue that the non-oil exports of MENA countries are, on average, one-third of the levels that would be expected on the basis of their per capita incomes, resource endowments, and population sizes.

As Nugent and Pesaran (2007) pointed out, countries in this region considerably differ in their degree of openness to trade. Algeria, Morocco, Pakistan, Jordan, and Tunisia all had tariff rates, averaging over 10 percent in 2005/2006, with Tunisia's being almost 23 percent. Despite some recent attempts at trade liberalization, many of these countries still have highly restrictive trade regimes. By contrast, in several of the Gulf state tariff rates are very low and there are virtually no other barriers to trade (other than on goods from Israel).

This paper seeks to verify the linkage between trade openness and inflation rate throughout an unbalanced panel of MENA region countries during 1990- 2010.
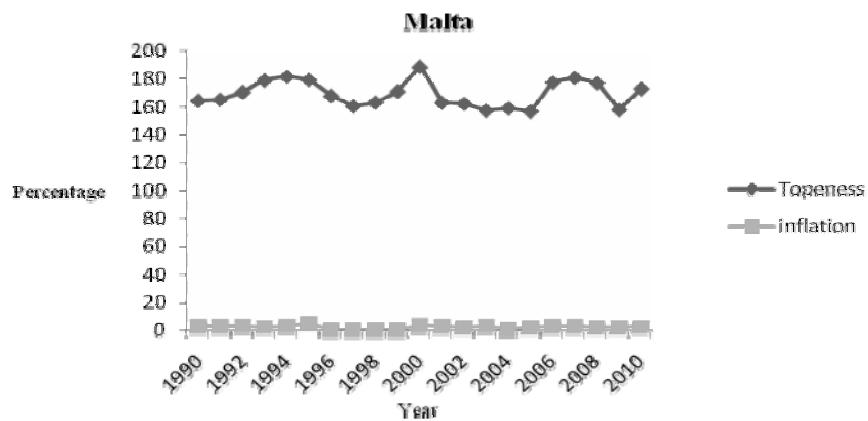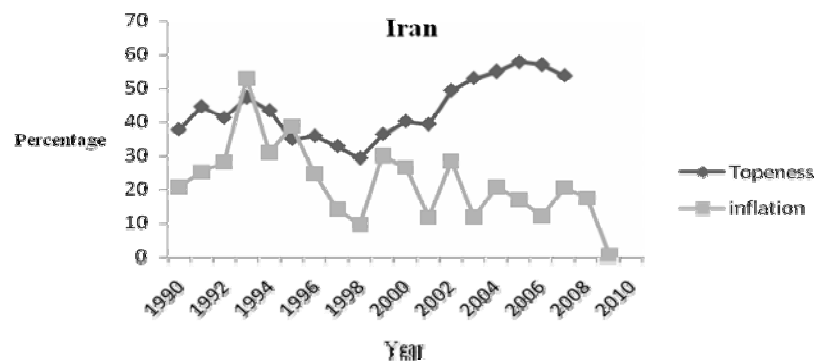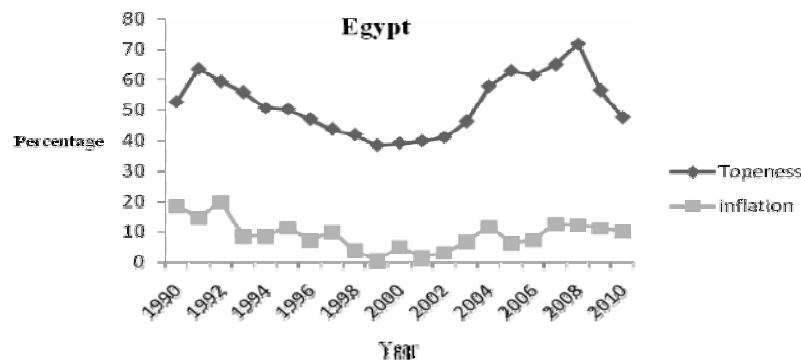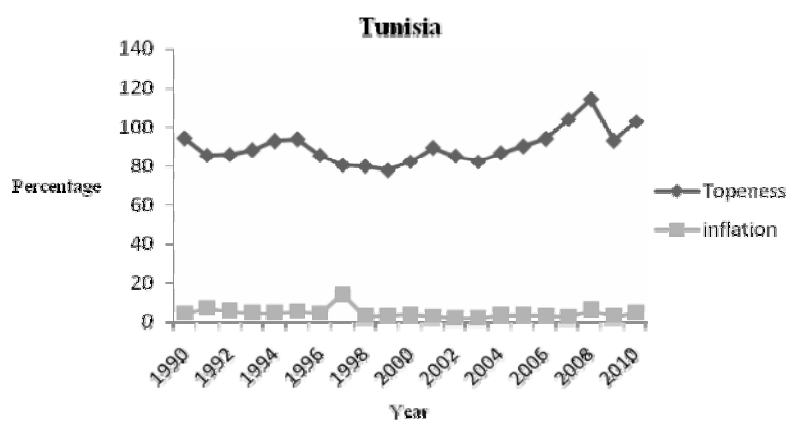
Inflation and Openness

Inflation can be defined as a sustained or continuous rise in the general price level or alternatively, as a sustained or continuous fall in the value of money. Several things should be noted about this definition. First, inflation refers to the movement in the general level of prices. It does not refer to changes in one price relative to other prices. These changes are common even when the overall level of prices is stable. Second, the rise in the price level must be somewhat substantial and continue over a period longer than a day, week, or month (Makinen, 2003). The fact is that a more open economy will face larger number of adverse shocks coming from the outside. The epicenter of the recent global economic crisis was the financial markets of the industrialized world, yet many developing countries were driven into recession as global demand and global trade volumes plummeted. Open economies heavily reliant on export revenues were among those hardest hit by the crisis. However, an open economy is less constrained by the limits of domestic demand and more likely to be involved in a wider range of formal and informal insurance schemes (e.g. international lending, production diversification, and formal insurance contracts) (Haddad et al. 2010). Frankel and Cavallo (2004) used a gravity instrument for trade openness and found that openness indeed makes countries less vulnerable, both to severe sudden stops and currency crashes, and that the relationship is even stronger when correcting for the endogeneity of trade.

For whatever underlying reasons, imagine that at least two major trading nations display substantially different internal inflation rates affecting prices of both traded and non-traded goods. If the rate of exchange of one nation's currency for that of the other is fixed, relative prices across the border would be changing at a rate equal to the difference between the two inflation rates. For example, if the U.S. inflation rate is 10 percent and the West German rate is 7 percent, then relative prices for U.S. goods would be rising by 3 percent per year in terms of German currency. Similarly, relative prices for German goods in U.S. currency would be falling at 3 percent per year. With fixed exchange rates, the exports of the rapidly-inflating nation would tend to dwindle, and their imports would tend to rise. In our example, this adjustment would dampen inflation in the United States and heighten it in Germany if large balance of payments surpluses and deficits are not allowed to accumulate and if trade is responsive to price change (Houck, 1979).

An open economy can also more easily buffer the internal shocks by relying more on exports where domestic demand is depressed. The international market being deeper, the shock waves may be felt further away but this helps diffuse the adjustment in countries where the shock

originates. Germany, one of the major world exporters, is a case in point. In the first quarter of 2009 the economy contracted by 3.4% but by the second quarter of 2010 it was expanding by 2.2% thanks in particular to the sustained demand in emerging economies. The dynamism of these economies have avoided a steeper global recession and are leading now the recovery, illustrating that interactions among countries transmit the shocks but also help diffuse them (OECD, ILO, WORLD BANK, WTO ,2010).

Fig. 1. Inflation and Openness trend in Selected MENA region Countries

Source: Authors' calculation (Preliminary data for inflation and openness are from World Development Indicators)

Review of Literature

After Romer's work, different other studies have found similar relation between inflation and openness. Terra's (1998) study for 114 countries found a strong negative relation among severely indebted countries during the debt crisis period in the 1980s. Muhammad and Batool (2006), Sachsida et al. (2006), Badinger (2009), Wynne and Kersting (2007), Bowdler and Malik (2006), Kim and Beladi (2005), Gruben and Mc-Leon (2004) and also Boschen and Weise (2003) found negative correlations between trade openness and inflation rate. Triffin and Grundel (1962) examine the economic growth of European countries and conclude that more open economies usually experience lower inflation. Iyoha (1973) studies 33 developing countries and finds a negative relation between them.

Rogoff (2003) estimated Phillips curves with the data which cover 14 industrial countries. For the period 1985-2005, he pooled annual data for all the countries (294 total observations) and regressed the change in inflation on the domestic output gap, the foreign gap, and both gaps. He concluded that when both output gaps are included in the Phillips curve, the domestic gap is highly significant and the foreign gap is barely significant. The results suggested that foreign gaps represent at most a secondary influence on inflation.

Cavallari (2001) analyses the impact of trade openness on inflation, across nineteen OECD economies in a strategic framework characterized by monopolistic production in the domestic sector and unionized labor markets and shows that the economy's inflationary bias reduces up to a critical level of trade openness. Beyond this threshold, wage setters may be induced to behave more aggressively in open economies, leading to higher equilibrium inflation. He shows that inflation is negatively related to openness when wage bargaining is decentralized, while there is virtually no link between openness and inflation at higher levels of wage centralization. Jafari Samimi et al. (2011) test the hypothesis that was first documented by Romer (1993) utilizing the ARDL Bounds test approach to level relationship proposed by Pesaran et al. (2001) for Iranian annual data over the period 1973-2007. Results confirm the existence of a long-run relationship among the variables under consideration. The results show that openness has a negative and significant effect on inflation in the short-run but its effect in the long-run is not significant. Lane (1997) focuses on how greater openness reduces the potential output gains from unexpected inflation in non-traded goods sectors with imperfectly competitive goods markets and sticky prices. Mukhtar (2010) used a multivariate cointegration and a vector error correction model. His study that covers the period from 1960 to 2007 showed that there is a significant

negative long-run relationship between inflation and trade openness, which confirms the existence of Romer's hypothesis in Pakistan.

The result of Cooke's study (2004) suggests that inflation is inversely related to openness when accounting for real balances alone, but that for a full analysis of inflation it is necessary to account for steady state consumption and this depends on foreign demand. When foreign demand is low the inverse relationship holds, but when foreign demand is sufficiently high inflation rises and falls with openness.

On the other hand, many other papers confirm a positive relationship between openness and inflation. For instance, Evan (2004) finds that a higher degree of openness in a country is associated with a higher equilibrium inflation rate. This result is driven by the fact that the monetary authority enjoys a degree of monopoly power in international markets as foreign consumers have some degree of inelasticity in their demand for goods produced in the Home country. Rajagopal (2007) discusses the impact of trade openness policy on tariff structure, export competitiveness, inflation and economic growth of Latin American countries and approves a positive relation among openness and general price level as an indicator of inflation. Bowdler (2003) proposes a new test of the hypothesis "openness to trade should exert a positive effect on the slope of the output-inflation tradeoff, or Phillips curve" based on new measures of the slope of the Phillips curve and more general cross-country regression models. He indicates some support for the standard theoretical prediction, but it is confined to those countries that have maintained floating exchange rate regimes. In fact, he rejects the findings of Romer (1993) and Temple (2002) on existence of a negative relation among two mentioned variables through a new measuring of the Phillips curve's slope. Ghanem (2010) is the other one who found such a positive correlation among them.

Methodology and Research Data

To understand the effects of trade openness towards inflation rate, the relationship can be written in the form of the following panel data equation;

$$Inf_{it} = \alpha + \mu_i + \lambda_t + \beta_1 Open_{it} + \beta_2 Gcap_{it} + \beta_3 Popg_{it} + V_{it} \tag{1}$$

i = 1, 2,…, N
t = 1,2,…,T

where, Inf_{it} represents the annual growth of Gross domestic product deflator which is a proxy for prices level

$Open_{it}$ (imports+exports) to GDP is the measure of trade openness of country i at the year t, $Gcap_{it}$ represents GDP per capita, $Popg_{it}$ is the annual growth of population of the MENA region countries during 1990- 2010, α, μ_i, λ_t and V_{it} are intercept, country – specific, time – specific and error term respectively. Summary statistics for the variables are given in Table 1.

Table 1. Summary Statistics for Variables

	Open	Popg	Inf	Gcap
Mean	88.20418	2.719505	8.271966	8989.566
Median	80.48878	2.058591	5.858726	3580.131
Maximum	210.1610	18.58832	119.9893	82388.85
Minimum	29.29622	-0.157926	-24.24943	281.1421

Table 1 (*cont.*)

Std. Dev.	36.55377	2.651219	12.20296	12462.05
Jarque-Bera	68.99465	3368.775	6839.274	1235.446
Probability	0.000000	0.000000	0.000000	0.000000
Observations	373	416	383	404

Source: Eviews 6.0

As mentioned before, the relationship between openness and inflation of countries in the MENA region[1] is investigated through a panel data technique for the period 1990- 2010. Data used are all obtained from World Bank Development Indicators (WDI). The first step before estimating the model is to investigate the stationarity of the variables. The second step is to test for the existence of a long-run relationship between trade openness and economic inflation rate of MENA region countries. The Kao (1999) panel cointegration test, which is based on an ADF statistics, is applied in this study to examine the long-run relationship. Finally, after applying a Hausman test to find the existence of random effects in model, we estimate the coefficients by a panel ordinary least squares method.

Findings

Panel Unit Root

In this sub-section, we implement the stationarity of the variables using unit root test by Levin, Lin and Chu, LLC (Levin et al., 2002). Results are reported in Table 2.

Table 2. Unit Root Tests

Variable	LLC statistics	Prob	Stationarity
Inf_{it}	-12.03	0.000	I(0)
$Open_{it}$	-4.51	0.000	I(0)
$Gcap_{it}$	8.37	1.000	I(1)
$D\,Gcap_{it}$	-11.32	0.000	I(0)
$Popg_{it}$	-10.64	0.000	I(0)

The results suggest that all the variables except $Gcap_{it}$ reject the null unit root hypothesis which assumes common unit root, so all are integrated to the order 0 and $Gcap_{it}$ is integrated to the order 1.

Panel Cointegration Test

Table 3. Panel Cointegration Test

	t-Statistic	Prob.
ADF	-3.94	0.000

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[1] Countries included in this study are: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirate and Yemen

As it is seen, the results from the cointegration approach suggest a positive long run relationship between openness and inflation rate.

Hausman Test

In order to select the appropriate method of estimation among fixed effects, and random effects we applied the Hausman's m_1 and m_2 tests using Stata11 (For more details about it, see Baltagi, 2008).

Table 4. Description of the Hausman Test

Hausman Test	Chi-2 Statistics	P-values
m_1	20.95	19.55
m_2	0.000	0.000

According to Table 3, Hausman's m_1 and m_2 specification test rejects presence of the random effects in favor of the fixed effects estimates at $p<0.05$. In other words, GLS estimators (belong to random effects), within-estimators (belong to fix effects) and between-estimators are not consistent and therefore explanatory variables cannot be considered independent of the error terms over time.

Redundant Fixed Effects Tests

A redundant test is done to investigate the presence of period fixed effects, cross-section fixed effects or a joint significance of the period and cross-section fixed effects. According to the results, the presence of fixed effect both for periods and cross-sections is proved. Table 4 gives the result.

Table 5. Redundant Fixed Effects Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.29	(291,18)	0.000
Cross-section Chi-square	109.20	18	0.000
Period F	2.82	(291,19)	0.000
Period Chi-square	56.12	19	0.000
Cross-Section/Period F	4.85	(291,37)	0.000
Cross-Section/Period Chi-square	159.73	37	0.000

Model Estimation

Our findings based on the two-way fixed-effects model are summarized in Table 5. As shown, there exists a significantly positive relation between trade openness and inflation rate of countries in the MENA region. This rejects the Romer's study result on being a reverse correlation between them. (1993) and confirms the Hardouvelis (1992) who suggests that an economy's openness from the input side is an exogenous observable characteristic that provides a direct way of testing the theory. When the imported intermediate goods displace capital (labor) in production, a higher degree of openness flattens (steepens) the economy's aggregate supply curve and increases (decreases) the inflationary bias. It also agrees with Karras (1999) who points out that an economy's openness reduces the ability of monetary policy to affect output, while increasing its effects on inflation. As expected, we also found positive effects of the growth rate of GDP per capita and population growth on inflation rate of the MENA region countries.

Table 6. Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	-11.48	4.97	-2.30	0.02
$Open_{it}$	0.19	0.05	3.53	0.00
$Gcap_{it}$	0.001	0.0002	5.56	0.00
$Popg_{it}$	0.58	0.31	1.87	0.06
R^2	0.48			
F	6.75			
F-Prob	(0.000)			

Conclusion

In this paper we have applied a static panel data technique to assess the impact of trade openness which is the sum of imports and exports to GDP, on the inflation rate of Middle East and North African countries during 1990 to 2010. The results of estimating a two-way fixed effects model, offered a negative and statistically significant correlation among the variables that contradict the study by Romer (1993) on being a negative relationship among them within a cross-country analysis. This means that in these countries which are mainly oil producing countries, monetary authorities should improve their knowledge of what changes the general level of prices. For instance, such countries can be so vulnerable to the factors such as external oil shocks which are resulted from more open degree of international trade and directly affect the domestic prices and this vulnerability triggers restrictions to achieve economic growth. Thus, reducing dependence on oil and substituting other alternative sources of energy such as renewable ones and also accomplishing technical developments are the major policy implementations in this field. The positive impact of trade openness on inflation can be also caused by monetary authorities' policy for having a monopolistic power in the international markets as foreign customers, to adjust the benefits of money growth.

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