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LABOR MARKET HETEROGENEITY AND OPTIMAL
EXCHANGE RATE REGIME
IN RESOURCE-RICH MENA COUNTRIES

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Send correspondence to:
Almukhtar Saif Al-Abri
Sultan Qaboos University
asalabri@squ.edu.om

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Abstract

Although countries of the MENA region are commonly considered as primary-commodity economies, they show sharp dissimilarities in a number of dimensions. Two important dimensions are the size of resource endowments and the degree of labor market flexibility. Countries such as members of the Gulf Cooperation Council (GCC) and Libya are highly oil-endowed economies with largely flexible labor markets and substantial remittances outflows. While the rest of the MENA countries, such as Egypt, Sudan, Yemen, Algeria, Iran and Iraq, show commonalities in terms of their relatively smaller oil-endowments and the lack of labor market flexibility. This paper attempts to incorporate the role of labor market flexibility in a unified theoretical framework of optimal exchange rate policies. For that purpose, the paper extends the standard rules-vs.-discretion model of monetary policy to allow for different assumptions about wage rigidities. The analysis suggests that when all prices are exogenous and wages are all optimally indexed to inflation (i.e., labor market flexibility), fixed exchange rate regimes deliver more desirable outcomes in terms of real output, inflation, and insulation against external shocks compared to flexible exchange rate regimes. On the other hand, the fixity of exchange rates combined with rigid goods and labor markets can add to real appreciations.

JEL Classification: F22; F33

Keywords: Optimal exchange rate regime; MENA region; Creditability; Natural resources; Labor market flexibility

ملخص

على الرغم من أن بلدان منطقة الشرق الأوسط تعتبر عادة من الاقتصادات الرئيسية السلع الأساسية، إلا إنها تظهر فروق حادة في عدد من الأبعاد. والبعدين الهامين هما حجم الموارد ودرجة مرونة سوق العمل. ودول مثل أعضاء مجلس التعاون الخليجي (GCC) وليبيا هي من الاقتصادات الغنية بالنفط مع وجود مرونة أسواق العمل إلى حد كبير ووجود تحويلات كبيرة إلى الخارج. في حين أن بقية بلدان المنطقة، مثل مصر والسودان واليمن والجزائر وإيران والعراق، وتظهر القواسم المشتركة من حيث أن لديهم هبة أصغر نسبيا في النفط وعدم وجود مرونة سوق العمل. تحاول هذه الورقة إدراج دور مرونة سوق العمل في إطار نظري موحد لسياسات سعر الصرف الأمثل. لهذا الغرض، تمتد الورقة لايجاد معيار نموذجي لقواعد تقدير السياسة النقدية بالسماح للافتراضات المختلفة حول جمود الأجور. يشير التحليل إلى أن عندما تكون جميع الأسعار الخارجية وكلها مفهومة الأجور على النحو الأمثل إلى التضخم (أي مرونة سوق العمل) تحقق الأنظمة الثابتة في سعر الصرف نتائج أكثر من المرغوب فيها من حيث الناتج الحقيقي، والتضخم، والعزل ضد الصدمات الخارجية مقارنة بالصرف المرن ونظم أسعار. من ناحية أخرى، فإن ثبات أسعار الصرف جنبا إلى جنب مع السلع وأسواق العمل الجامدة يمكن أن تضيق ارتفاعا حقيقيا.

1. Introduction

The MENA region has witnessed a number of political, social, and economic developments during the last decade. Among these developments are the economic reforms in the context of liberalizing trade and opening up the financial systems. The Arab Spring that has started in the past few years has also mandated policy makers to take constructive steps toward economic development and expansion of employment opportunities. Another important development is the shift in the direction of MENA countries' trade away from the US and towards the Euro area, East Asia, China, and Japan and the increasing counter-cyclical of oil-exporters with the US business cycle (Habib and Stráský 2008; Setser 2007). The main challenge for MENA countries in the short and medium-term is to create jobs for the growing labor force. To that end, many MENA countries have invoked programs to develop the private sector, which would entail greater flexibility of the labor markets.

These developments, and the recurring financial and exchange rate crises in several developing and emerging countries, warrant revisiting the debate on the optimal exchange rate regime for MENA countries. This issue is also timely as many countries that peg their currencies (e.g. GCC countries) face recurring challenges related to prolonged misalignments in real exchange rates and increasing volatility of imported inflation (Coudert et al. 2011; Yousefi and Wirjanto 2003). Similarly, countries that have moved toward less restrictive exchange rate regimes, such as Egypt, Algeria, Sudan and Yemen, face concurrent challenges related to unstable nominal exchange rates, creditability, as well as trade destructive changes in real exchange rates (Elbadawi and Kamar 2005).

This paper analyzes the optimal exchange rate regimes for the resource-rich MENA countries with particular emphasis on the heterogeneity of labor markets. We discuss the exchange rate regimes for two groups of countries: resource-rich-labor-importing (RRLI), including members of the GCC countries and Libya, and resource-rich-labor-abundant (RRLA) countries including Algeria, Egypt, Iran, Iraq, Sudan, and Yemen. Whereas the labor force in RRLA countries is composed mostly of nationals, RRLI countries rely heavily on foreign expatriates (see Table 2). The foreign labor force works mainly in the private sector on short-term contracts. As such, the size of the foreign labor force can quickly be adjusted to fluctuations in the business cycle triggered by oil price shocks.

The paper extends the standard rules-vs-discretion model of monetary policy to allow for different assumptions about wage rigidities. We evaluate the loss of flexibility against the gain in creditability with alternative assumptions about the labor market. In countries with relatively more flexible labor markets, fixed exchange regimes are more desirable in responding to shocks as the creditability gains of fixed exchange rate regimes might outweigh the loss of flexibility in monetary policy. However, with rigid labor markets and employments, flexible exchange regime are more desirable in responding to shocks as the loss of flexibility by fixing the exchange rate outweighs the gain in creditability. Our analysis also highlights the conditions that these countries should satisfy in the transition to a more flexible exchange rate arrangement.

This paper also suggests two future research themes within the line of optimal exchange rate policy. The first theme is to incorporate the labor market into the models of optimal exchange rate regime choice. The second theme is to develop the institutional strategies and prerequisites to move to a more flexible exchange rate policy.

The rest of this paper is organized as follows. Section 2 highlights the main features of the MENA economies and their economic performance under different exchange rate regimes. Section 3 discusses the literature on optimal exchange rate regime choice for primary-commodity exporting countries. Section 4 analyzes the role of labor market heterogeneity using a simple model of rules-vs-discretion. The final section presents some conclusions and recommendations.

2. Exchange Rate Regimes in MENA Region: A Tale of Two Groups

The MENA countries share a number of commonalities in terms of their small economic size, their high population growth rate, their low level of export diversification, their heavy reliance on primary commodities in exports and in fiscal revenues, their under-developed financial systems, and the dominance of the public sector in economic activities.¹ At the same time, MENA countries differ in several other dimensions including: the size of natural resource endowments, population size, labor force composition, historical experiences of inflation, degree of economic development, geographic diversification of exports, and quality and creditability of institutions. This diversity of the MENA region suggests a number of ways to segment these countries.² However, for the purpose of analyzing the optimal exchange rate regime, we focus our attention on natural resource-rich MENA countries. Within this group, we find it also useful to segment them further into two groups: RRLI and RRLA. Tables 1 and 2 compare the countries included in the two groups against a number of economic and financial indicators.

2.1 Economic structure

As presented by Tables 1 and 2, except for Egypt, Sudan, and Yemen, the countries in the two groups are highly endowed with oil and gas reserves (current levels of production and proved reserves). The salient differences between countries in the two groups are the level of economic development (represented by the GDP per capita), the size of the population, and the composition of the labor force. All countries exhibit similar levels of export diversification except for Egypt, Bahrain, and Iran, which show a bigger share of manufacturing exports in total merchandise exports. Although countries in the two groups show similar patterns in terms of their financial sector structure—a relatively shallow and a primarily bank-based financial sector—the level of financial development is not the same across the two groups. As indicated by Table 2, the domestic credit provided by private banks is substantially higher in RRLI countries compared to RRLA countries.

One of the important structural differences between the two groups is the degree of labor market flexibility. Whereas the labor force in RRLA countries is composed mostly of nationals, RRLI countries rely heavily on foreign expatriates (Table 2). The foreign labor force works mainly in the private sector on short-term contracts. As such, the size of the foreign labor force can quickly be adjusted to fluctuations in the business cycle triggered by oil price shocks. The other dimension associated with labor market heterogeneity is the size and direction of workers' remittances. The large size of the foreign labor force in RRLI countries results in substantial workers' remittances outflows. On the contrary, the net remittances in the RRLA group are

¹ The labor force growth rate in the MENA region is the second highest in the world after Sub-Saharan Africa, with an average annual growth estimated at 3.4 percent a year between 2000 and 2010, which is twice that of other developing countries (World Bank 2007).

² For example, World Bank (2007) classifies MENA countries into three main groups: *Resource-rich-labor-abundant countries* (e.g. Algeria, Iraq, Iran, Libya, Syria, and Yemen); *Resource-rich-labor-importing countries* (e.g. GCC countries-Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates); *Resource-poor-labor-abundant countries* (e.g. Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco, Tunisia, and the Palestinian Authority).

positive indicating that these countries are net exporters of labor. The majority of remittances inflows that are received by these countries come from MENA oil exporters, mainly the GCC countries (Naufal and Carlos 2010).

2.2 Economic performance

This diverse economic structure casts its shadow on the economic performance of individual countries. During the last decade, RRLI countries have exhibited stronger and steadier growth rates and have enjoyed much higher development levels compared to the RRLA countries (Table 1). This sharp contrast in growth performance is mainly attributed to the recent oil boom, 2003-2012. As discussed earlier, the substantial increase in investments and government expenditures in the oil-exporting countries of the MENA region had also spread to the rest of the region through increases in worker remittances, and capital flows. On the financial front, RRLI countries have built considerable amounts of financial savings in the form of foreign currency reserves and sovereign funds (Table 2). However, the level of volatility of GDP growth in the region as a whole has been twice that of the developing country average and twice more volatile in oil-rich economies than in the rest of the region (Abed and Davoodi 2003). The main determinant of growth in the MENA region has been the fluctuations in international oil prices. The high dependence on oil revenues is also reflected in the volatile and pro-cyclical fiscal policy, particularly in RRLI countries. However, the RRLA countries are also sensitive to oil price fluctuations due to the role of worker remittances and development aid received from the RRLI countries. Moreover, the tax system of the fiscal policy is ill-structured in the two groups (RRLA and RRLI countries), resulting in a narrow tax base and high tax evasion (Leenders and Sfakianasis 2003).³

2.2 Exchange rate regimes in the MENA region

The diversity in economic structures and institutional creditability in the MENA region have also been extended to the choice of exchange rate regimes by individual countries. While the RRLI countries have a long track record of pegging to the US dollar or to a basket dominated by the US dollar in the last three decades, the RRLA countries had mixed experiences with intermediate and managed float regimes during the same period.

Several motivations could explain the tendency of the RRLI countries to peg their exchange rate to the US dollar. First, pegging to the US dollar allows these economies, especially those with weak economic and political institutions, to maintaining central bank creditability by importing the United States' stable monetary policy. Second, pegging to the dollar ensures them a relative stability in crude oil revenues.⁴ Third, it also reduces the risks of financial instability that exchange rate volatility might cause. During the last three decades, the pegged exchange regime had largely delivered its expected benefits to this group (Squalli 2011). Ghanem (2012) finds that MENA countries with de facto fixed exchange rate regimes were successful in maintaining low inflation. In addition, RRLI countries have also shown more cushion against financial crises as evidenced by their resilience in the face of the global financial crisis in 2008. This is mainly due to the large international financial assets they had built up particularly during the oil boom 2003-2012. However, one setback that has been experienced by pegging countries is the chronic

³ Tanzi and Zee (2000) identifies four major challenges to efficient tax systems in developing countries: the difficulty in income tax base calculations due to irregular earnings; the absence of well-trained staff in tax administration; the informal structure of the economy; and the uneven income distribution in developing countries, which prevents enactment of progressive taxation.

⁴ As of 2010, of the 24 countries where oil exports represent at least 50 percent of total exports, 14 of them pegged their currency to the US dollar, 5 pegged to the Euro, and 6 pegged to a basket of currencies (IMF 2010).

real exchange rate misalignment adherent to oil price volatility, with its consequent impact on export competitiveness. To address this drawback of pegged regimes, Frankel (2005/2010) suggested pegging to the price of the export commodity in order to reduce the effects of oil price fluctuations. Another proposal is that monetary policy should target currency misalignment (Engel 2009).

As for the RRLA countries, they have pursued exchange rate based stabilization strategies for some time during the last three decades. The motivation to adopt less restrictive exchange rate systems, such as a managed float, crawling pegs, and target zone was to improve trade competitiveness and output stabilization.⁵ However, several countries have not yet reaped the expected benefits of such regimes. For example, Elbadawi and Kamar (2005) find evidence that in some MENA countries a combination of high inflation inertia and either unstable or pegged exchange rate regimes has been associated with high and extended episodes of real exchange rate overvaluations. In the aftermath of the currency crises in Mexico (1994), Southeast Asia (1997), Russia (1998), and Brazil (1999), the sustainability of conventional fixed pegs (soft pegs) in the face of capital mobility and other shocks was questioned. The main motive to move away from pegged regimes and to increase flexibility is to deal with exogenous shocks, contribute to financial stability, and avert future banking or currency crises. Despite that, a number of RRLA countries (particularly Iran and Sudan) had experienced episodes of unstable currencies and hyper-inflation, which also produced massive real overvaluations. Chia et al. (2012) find that in moving from fixed to flexible the rise in volatility of the nominal exchange rate is also coupled by a rise in volatility of the real exchange rate. Also, the effects of terms-of-trade shocks and foreign interest rate shocks are more prolonged under flexible exchange regimes than under fixed regimes.

Sfia (2011) analyzes the determinants of exchange rate regime choice in 17 MENA countries over the 1974–2004 using binomial and multinomial probit models. The results of regressions highlight the important influence of only two factors on the choice of exchange rate regimes: trade openness and oil export capacity; and both factors favor the choice of fixed exchange regimes. Sfia also finds that neither the political economy variables nor the currency crisis measures are robust or significant predictors of exchange rate regimes in the MENA region.

In summary, the exchange rate regimes in the MENA region have had varying degrees of successes. Although the empirical evidence suggests that for the RRLI countries, pegged exchange rate regimes are associated with the best inflation performance. However, this was not the experience of the RRLA countries with pegged regimes. But why do pegged regimes deliver their expected benefits to the first group and not to the second group? One of the main dimensions in choosing an exchange rate regime is the ability to establish credibility with the public. The exchange rate regimes chosen by the RRLA countries had consistently produced inflation bias. The typical situation for almost all the RRLA countries has been one of fiscal dominance, where the authorities use the exchange rate as a nominal anchor while resorting to excessive monetary emission to finance the large deficits (Elbadawi and Kamar 2005). As suggested by the theory, when the public have doubt of the central bank's determination to reduce inflation, they will rationally expect more inflation than otherwise targeted by the central bank and set their expectation of inflation accordingly. Given this expectation of the public, the central bank's best strategy is to create inflation equal to that expected by the public. Thus, the

⁵ For a detailed review of the recent exchange rate regime history in the MENA region, see Elbadawi and Kamar (2005).

economy ends up with positive inflation but not additional output. Another explanation in the literature suggests that when the peg is at an undervalued rate and the country is unable to offset the growth of money supply that occurs with persistent current account surpluses, accumulation of foreign reserves will translate into excessive monetary growth; in such cases the curbed inflation benefit from pegs does not occur.

An important dimension that might explain the success of the RRLI countries with pegged regimes is their labor market structure, although traditional Optimum Currency Area (OCA) analysis suggests that in the absence of independent monetary policy, labor mobility and flexible prices and wages are fundamental pre-requisites to cushion the effects of shocks on the real economy under fixed exchange rate regimes. The GCC countries have been able to compensate for the lack of these pre-requisites through the mobility of foreign workers. The GCC countries have unusual labor force structure. They heavily depend on expatriate workers who work primarily in the private sector, whereas nationals work in the public sector. The labor supply in the private sector is highly elastic. During periods of negative oil price shocks, the government reduces its spending and therefore the private sector can terminate the expatriate workers' contracts. In this case, labor mobility can substitute for exchange rate flexibility. On the other hand, the wages and jobs in the public sector are not flexible. The government can protect the jobs for the locals using the levels of revenues from oil sales. Willett et al. (2010) argue that the insulation of nationals from the effects of macroeconomic shocks has allowed GCC countries to achieve lower inflation rates. This was carried out without generating the types of strong domestic unemployment pressures that typically emerge in absence of independent monetary policy as suggested by the OCA literature.⁶

3. Literature on Optimal Choice of Exchange Rate Regimes

The extensive literature on optimal exchange rate regimes identifies a number of factors that should be considered in exchange rate regime choice including: the size and openness of the country to trade and capital mobility, the structure of its production and exports, the level of financial development, the history of inflation, the types and sources of shocks, and the credibility of institutions. Levy-Yeyati et al. (2010) summarizes choice of exchange rate regimes in three competing approaches: 1) the optimal currency area (OCA) which relates the choice of exchange regimes to country's trade links, size, openness, and the types and sources of shocks the economy is subject to; 2) the financial view which relates to the impossible trinity (the fact that policymakers can choose two out of three corners of the trinity: capital mobility, monetary policy, and a fixed exchange rate) and the currency mismatch argument or the balance sheet effects; 3) the political economy view, which relates the use of an exchange rate anchor to establish credibility with the public. Despite the well-developed theoretical frameworks and the empirical evidences, many countries are still pondering their options of exchange rate regimes. This illustrates the challenging trade-offs that confront monetary policymakers in prioritizing their policy objectives. A review of this extensive literature is beyond the scope of this paper. However, the literature seems to agree on the following simple scheme in choosing a particular regime: when the country is developing and its banking and financial system is not developed and has less diversified production and exports, a peg to a low inflation and stable monetary policy anchor country seems to be the appropriate choice, particularly if the policy

⁶ One caveat to this argument is that, although the level of unemployment remains low relative to the counterfactual of a totally inflexible labor market, there are alarming signs of rising unemployment among nationals due to the increasingly limited capacity of the public sector in absorbing more labor.

preference is to keep domestic inflation under control but lacks policy credibility. As the banking and financial markets develop and capital mobility increases, a country should move toward more flexibility, e.g. crawling exchange rate (a more flexible version of the fixed regime). Finally, when a country reaches the stage of having an advanced banking and financial system that is fully integrated in the global capital markets and has diversified production and trade, the freely floating exchange rate is more appropriate with a nominal anchor strategy such as inflation targeting.

Despite the economic and financial importance of the MENA economies, few contributions have been devoted to the issue of these countries' exchange rate regime choice (Jbili and Karamenko 2003). On the theoretical side, few studies have incorporated the economic structure and the policy preferences of primary commodity exporting countries. For example, Al-Abri (2014) examines the choice of the optimal exchange rate regime for an oil-exporting small open economy using a three-country new Keynesian open economy model, incorporating the primary commodity (crude oil) with different sources of shocks. Despite the absence of a non-oil traded sector in this primary commodity economy, the welfare analysis suggests that flexible exchange rate regimes can reduce the impacts of real shocks and consumption volatility given certain caveats about pricing-schemes of imported goods. Taş and Togay (2010) uses a model of asymmetric information and dynamic learning in the spirit of Svensson and Woodford (2004) to analyze the optimal exchange rate regime for Iraq in the new era. Squalli (2011) uses a general central bank loss function in the spirit of Berger et al. (2001) to analyze the viability of the US dollar peg for the GCC countries, focusing on the role of imported inflation. In this paper, we contribute to this literature by incorporating the role of labor market heterogeneity in optimal exchange rate regime choice in a primary commodity exporting country.

4. Labor Market Role in Exchange Rate Regime Choice

The basic theoretical model developed by Milton Friedman in the early 1950s shows that in a world of sticky prices, the flexible exchange rate outperforms the fixed exchange rate system in insulating the economy against real shocks. A key merit of floating regimes is that they help deflect or absorb the impact of adverse external shocks (e.g., shocks to terms-of-trade, reversal of capital flows, contraction in world demand, foreign interest rate shocks, etc.), and avoid large costs to the real economy. These shocks usually necessitate an adjustment in real exchange rates (i.e., relative prices). Given that domestic prices move slowly, it is both faster and less costly to have the nominal exchange rate respond to a shock and make the necessary adjustment in the real exchange rate. This makes flexible exchange rate systems more desirable in this case.

However, with high degree of wage indexation in the economy, the degree of pass-through from exchange rates to prices is high and, thus, limits the shock buffering capacity of the floating regimes. Devereux and Engel (2003) show that exchange rate flexibility is desirable to the extent that the law of one price holds. However, if prices are unresponsive to exchange rate fluctuations, then the expenditure switching channel of flexible exchange rate adjustment will not work, and fixed regimes might outperform flexible regimes in this case. In a similar vein, Castrén et al. (2004) show that labor market reforms, which reduce the persistence of the effect of shocks, make an exchange rate peg more robust, and therefore more credible. Using econometric tests for the gold-standard 1881-1913, Khoudour-Castéras shows that the free labor movements that characterized the pre-1914 world most likely helped gold standard members to maintain the stability of their currency, while for countries with flexible exchange rates, which experienced much less volatility in their emigration rate, the nominal exchange rates constituted

the main adjustment mechanism. We thus, turn to our theoretical analysis to incorporate the market flexibility in exchange rate regime choice of a primary commodity exporting country.

4.1 Theoretical framework

For the purpose of analyzing the role of labor market heterogeneity in the MENA region in the choice of optimal exchange rate regime, we consider a standard static rules-vs-discretion model of a small open economy (Aizenman and Glick 2008; Barro and Gordan 1983; Berger et al. 2001; Flood and Marion 1999; Gray 1976). The home country is small and takes all prices as exogenous. The monetary authority's loss function is quadratic in output gap, inflation, and nominal exchange rate stability. It acts to minimize the expected deviation of output, inflation, and the nominal exchange rate from their target levels ($y_f > 0$ and $\pi_t^* = 0$) as:

$$L = E_t \left(\lambda(y_t - y_f)^2 + \pi_t^2 + \delta(s_t - \bar{s}_t)^2 \right) \quad (1)$$

Where y_t is log of output, y_f is target log of output, λ is the cost of missing the output target (or the relative weight assigned by the policymaker on the respective policy objectives), and π_t is the log of actual inflation rate. s_t is the change in the nominal exchange rate and \bar{s}_t is the normal change in the nominal exchange rate. δ is the cost of excessive nominal exchange rate volatility. The economy is modeled with the following structural equations:

$$\text{Aggregate supply} \quad y_t = -\alpha(w_t - \pi_t) + \varepsilon_t, \quad \alpha > 0 \quad (2)$$

$$\text{Wage rate} \quad w_t = \theta\pi_t + (1 - \theta)\pi_t^e, \quad 0 \leq \theta \leq 1 \quad (3)$$

$$\text{Cost-augmented purchasing power parity} \quad \pi_t = (s_t + \pi_t^* + \nu) + \gamma w_t \quad (4)$$

The aggregate supply is a Lucas-type function that responds only to the unexpected portion of macroeconomic policy, when actual inflation, π_t , exceeds nominal wage increases, w_t . α is the payoff to unexpected inflation in terms of higher real output. The shock to aggregate supply, ε_t , is the terms-of-trade shock in this case and has expected value of zero at time $t - 1$ and constant variances σ_ε^2 and is serially uncorrelated.

To incorporate the labor market heterogeneity in the MENA region which is discussed in Section 2, we divide the labor force into two parts: a fraction θ of the labor force who are expatriate and their wage rate is flexible and can be indexed to the inflation rate, $w_t = \theta\pi_t$ and a fraction $(1 - \theta)$ of the labor force who are nationals for whom wages are rigid and preset to the expected inflation formed at time $t - 1$, $w_t = (1 - \theta)\pi_t^e = (1 - \theta)\pi_{t-1}$. For example, when $\theta = 0$ then wages are all preset, this makes the aggregate supply curve flatter and real external shocks have more effect on output and less effect on inflation. With this specification, the slope of the aggregate supply curve shows how effectively various exchange rate regimes insulate domestic output from unanticipated shocks.⁷

Following Berger et al. (2001), the stochastic purchasing power parity condition, Eq. (4), is brought to close the model, where s_t is the rate of nominal exchange rate depreciation ($s_t = 0$ under fixed exchange rate regime), π_t^* is the inflation rate in the anchor country, and ν is a foreign monetary shock that can also represent a disturbance to the world's interest rate. For

⁷ In this simple model, they assume that the proportion of wage indexation (θ) is exogenous. A proper modeling should also consider the case where the government's choice of exchange-rate regime systematically influences the degree of indexation and consequently the slope of the economy's aggregate supply curve.

simplicity, we assume that the correlation of this shock with the terms-of-trade shock ε_t is zero.⁸ To allow for a cost-push inflation, we augment the purchasing power parity with the nominal wage rate (γw_t), where γ is the pass-through of wage hikes to the domestic inflation. Similar formulations are provided in Edwards (1996). We, henceforth, deal with the case in which the equilibrium is time invariant and we omit time subscripts.

Equilibrium outcomes

The monetary authority's goal is to determine the rational expectations consistent optimal y and π that minimize the loss function. The time consistent rational expectations equilibrium under a flexible exchange rate regime is:

$$\pi = \frac{\lambda\alpha(1-\theta)}{1 + \lambda\alpha^2(1-\theta)^2 + \delta(1-\gamma\theta)^2} y_f - \frac{\lambda\alpha(1-\theta)}{1 + \lambda\alpha^2(1-\theta)^2 + \delta(1-\gamma\theta)^2} \varepsilon + \frac{\delta(1-\gamma\theta)}{1 + \lambda\alpha^2(1-\theta)^2 + \delta(1-\gamma\theta)^2} v \quad (5)$$

$$y = \frac{1 + \delta(1-\gamma\theta)^2}{1 + \lambda\alpha^2(1-\theta)^2 + \delta(1-\gamma\theta)^2} \varepsilon + \frac{\delta(1-\gamma\theta)}{1 + \lambda\alpha^2(1-\theta)^2 + \delta(1-\gamma\theta)^2} v \quad (6)$$

Note that with $\theta=1$ (wages are fully flexible), the expected inflation rate by the public is zero. Also, the terms-of-trade shock does not affect the domestic prices as the adjustment is borne by the nominal exchange rate. The terms-of-trade shock affects real output in a one-to-one fashion. This is because under a flexible exchange rate regime with full indexation of wages, changes in nominal exchange rates are fully passed through to domestic prices, thus, the expenditure switching channel does not perform the usual real shock adjustment. Note that the foreign monetary shock (v) does affect real output and inflation under flexible exchange rate regimes. This is due to the presence of the nominal exchange rate in the authority's loss function.

However, when $\theta=0$ (nominal wages are all preset) the inflation rate is higher than the case of full wage indexation. On the other hand, the impact of the terms-of-trade shock on real output is lower than the case of full wage indexation. This suggests that with nominal stickiness, countries that are subject to real shocks would benefit from exchange rate flexibility. For example, a negative terms-of-trade shock that depreciates the exchange rate would help reduce real wages and ensure expenditure switching from more expensive foreign goods to relatively cheaper domestically produced ones, thereby maintaining employment and output.

If the monetary authority decides to peg the exchange rate against an anchor country, then $s_t = 0$ in Eq. (4). In this case, the rational expectations consistent optimal y and π that minimize the loss function are:

$$\pi = \frac{1}{(1-\gamma\theta)} \pi^* + \frac{1}{(1-\gamma\theta)} v \quad (7)$$

⁸ Berger et al. (2001) analyze the case when this correlation is non-zero. The assumption of zero correlation might not be realistic given the financial crisis of 2008 which had also dramatically affected international oil prices. Thus, the terms-of-trade shocks in oil-exporting country are positively related to external monetary shocks.

$$y = \frac{\alpha}{(1 - \gamma\theta)} v + \varepsilon \quad (8)$$

The expected inflation rate is equal to the foreign inflation rate, adjusted by a ratio of wage indexation and the degree of pass-through from nominal wages to domestic inflation. It is also obvious that the level of wage indexation (θ) affects the responses of domestic inflation rate and real output to the foreign monetary shock and the terms-of-trade shock respectively. It can be shown that with $\theta=1$ (nominal wages are fully indexed to inflation rate), the foreign monetary shock has a lower effect on real output under a fixed exchange rate regime. This supports the notion that countries which are subject to external nominal shocks would be better off with a fixed exchange rate regime. For example, a nominal shock to money demand would affect the domestic liquidity, as a result of central bank's purchases and sales of foreign exchange in the foreign exchange market in order to maintain the fixity of the exchange rate. Under this adjustment mechanism, there is no need for wage or domestic price movements to absorb the shock.

When substituting the equilibrium output and inflation under the two exchange rate regimes, in the central bank loss function [Eq. (1)], we obtain:

$$L^{FLEX} = \lambda y_f^2 + \frac{\lambda}{(1 + \lambda\alpha^2(1 - \theta)^2 + \delta(1 - \gamma\theta)^2)^2} \sigma_\varepsilon^2 + \frac{2(\lambda + 1)\delta^2(1 - \gamma\theta)^2}{(1 + \lambda\alpha^2(1 - \theta)^2 + \delta(1 - \gamma\theta)^2)^2} \sigma_v^2 + \delta\sigma_s^2 \quad (9)$$

$$L^{FIX} = \lambda y_f^2 + \frac{1}{(1 - \gamma\theta)^2} \pi^{*2} + \lambda\sigma_\varepsilon^2 + \frac{1 + \lambda\alpha^2}{(1 - \gamma\theta)^2} \sigma_v^2 \quad (10)$$

where σ_s^2 is the variance of the nominal exchange rate. To compare the loss function with alternative labor market assumptions, Table 3 presents the values of the loss function under alternative exchange rate regimes and the two polar cases of nominal wage indexation.

Considering fixed exchange rate regimes only, the loss function is lower with full wage indexation ($\theta = 1$) compared to the case of no wage indexation ($\theta = 0$). This is because when the nominal exchange rate is not allowed to adjust to real external shocks, the required adjustment in the real exchange rate is made possible through changes in prices and nominal wages. Under a fixed exchange rate regime the foreign inflation and the variance of foreign monetary shocks are transmitted to the domestic economy. In this case, an independent monetary policy is impotent to respond to the real shock. With full wage indexation ($\theta = 1$), we can see that the terms-of-trade volatility has a higher impact on the loss function of fixed exchange rate regimes compared to that of flexible exchange rate regimes. The opposite is true when considering foreign monetary volatility. Thus, with some plausible restrictions on the model parameters, the above results suggest that fixed exchange rate regimes work better for countries with flexible labor markets (e.g. RRLI countries), while flexible exchange rate regimes work better for countries with inflexible labor markets (e.g. RRLA countries). This suggests that with no nominal stickiness, creditability gains under fixed exchange rate regimes are lower than the loss of flexibility in monetary policy. Likewise, with nominal stickiness and flexible exchange rate regimes, the loss of flexibility outweighs the gain in creditability.

4.2 Discussions

The above theoretical framework suggests that when the home country takes all prices as exogenous and wages are all optimally indexed to actual inflation, fixed exchange rate regimes

provides better insulation against external shocks compared to flexible exchange rate regimes. On the other hand, the fixity of exchange rates combined with rigid goods and labor markets can add to the real appreciations.

One important caveat in this regard is that we need to distinguish shocks that are originating internally from those originating externally. The above discussion is related to the shocks that are exogenous to the country. If the shocks are internal (endogenous), then the country can better deal with these shocks using a fixed exchange rate regime. This is because under a fixed exchange rate regime, fiscal policy is more effective in offsetting real shocks.

Another caveat is the endogeneity of the labor markets when assessing the consequences of alternative exchange rate regimes. For example, under fixed exchange rates the nominal exchange rate is fixed and we expect higher rigidity in wages and prices due to the stable inflation rate, thus, fiscal expansion or contraction will not be correlated with income. Under flexible exchange rates, we expect prices and wages to be less rigid due to the higher volatility of the nominal exchange rate. These prices will respond more quickly to real shocks before the offsetting fiscal policy can have its effects on the economy. Thus, the endogeneity problem in offsetting real shocks is lower under the fixed exchange rate. A third caveat is related to the observation that although certain exchange rate regimes might provide insulation from foreign disturbances, they may nevertheless be inferior to other regimes in terms of their ability to minimize the loss function.

5. Conclusions and Recommendations

This paper discusses the alternative exchange rate regime arrangements for the natural resource abundant MENA region with emphasis on the diverse labor market. We evaluate the loss of flexibility or the gain in creditability with alternative assumptions about the labor market. While the lesson of no “one-size-fits all” with regard to the choice of the optimal exchange rate regime still applies, our analysis suggests some important policy implications. The notion that flexible exchange rate regimes are real shock absorber should be taken with caution under heterogeneous labor markets. In countries with relatively more flexible labor markets, fixed exchange regimes are more desirable in responding to shocks as the creditability gains of fixed exchange rate regimes might outweigh the loss of flexibility in monetary policy. However, with rigid labor markets and employments, flexible exchange regimes are more desirable in responding to shocks as the loss of flexibility by fixing the exchange rate outweighs the gain in creditability. Nevertheless, pegged regime countries should also consider more flexible exchange rate regimes. This is partly due to the growth in the size of the private sector and that the economy is becoming more market oriented. The capacity of government employment has already been stretched to the limit as these countries attempt to avert possible transmissions of the Arab Spring. In addition, some resource rich MENA countries are fast approaching the end of their primary resource reserves. These developments suggest that the labor market is changing in oil exporting countries.

The movement toward more flexible regimes requires appropriate sequencing of improvements in financial systems and progress in fiscal adjustment. For example, capital account liberalization should come after domestic financial market liberalization to avoid destabilization through large capital inflows. More importantly is the need for these countries to initiate the transition from the current exchange rate regimes without waiting for a crisis to occur. Drawing on the experiences of resource-rich countries which had moved from fixed towards more flexible regimes (particularly, Chile and Egypt), highlights the need to make the necessary preparations

during periods of strong fundamentals. For example, the Chilean move to a managed float happened during periods of strong macroeconomic fundamentals which ensured a smooth transition to and the viability of the new system.⁹ In contrast, the Egyptian movement to a managed float was under market pressures and during periods of high volatility in real exchange rate. As a result, the credibility of the flexible exchange rate regime has not yet been fully established.

Parallel to this, is the observation that exits from pegged exchange rate regimes have often been accompanied by crises and severe declines in economic activity. Aizenman and Glick (2008) and Eichengreen (1999) find that exits from pegged exchange rates have not occurred under favorable circumstances. Aizenman and Glick (2008) show that achieving inflation stability via an exchange rate anchor can create a “trap” whereby the regime initially confers gains in anti-inflation credibility, but ultimately results in an exit occasioned by large adverse real shocks, resulting in big welfare losses to the economy. This suggests that more conservative and longer-lasting pegged regimes are likely to end with severe output losses.

Finally, we add to the growing notion in this literature that regardless of the current exchange rate regimes adopted by countries in the MENA region, the need to develop market based policy instruments to fulfill the prerequisites for a successful operation of a flexible exchange rate regime is becoming more critical. For example, under an inflation-targeting framework, the central bank commits to meeting a certain inflation target in a given period and uses appropriate instruments to achieve it. The central bank would adjust short-term interest rates in response to developments in expected inflation, the output gap, and some measure of the exchange rate (Svensson 1999; Svensson and Woodford 2004). For this arrangement to be successful, other prerequisites need to be satisfied including: an overall institutional commitment to price stability; absence of fiscal dominance and existence of high degree of fiscal and monetary policy coordination; policy instrument independence and strong operational capability of the central bank.

⁹ In the past three decades, Chile has moved from a fixed exchange regime, a crawling band, a managed floating regime, to a freely floating regime with inflation targeting. Throughout its recent macroeconomic history, Chile was able to maintain competitive real exchange rates, mainly by adopting regime-consistent macroeconomic policy, but also by imposing capital controls that discourage dis-stabilizing capital inflows (Edwards 2000).

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Table 1: Natural Resources Abundance and Export Diversification in MENA Region

	GDP per capita 2012 (millions of 2005 constant US dollars)	Average real GDP growth rate 1980-2012	Standard deviation of real GDP growth rate 1980-2012	Oil production (millions of barrels) in 2012	Proven Oil reserves trillion barrels (end of 2012)	Gas production (billion cubic meters) in 2012	Proven gas reserves trillion cubic meters (end of 2012)	Fuel exports as % of merchandise exports 2000-2012	Manufacturing exports as % of merchandise exports 2000-2012
Group1: RRLI									
Bahrain	14,253	4.3	4.4	NA	NA	14.2	0.2	61.4	9.97
Kuwait	29,338	5.9	8.5	3,127	101.5	14.5	1.8	94.5	4.44
Libya	8,776	4.3	5.0	1,509	48.0	12.2	1.5	97.2	2.74
Oman	13,903	6.1	5.3	922	5.5	29.0	0.9	82.9	8.95
Qatar	54,249	12.1	6.3	1,966	23.9	157.0	25.1	85.0	7.58
Saudi Arabia	17,591	2.8	5.1	11,530	265.9	102.8	8.2	89.5	8.91
UAE	24,708	3.3	6.2	3,380	97.8	51.7	6.1	74.7	3.13
Group 2: RRLA									
Algeria	3,185	2.7	2.3	1,667	12.2	81.5	4.5	97.3	1.98
Egypt	1,560	4.7	1.9	728	4.3	60.9	2.0	40.7	34.31
Iran	3,105	3.7	5.6	3,680	157.0	160.5	33.6	78.7	9.98
Iraq	1,603	5.6	20.0	3,115	150.0	0.8	3.6	89.4	0.21
Sudan	836	4.1	5.4	82	1.5	NA	NA	82.3	1.41
Yemen	778	4.1	3.7	180	3.0	7.6	0.5	92.7	1.44

Sources: BP Statistical Review of World Energy, British Petroleum, 2013; World Development Indicators (WDI), World Bank, 2013.

Table 2: Selected Indicators for the MENA Region

	Population in 2012 (million)	International migration stock as % of population 2010	Central bank official reserves (months of imports in 2012)	Average domestic credit to private sector during 2000-2012 (% of GDP)	Average net remittances during 2000-2011 (billion US dollars)	Public debt in 2012 (% of GDP)	Average CPI Inflation 2000-2012 (%)	IMF de facto exchange rate regime in 2012
Group1: RRLI								
Bahrain	1.3	25.2	2.3	59.7	-1,371	54.3	1.5	Pegged to US dollar
Kuwait	2.7	70.1	9.1	64.7	-5,933	6.0	3.5	Pegged to a basket
Libya	6.0	11.3	80.7	12.6	-766	3.5	1.7	Pegged to SDR
Oman	3.2	29.5	4.4	37.8	-3,312	4.1	3.1	Pegged to US dollar
Qatar	2.0	74.6	5.4	36.5	-9,871	32.8	4.5	Pegged to US dollar
Saudi Arabia	26.9	26.7	35.4	34.0	-21,314	11.5	2.7	Pegged to US dollar
UAE	5.5	69.0*	NA	51.3	-7,460	43.3	3.4	Pegged to US dollar
Group 2: RRLA								
Algeria	38.1	0.65	35.9	12.3	118	7.9	3.8	Managed float
Egypt	85.3	0.31	2.4	45.3	6,162	88.0	8.0	Stabilized arrangements
Iran	79.9	2.9	NA	26.0	NA	19.9	16.2	Managed float
Iraq	31.9	0.27	13.1	3.6	93	NA	17.5	Stabilized arrangements
Sudan	34.9	1.65	0.2	9.3	1,416	106.4	12.3	Managed float
Yemen	25.4	2.28	4.1	6.4	1,130	43.0	11.7	Managed float

Sources: World Development Indicators (WDI), World Bank, 2013; The Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), IMF, 2012.

Table 3: The Central Bank's Loss Function under Alternative Exchange Rate Regimes and Different Nominal Wage Indexation

Wage indexation	Flexible exchange regime	Fixed exchange regime
$\theta = 0$	$\lambda y_f^2 + \frac{\lambda}{(1 + \lambda\alpha^2 + \delta)^2} \sigma_\varepsilon^2 + \frac{2\lambda\delta^2}{(1 + \lambda\alpha^2 + \delta)^2} \sigma_v^2 + \delta\sigma_s^2$	$\lambda y_f^2 + \pi^{*2} + \lambda\sigma_\varepsilon^2 + (1 + \lambda\alpha^2)\sigma_v^2$
$\theta = 1$	$\lambda y_f^2 + \frac{\lambda}{(1 + \delta(1 - \gamma)^2)^2} \sigma_\varepsilon^2 + \frac{2(1 + \lambda)\delta^2(1 - \gamma)^2}{(1 + \delta(1 - \gamma)^2)^2} \sigma_v^2 + \delta\sigma_s^2$	$\lambda y_f^2 + \frac{1}{(1 - \gamma)^2} \pi^{*2} + \lambda\sigma_\varepsilon^2 + \frac{(1 + \lambda\alpha^2)}{(1 - \gamma)^2} \sigma_v^2$