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CIVIL CONFLICTS AND EXCHANGE RATE MISALIGNMENT: EVIDENCE FROM MENA AND ARAB LEAGUE MEMBERS

THIBAULT LEMAIRE

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Civil Conflicts and Exchange Rate Misalignment: Evidence from MENA and Arab League Members

Thibault Lemaire [1,2]

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Abstract

For more than a decade, civil conflicts intensity has been high in the Middle East and North Africa, yet the monetary and financial impacts of such episodes have received relatively little attention. Using macroeconomic and conflict panel data for Arab League members, Iran and Turkey during the period 1970–2018, this paper constructs a country-specific real exchange rate misalignment index and adopts an instrumental variable approach to show that civil conflicts lead to real exchange rate overvaluations in the region. Economic policy during post-conflict transitions should be elaborated based on a strategy to realign the currency in order to prevent further macroeconomic imbalances and foster social stability, economic growth and long-term development.

Keywords: Exchange Rate Misalignment, Civil Conflict, Middle East & North Africa, Emerging and Developing Countries.

JEL Classification: C23, D74, E32, F31, F41.

[1]Banque de France, Université Paris 1 Panthéon - Sorbonne. thibault.lemaire@etu.univ-paris1.fr.

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1 Introduction

Economic research has shown that macroeconomic stability is an important requisite to achieve sustainable economic growth and build prosperous, inclusive societies. Recently however, several Arab League member States and countries from the Middle-East have experienced episodes of high inflation and large nominal exchange rate movements. While countries from the region have long been affected by civil conflicts, these have been particularly intense in Iraq, Libya, Somalia, Sudan, Syria and Yemen in recent years. The adverse human and macroeconomic consequences of civil conflicts on the real sector have been extensively studied by the literature, especially in Sub-Saharan Africa, but relatively less attention has been paid to the implications for the monetary and financial sectors.

In this paper, I combine macroeconomic data with data on civil conflicts occurrence and intensity to assess the effects of civil conflicts on real exchange rate (RER) misalignment in Arab League member countries, Iran and Turkey. Large RER misalignment would create or reinforce macroeconomic imbalances that could threaten the following post-conflict transition. ElBadawi and Soto (2013b) show that while exchange rate regimes are persistent over time, a significant share of countries tend to adopt a more flexible exchange rate regime in post-conflict transitions. This denotes the need to correct the imbalances created by the conflict: high inflation is one of them and primarily affects the most vulnerables. Because civil conflicts affect aid, capital inflows, agricultural output and exports, and because they lead to a higher demand for military goods and imports, they might lead to a RER depreciation. However, higher public spending and high inflation due to shortages in basic goods, among other reasons, could have an opposite effect and lead to a RER appreciation. Since the response of RER misalignment to civil conflicts is undetermined, I adopt an empirical approach.

Following Collier (1999), among others, the recent literature on the economic causes and consequences of civil conflicts is quite extensive and has identified a great variety of relationships, particularly focusing on Sub-Saharan Africa and on country case studies. While the RER is increasingly recognised as an important determinant of growth and structural change (Rodrik, 2008; Guzman et al., 2018), little attention has been paid to the effects of civil conflicts on this variable.

The contribution of this paper is therefore threefold. First, it assesses the macroeconomic impacts of civil conflicts outside Sub-Saharan Africa, in a region that has received less attention in this literature. Second, it provides country-specific estimations of the RER misalignment over a long period, following the behavioural approach developped in Edwards (1989), ElBadawi (1994) and Clark and MacDonald (1998), among others. Third, while the computation and the macroeconomic effects of RER misalign-

ment have been widely studied, this paper adds to a still scarce literature on the determinants of RER misalignment.

To test the hypothesis that RER misalignment is affected by civil conflicts, I use conflict data from the Center for Systemic Peace, real effective exchange rate data from Darvas (2012) and macroeconomic data mainly from the World Development Indicators, complemented by several other sources. The panel dataset has a yearly frequency, covers the period 1970–2018 and includes 19 Arab League member countries, Iran and Turkey. Libya, Palestine and Somalia are excluded from the sample due to missing data that impede to compute their RER misalignment. Since the OLS estimates might be biased due to several sources of endogeneity, I adopt an instrumental variable approach and instrument the magnitude of civil conflicts in each country by the magnitude of civil conflicts in the neighbouring countries. The correlation between civil conflict domestically and in neighbouring countries has been established by the literature (see for example Phillips, 2015), and I argue that the exclusion restriction is fulfilled since civil conflicts in neighbouring countries only affect international capital flows in the short-term through the increased probability of civil conflicts domestically.

The results show that civil conflicts lead to RER overvaluations. Additionnally to the threats posed on the post-conflict transition itself by the resulting dissatisfaction and social unrest, the outcome of the creation of new institutions can be affected and have lasting effects. If left unaddressed, RER overvaluation resulting from civil conflicts can therefore have effects in the long-run, beyond the business cycle, and sum to human and physical capital losses to hinder economic growth and development prospects.

The remainder of the article is organized as follows. Section 2 reviews the literature, Section 3 details the construction of the real exchange rate misalignment index and Section 4 presents the data and stylized facts. Section 5 introduces the empirical strategy and Section 6 presents and discusses the results. Finally, Section 7 concludes.

2 Review of the Literature

Civil conflicts have attracted much attention and are the object of a vast economic literature. Their occurences have been analysed (Collier and Hoeffler, 2002), as well as their social, economic and environmental consequences (Collier, 1999; Devadas et al., 2019; Prem et al., 2020), including their consequences on neighbouring countries (David et al., 2020). A large strand of this literature has focused on civil conflicts' determinants (Collier and Hoeffler, 2004). The occurence, the duration and the intensity of such conflicts are related to climate change and weather shocks (Burke et al., 2009, 2015;

Mach et al., 2019), negative growth shocks (Miguel et al., 2004), income shocks (Dube and Vargas, 2013), inequalities (Østby et al., 2009), rents (ElBadawi et al., 2020), or humanitarian interventions in some cases (Nunn and Qian, 2014), among other causes. Theoretical and empirical analysis also confirmed that country-specific dynamics in political economy affect civil conflicts' duration and intensity (Fergusson et al., 2013, 2016). Another strand of this literature has discussed the economic issues related to the crucial post-conflict transitions (ElBadawi, 2008; Collier et al., 2008; ElBadawi and Soto, 2013b; Fergusson et al., 2021).

The literature on the economics of civil conflicts, especially when using cross-country data, has largely focused on Sub-Saharian Africa. Several specific countries, such as Colombia, have also been widely studied. The Middle-East and North Africa is not absent, but it has received relatively little attention compared to the prevalence of such conflicts and their impacts in the region. By using data for Arab League members, Iran and Turkey, this paper contributes to fill this gap in the literature.

The literature that has assessed the economic consequences of civil conflicts has also mainly focused on real variables, such as human and capital loss, growth decline and migrations, for example. With notable exceptions, monetary and financial variables, which do not correpond to the most pressing preocupations, have received much less attention. ElBadawi and Soto (2013a), for example, find evidences that managed floating exchange rate regimes have a greater capacity to stabilize inflation in post-conflict transitions.

Several authors have argued that sustained and limited RER undervalations can be growth-enhancing by correcting market failures and fostering exports and structural change (Rodrik, 2008; Guzman et al., 2018). The RER is unlikely to be the main concern of any group involved in a civil conflict and growth-promotion is not a policy objective in this case, but large RER misalignments could weigh on the post-conflict transition and complicate the return to stability.

Several outcomes of civil conflicts could generate forces, sometimes working in opposite directions, that lead to RER misalignments. Staines (2004) finds that aid usually declines during civil conflicts. The same appears to be true for capital inflows (Li et al., 2017) and exports (ElBadawi and Soto, 2013b). These shortages in the supply of foreign currency are expected to lead to RER depreciations and are reinforced by the higher demand for legal or clandestine imports of military goods, which constitute an increase in the demand for foreign currency. The U.S. civil war provides a famous historical example, when the then Secretary of Treasury secured three bank loans of fifty million U.S. dollars each to secure access to gold and therefore imports (Mehrling and Sandilands, 1999). The decrease in agricultural sector intensity (Eklund et al., 2017)

and agricultural output (Jaafar et al., 2015) further depresses exports and increases the demand for imports to satisfy subsistance requirements, making hard currency more valuable and depreciating further the domestic currency.

Civil conflicts also generate appreciating pressures on the domestic currency. Increased remittances and bilateral or multilateral military aid could limit the shortages of foreign currency. Miyamoto et al. (2019) find that higher public spendings lead to a RER appreciation in developing countries, and public expenditures increase during civil conflicts, beyond the reallocation of health and education budget to military spending (Gupta et al., 2004). Furthermore, civil conflicts often lead to substantial inflation hikes (ElBadawi, 2008). A lower demand for money and higher public financial needs, in an environment of reduced public revenues and access to financing, can account for this fact and explain why government's tolerance for inflation increases during conflict, as shown in Adam et al. (2008). Together, these consequences of civil conflicts could lead to substantial RER overvaluation and large macroeconomic imbalances that could endanger the post-conflict transition.

Because these mechanisms can work in opposite directions and the response of RER to civil conflicts is uncertain, this paper adopts an empirical approach to assesses the effects of civil conflicts on RER misalignment. By focusing on the monetary and financial consequences of civil conflicts, this papers contributes to fill this second gap in the literature.

3 Real Exchange Rate Misalignment

This section details the construction of the real exchange rate misalignment index, following a behavioural approach in the tradition of Edwards (1989), ElBadawi (1994), Clark and MacDonald (1998) and Goldfajn and Valdés (1999), among others. Alternatives approaches, namely the fundamentals and the external sustainability approaches, are possible but imply drawbacks in the case of developing countries. Noureldin (2018) discusses these limitations.

The behavioural approach, based on theoretical foundations, links a theoretical long-term real exchange rate equilibrium to net foreign assets, terms of trade and a Balassa-Samuelson effect, as well as other real exchange rate determinants. The misalignment is then defined as the difference between the observed real exchange rate and the estimated equilibrium real exchange rate. The main advantages of this approach is to incorporate the Balassa-Samuelson effect, instead of the relative prices of traded goods only, and not to rely on normative current account targets. The behavioural approach relies instead on an econometric specification that links the real

exchange rate to its determinants, which is verified by construction. Bénassy-Quéré (2015) offers a textbook treatment of this notion and its theoretical foundations.

The first step to estimate the equilibrium RER consists in specifying an empirical model that expresses the RER as a function of a vector of its fudamentals. Equation (1) details the specification:

$$RER_{i,t} = \alpha_i + \mathbf{\Omega}\mathbf{X'}_{i,t} + \varepsilon_{i,t} \tag{1}$$

where t denotes the time and i the country, α_i a country-specific intercept, RER the real exchange rate (in log), $\mathbf{\Omega}$ a vector of parameters and $\mathbf{X'}$ a vector of fundamental RER determinants comprising the commodity terms of trade (in log), productivity differential with respect to OECD countries, proxied by the ratio of real per capita GDP over that of OECD countries (in log), to capture the Balassa-Samuelson effect, trade openness, government consumption, net foreign assets and the world interest rate, proxied by the Federal Reserve 1-Year Treasury Constant Maturity Rate. $\varepsilon_{i,t}$ is the error term.

Equation (1) is estimated following three econometric methods that allow for an error-correction mechanism when using panel data. The dynamic fixed effects (DFE) estimator restricts all short- and long-run parameters to be equal across countries, except for the intercept which is country-specific, and the mean group (MG) estimator allows both the short- and long-run parameters to be country-specific. The pooled mean group (PMG) estimator assumes that all countries share common long-run parameters but allows short-term parameters to differ accross countries, and therefore offers the best compromise between consistency and efficiency. ElBadawi et al. (2012) offer a detailed description of each estimator and the trade-offs involved.

Table 1 presents the results of the estimation of equation (1) using the DFE, MG and PMG estimators. The signs of coefficients are consistent with the theory, except for net foreign assets which appears to be associated to a RER depreciation. Increases in the commodity terms of trade, productivity, the international interest rate and public consumption are associated to a RER appreciation, while increased trade openness is associated with a RER depreciation.

After estimating equation (1), the equilibrium exchange rate is computed as indicated in equation (2):

$$RER^{E}_{i,t} = \widehat{\delta}_i + \widehat{\mathbf{\Omega}}\overline{\overline{\mathbf{X'}}}_{i,t} \tag{2}$$

where $\overline{\overline{\mathbf{X'}}}$ is a vector of the long-term values of the RER determinants, *i.e.* the trend components obtained using the Hodrick-Prescott filter, $\widehat{\mathbf{\Omega}}$ is a vector of estimated parameters from equation (1), and $\widehat{\delta}_i = \overline{RER}_i - \widehat{\beta}'\overline{\mathbf{X'}}_i$ is a country specific intercept that

Table 1 – Real Exchange Rate Long- and Short-Run Determinants

	(1) Dynamic Fixed Effects	(2) Mean Group	(3) Pooled Mean Group
Long-Run Coefficients:			
Commodity Terms of Trade (ln)	-0.273	-0.456	0.279*
	(0.268)	(0.781)	(0.154)
Productivity (ln)	0.715***	0.319	0.389***
	(0.126)	(0.301)	(0.049)
International Interest Rate	0.013	0.041*	-0.008
	(0.013)	(0.024)	(0.005)
Net Foreign Assets	0.053	-0.229	-0.390***
	(0.223)	(0.591)	(0.032)
Public Consumption	1.233*	0.889	1.240***
	(0.664)	(1.773)	(0.158)
Trade Openness	-0.196	0.217	-0.248***
	(0.238)	(0.523)	(0.045)
Short-Run Coefficients:			
Error Correction Term	-0.119***	-0.351***	-0.132***
	(0.019)	(0.062)	(0.046)
D.Commodity Terms of Trade (ln)	-0.232***	-0.015	-0.342**
	(0.067)	(0.303)	(0.161)
D.Productivity (ln)	0.292***	0.146**	0.252**
	(0.045)	(0.067)	(0.100)
D.International Interest Rate	0.001	-0.001	0.005
	(0.003)	(0.003)	(0.005)
D.Net Foreign Assets	0.150**	0.003	0.125
	(0.062)	(0.181)	(0.184)
D.Public Consumption	0.300*	0.112	0.331
	(0.175)	(0.348)	(0.208)
D.Trade Openness	-0.063	-0.003	-0.040
	(0.045)	(0.059)	(0.031)
Constant	0.848***	1.451	0.579***
	(0.202)	(1.461)	(0.209)
Observations	800	800	800

Note: Standard errors in parentheses. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

allows to normalize the equilibrium RER so that the long run RER misalignment is equal to zero in each country. $\overline{RER}$ and $\overline{\mathbf{X}'}$ correspond to the mean values of the RER and its determinants, respectively.

Equation (2) can therefore be rewritten as:

$$RER^{E}_{i,t} = \overline{RER}_i + \widehat{\mathbf{\Omega}} \left(\overline{\overline{\mathbf{X}'}}_{i,t} - \overline{\mathbf{X}'}_i \right) \tag{3}$$

As evidenced in equation (3), the equilibrium RER corresponds to the mean value of the RER and a term that depends on the weighted difference between the trend components of the RER fundamentals and their mean values. The RER misalignment can then be defined and computed as the difference between the observed RER and the equilibrium RER:

$$RER^{MIS}_{i,t} = RER_{i,t} - RER^{E}_{i,t} = \left(RER_{i,t} - \overline{RER}_i \right) - \widehat{\mathbf{\Omega}} \left(\overline{\overline{\mathbf{X}'}}_{i,t} - \overline{\mathbf{X}'}_i \right) \tag{4}$$

As indicated in equation (4), the RER misalignment depends positively on the difference between the observed RER and its mean value, and depends negatively on the weighted difference between the trend components of the RER fundamentals and their mean values. Noting that $RER_{i,t} = \widehat{\alpha_i} + \widehat{\mathbf{\Omega}} \mathbf{X}'_{i,t} + \widehat{\varepsilon_{i,t}}$, that $\overline{RER}_i = \widehat{\alpha_i} + \widehat{\mathbf{\Omega}} \overline{\mathbf{X}'}_i$, that the cyclical component of the RER determinants can be written as $\widetilde{\mathbf{X}'}_{i,t} = \mathbf{X}'_{i,t} - \overline{\overline{\mathbf{X}'}}_{i,t}$ and rearranging equation (4), the RER misalignment can be expressed as:

$$RER^{MIS}_{i,t} = \widehat{\mathbf{\Omega}} \widetilde{\mathbf{X}'}_{i,t} + \widehat{\varepsilon}_{i,t} \tag{5}$$

Equation (5) shows that the RER misalignment depends on the weighted cyclical components of the RER determinants and short-term shocks. The next section introduces the data and presence stylized facts on civil conflicts and RER misalignment in Arab League member states, Iran and Turkey.

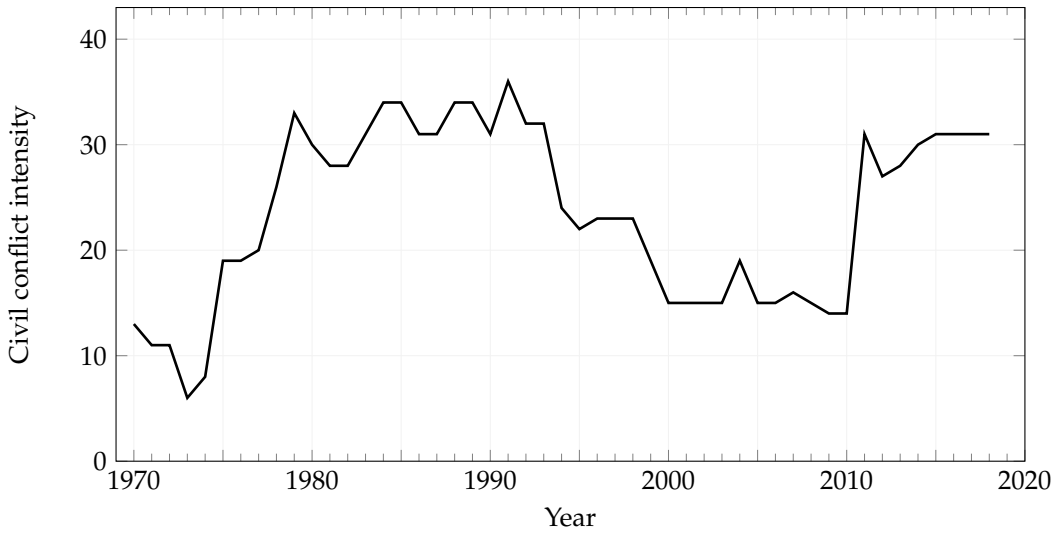
4 Data and Stylized Facts

The country-level data cover 19 countries from the Arab League as well as Iran and Turkey, between 1970 and 2018. Libya, Somalia and Palestine are not included in the sample because missing data for these countries impede to build their RER misalignment index. Appendix Table A.1 details the list of countries included in the sample, and Appendix Table A.2 lists all the data sources used in this paper.

4.1 Civil Conflicts

The data for civil conflicts is retrieved from the Major Episodes of Political Violence (MEPV) dataset elaborated by the Center for Systemic Peace. This dataset differenciates civil violence from civil war based on the degree of militant organization, on tactical and strategic characteristics, and on the expressed level of commitment to the use of violence. The concept of war corresponds to stronger institutional or institutionalized components and more definite objectives. The distinction, however, necessarily implies a subjective judgement, and the same is true for the classification of an intrastate conflict as a civil or ethnic conflict. Therefore, the variable capturing total civil conflict includes both civil and ethnic conflicts, independently from their classification as violence or war.

Figure 1 – Civil Conflict Intensity in Arab League Members and MENA Countries



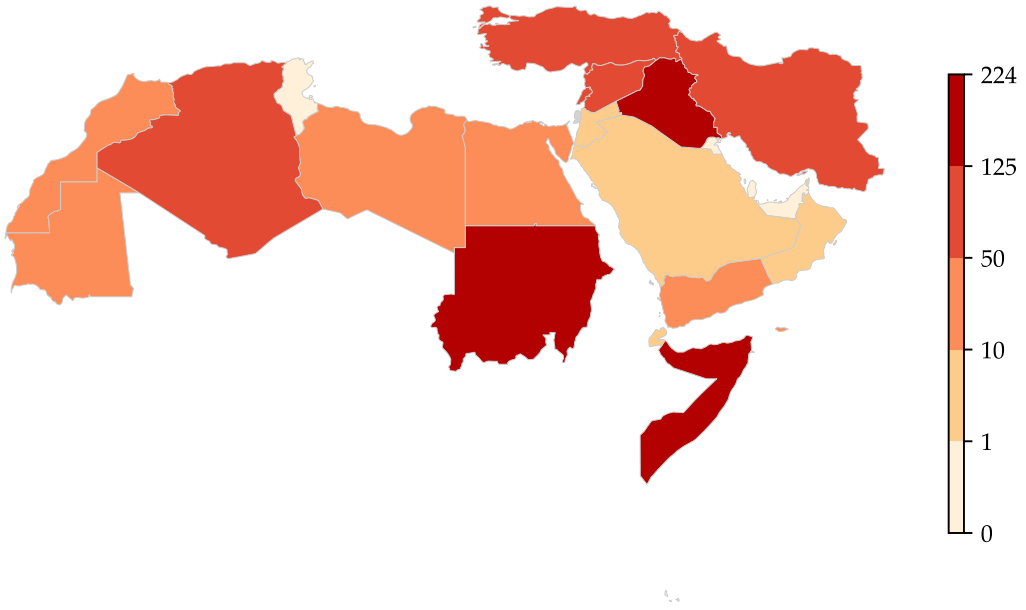
Source: Center for Systemic Peace, elaborated by the author. The country-year conflict intensity index takes values between 0 and 10.

The magnitude of each of these conflicts is coded on a 0 to 10 scale. A score of 0 denotes the absence of conflict, and scores from 1 to 10 denote increasing intensity of conflicts, from "Sporadic or Expressive Political Violence" to "Extermination and Annihilation". Magnitude scores are considered consistent and comparable across categories and cases and can vary across year during a single conflict episode, allowing therefore to obtain a country-year indicator for civil violence, civil war and (total) civil conflict.

Figure 1 shows the evolution of the aggregate intensity of civil conflicts in 21 Arab League members, Iran and Turkey between 1970 and 2018 (data for Palestine is absent from the MEPV dataset). After attaining their lowest intensity in 1973, civil conflicts intensified from 1974, and more sharply from 1975, until reaching their highest

intensity in 1991, at the end of the Cold War when the Soviet Union disintegration culminated. The intensity of civil conflicts sharply declined in the next decade, reaching a relatively low plateau in year 2000 that was maintained during the first decade of the 21st Century. However, the intensity of civil conflicts during this decade remained much higher than at the beginning of the 1970s. In 2011, massive political upheaval led to a new episode of intensification of civil conflicts in the region. The intensity of these conflicts was maintained during the entire decade, at a level comparable to those observed at the end of the 1970s and throughout the 1980s.

Figure 2 – Total Civil Conflict Intensity, 1970–2018



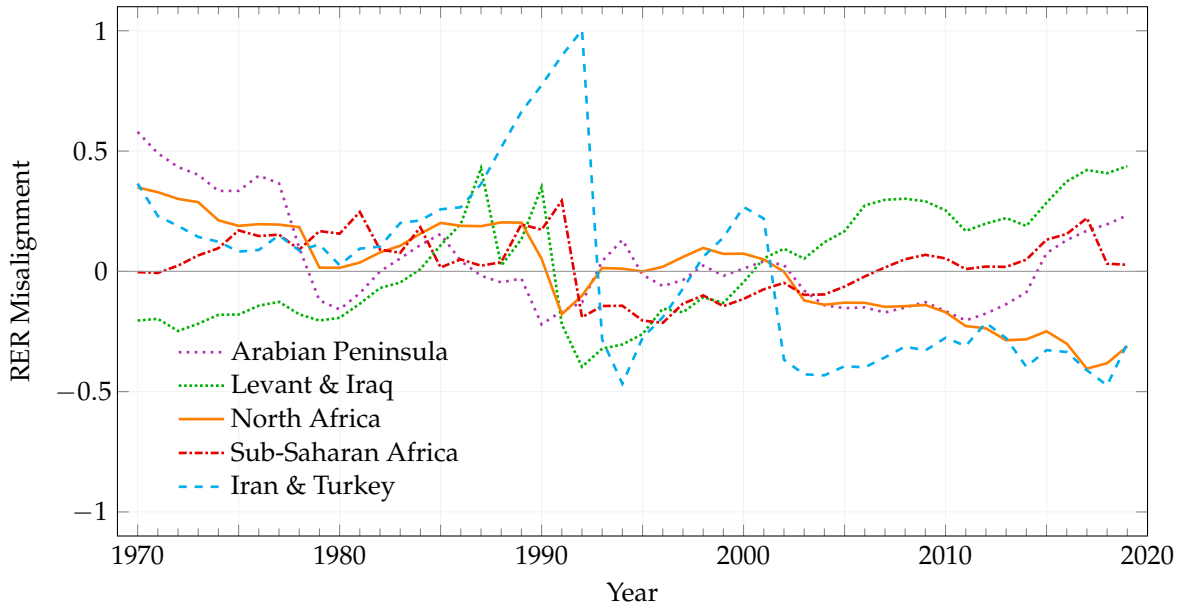
Source: Center for Systemic Peace, elaborated by the author. The country-year conflict intensity index take values between 0 and 10.

Figure 2 shows the aggregate intensity of civil conflicts for each country between 1970 and 2018. Civil conflicts intensity has been the highest in Iraq, Sudan and Somalia during the period and overall, Western Asia appears to have suffered a greater intensity of civil conflicts than North Africa, the Arabian Peninsula being the least affected area. Only six countries did not suffer any civil conflict during this period: Bahrain, Comoros, Kuwait, Qatar, Tunisia and the United Arab Emirates. Appendix Figure B.1 shows the complete time-series of civil conflict for each country.

4.2 Real Exchange Rate Misalignment

Data for real exchange rates are retrieved from Darvas (2012) and correspond to the real effective exchange rates that include 66 trading partners. The determinants of the equilibrium RER are retrieved from several sources. The commodity terms of trade come from Gruss and Kebhaj (2019), the international interest rate is proxied by the U.S. 1-Year Treasury Constant Maturity Rate, retrieved from the Federal Reserve Economic Data, and data on net foreign assets (in % of GDP) and the productivity index, defined as the ratio of per capita nominal GDP to the OECD average per capita nominal GDP (in current USD), come from the WDI dataset (World Bank - WDI, 2020). The share of public consumption in GDP and trade openness, computed as the sum of the shares of merchandise imports and exports in GDP, come from the Penn World Tables version 9.1 (Feenstra et al., 2015).

Figure 3 – Real Exchange Rate Misalignment, by region

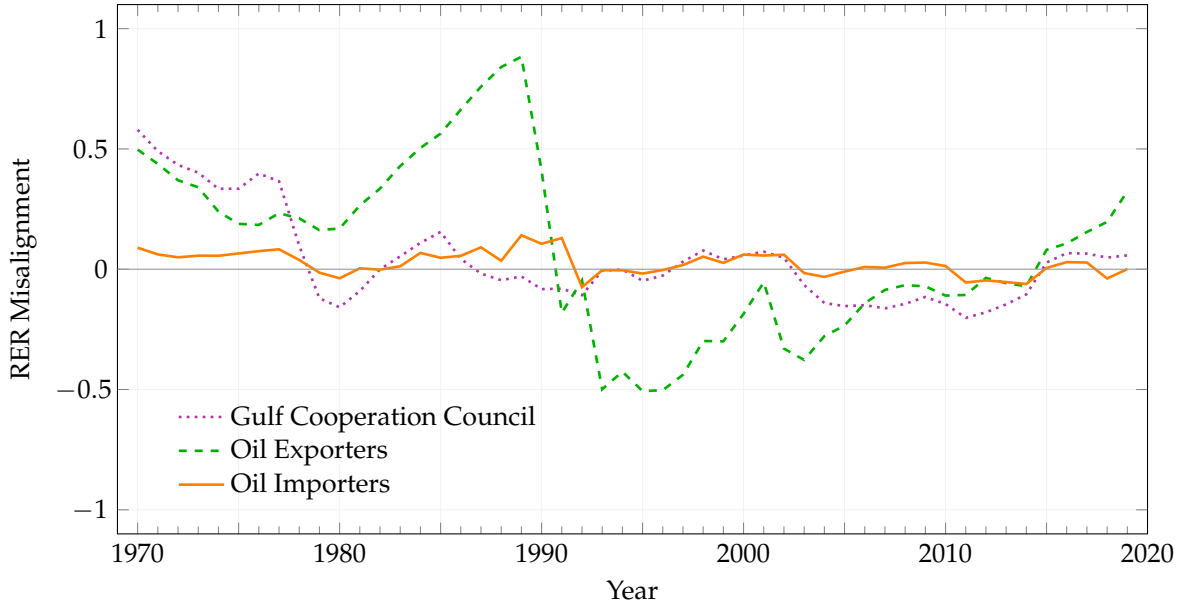


Source: Darvas (2012), calculations and elaboration by the author. A positive value denotes a RER overvaluation, a negative value a RER undervaluation. The RER misalignment is obtained following the procedure detailed in Section 3.

Figure 3 describes the evolution of RER misalignment in different geographic regions between 1970 and 2019. The RER misalignment shows a downward trend in North Africa, from a substantial overvaluation in the 1970s to a large undervaluation since the 2000s. It has been more volatile in Iran and Turkey, with a large overvaluation until 1992 and around 2000, and a large undervaluation in 1993–1995 and since 2002. In the Levant and Iraq, the RER misalignment appears to be substantially overvalued in 1984–1990, and then steadily increase from a large undervaluation in 1992 to a large

overvaluation in 2019. In Sub-Saharan African countries that are members of the Arab League, the RER appears to have been relatively closer to its equilibrium over the period. The region shows an overvaluation until 1991, an undervaluation in 1992 and a steady increase towards a modest overvaluation in 2017. The RER has remained close to its equilibrium since. In the Arabian Peninsula, the RER misalignment shows a large overvaluation before 1978, followed by a steady increase from undervaluation to overvaluation between 1980 and 1985. The RER remained close to its equilibrium between 1986 and 2003, before showing a non-negligible undervaluation until 2014. It has been slightly but increasingly overvalued since.

Figure 4 – Real Exchange Rate Misalignment, by economic group



Source: Darvas (2012), calculations and elaboration by the author. The classification for this figure follows the IMF classification. A positive value denotes a RER overvaluation, a negative value a RER undervaluation. The RER misalignment is obtained following the procedure detailed in Section 3.

Figure 4 describes the evolution of RER misalignment in different economic groups between 1970 and 2019, following the IMF classification. Unsurprisingly, oil importers appear to have a relatively less volatile exchange rate. After a modest overvaluation up to 1991, the RER fluctuated around and remained close to its equilibrium since.

Among members of the Gulf Cooperation Council, the RER shows a large overvaluation before 1978, followed by a steady increase from undervaluation to overvaluation between 1980 and 1985. The RER remained close to its equilibrium between 1986 and 2002, before showing a non-negligible undervaluation until 2014. It has been slightly overvalued but close to its equilibrium since. In other oil-exporting countries, the RER has been more volatile. It went from a large overvaluation until 1990, to a strong undervaluation in 1993. It has since steadily increased, and it became substan-

tially overvalued from 2015.

Appendix B contains additional figure that show the RER fluctuations at the country-level. Appendix Figure B.2 shows the observed and the equilibrium RER for each country, and Appendix Figure B.3 shows the misalignment index for each country.

5 Empirical Framework

To assess the effects of civil conflicts on RER misalignment, I estimate the baseline equation (6) using the OLS method:

$$RER_{i,t}^{MIS} = \beta_0 + \beta_1 CivConf_{i,t} + \boldsymbol{\Theta}\widetilde{\mathbf{X}'}_{i,t} + \alpha_i + \mu_{i,t} \tag{6}$$

where t denotes the year and i the country. $RER_{i,t}^{MIS}$ denotes the RER misalignment index defined in section 3. The main explanatory variable, $CivConf_{i,t}$, denotes one of the three measures of civil conflict intensity in country i during year t. $\boldsymbol{\Theta}$ is a vector of parameters and the vector $\widetilde{\mathbf{X}'}_{i,t}$ denotes the set of fundamental RER determinants' cyclical components, which are known to affect the RER misalignment and are obtained using the Hodrick-Prescott filter. α_i denotes country fixed effects and captures country-specific time-invariant factors, such as institutions, geographic location or agro-ecological conditions, that may affect RER misalignment. $\mu_{i,t}$ denotes the random error term.

As in equation (1), the set of fundamental RER determinants' cyclical components comprises commodity terms of trade, productivity differential with respect to OECD countries, proxied by the ratio of real per capita GDP over that of OECD countries, trade openness, government consumption, net foreign assets and the world interest rate, proxied by the Federal Reserve 1-Year Treasury Constant Maturity Rate. Because the world interest rate does not vary accross country, the term φ_t that captures year fixed-effects would induce perfect multicollinearity and is therefore not included in equation (6). Year fixed-effects, however, would allow to control for unobserved factors that affect all countries in a given year, such as global demand shocks. For this reason, a variant of equation (6) includes the term φ_t and removes the proxy for the world interest rate from the vector $\widetilde{\mathbf{X}'}_{i,t}$.

The baseline equation might suffer from several shortfall that impede a causal interpretation of the OLS estimates. First, although the transmission mechanisms might not appear to be evident, the relation between civil conflicts and RER misalignment might suffer from reverse causality (Ambaw and Sim, 2019). According to this view, a highly misaligned RER could fuel discontent or lead to severe losses for some agents, and therefore lead to civil conflict. Second, the presence of missing variables in the

error term might bias the OLS estimates. A major economic crisis may affect both the RER misalignment and social stability, increasing the probability of occurrence of a civil conflict. It could be possible to control for some of these variables to increase the robustness of the results, but some missing variables are unobservable and time-varying, and cannot be controlled for by a proxy nor by fixed-effects.

To overcome these shortfalls, I adopt an instrumental variable approach and instrument the intensity of civil conflict in country i at year t by the intensity of civil conflicts in country i's neighbouring countries at year t. I use a Two-Stage Least Squares (2SLS) procedure, in which equation (7) describes the first stage and equation (8) the second stage:

$$CivConf_{i,t} = \lambda_0 + \lambda_1 \sum_{n=1}^{N_i} CivConf_{n,t} + \mathbf{\Phi}\widetilde{\mathbf{X}'}_{i,t} + \lambda_i + \upsilon_{i,t} \tag{7}$$

$$RER_{i,t}^{MIS} = \beta_0 + \beta_1 \widehat{CivConf}_{i,t} + \mathbf{\Theta}\widetilde{\mathbf{X}'}_{i,t} + \alpha_i + \mu_{i,t} \tag{8}$$

where n denotes each of country i's N_i neighbouring countries, α_0 is a constant, $\mathbf{\Phi}$ a vector of parameters, λ_i country fixed-effects and $\upsilon_{i,t}$ a random error term. $\widehat{CivConf}_{i,t}$ denotes the predicted value of $CivConf_{i,t}$ obtained from the first stage and depends on the instrument and the control variables. All the other variables remain as previously defined.

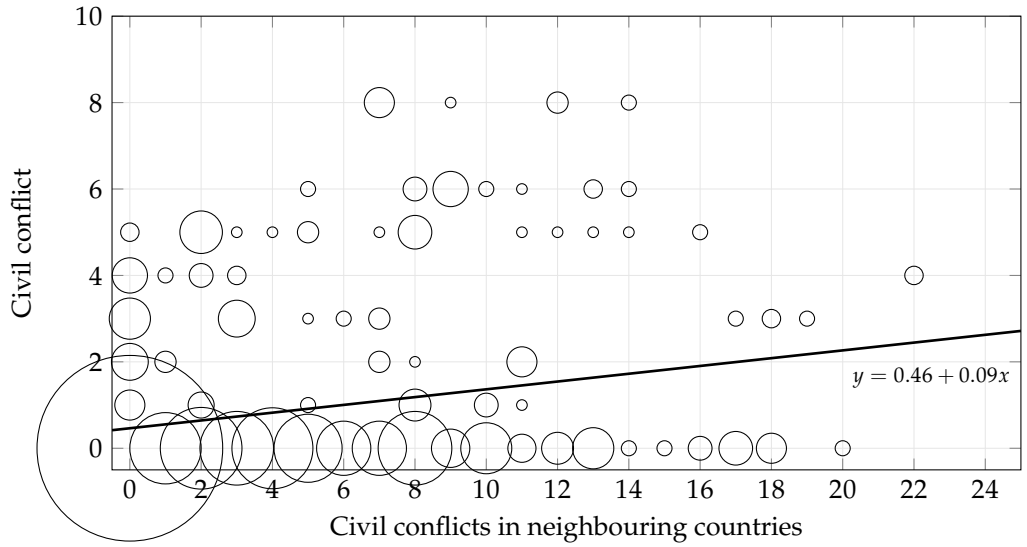
For this strategy to be valid and allow for a causal interpretation, the instrument must verify both the relevance condition and the exclusion restrictions. Figure 5 shows that the relevance condition is fulfilled since the intensity of civil conflicts in country i is positively correlated with the aggregate intensity of civil conflicts in neighbouring countries.[1]

The exclusion restriction cannot be formally tested since the first stage only includes one instrumental variable. This restriction is verified if the aggregate intensity of civil conflicts in country i's neighbouring countries affect country i's RER misalignment through its own intensity of civil conflicts but is uncorrelated with the error term.

Civil conflicts in neighbouring countries are unlikely to cause shifts in capital flows such as remittances, foreign direct investment and official development assistance since their determinants depend mainly on structural characteristics of the country. Shifts in international capital flows induced by civil conflicts in neighbouring countries are expected to be observed in bilateral military cooperation, arms purchases, or humanitarian assistance to alleviate the pressures caused by refugee inflows. Such

[1] This correlation holds when the control variables are included, as shown in the first stage results in section 6.

Figure 5 – Correlation Between Civil Conflict and Neighbours' Civil Conflicts



Source: Center for Systemic Peace, elaborated by the author. The OLS estimate shows the correlation between civil conflict and civil conflicts in neighbouring countries and is significant at the 1% level. The circles' size is proportional to the number of observations.

capital flows can affect the RER misalignment, but they do so only because civil conflicts in neighbouring countries increase the risk of civil conflict within the country. International financial flows linked to refugee inflows, for example, only materialize on a large scale when arrivals are numerous and can threaten the economic and social stability of the country. Lebanon is a singular case in this aspect, since its position as a regional financial center and its banking sector regulation, including bank secrecy for non-residents until recently, could threaten the validity of the exclusion restriction. However, Appendix Table C.1 shows that excluding the country from the sample does not alter the results, indicating that the empirical strategy is robust to this specific threat.

6 Results

Table 2 reports the OLS estimates obtained from equation (6). Odd columns include the international interest rate as a dependent variable and country fixed-effects, while even columns do not include the international interest rate but add year fixed-effects to the country fixed effects. The results of these two specifications are similar, particularly when focusing on the main explanatory variable.

Table 2 columns (1) and (2) show that civil violence is not associated with RER misalignment when controlling for the cyclical component of the main RER misalignment determinants. Civil warfare, on the contrary, appears to be strongly and posi-

tively associated with RER misalignment, as shown in columns (3) and (4): a one-unit increase in civil warfare intensity is associated with a 0.06 unit increase in RER overvaluation. Columns (5) and (6) show no association between total civil conflicts (which include both civil and ethnic violence and war) and RER misalignment. These results suggest that only organised or institutionalised civil conflicts, *i.e.* those that incorporate the strongest commitment to violence, lead to RER overvaluations.

Table 2 – Civil Conflicts and Real Exchange Rate Misalignment - OLS Approach

	Real Exchange Rate Misalignment (Index)					
	(1)	(2)	(3)	(4)	(5)	(6)
Civil Violence	0.004	-0.003				
	(0.044)	(0.045)				
Civil Warfare			0.067***	0.064***		
			(0.015)	(0.016)		
Total Civil Conflicts					0.005	0.006
					(0.009)	(0.009)
Commodity Terms of Trade [a]	-0.498*	-0.340	-0.540**	-0.378	-0.501*	-0.341
	(0.277)	(0.294)	(0.274)	(0.291)	(0.277)	(0.293)
Productivity [a]	0.401**	0.340*	0.446***	0.386**	0.401**	0.339*
	(0.173)	(0.184)	(0.171)	(0.182)	(0.173)	(0.183)
International Interest Rate [a]	0.004		0.005		0.004	
	(0.012)		(0.012)		(0.012)	
Net Foreign Assets [a]	0.533*	0.486	0.554*	0.498*	0.536*	0.485
	(0.296)	(0.305)	(0.293)	(0.302)	(0.296)	(0.305)
Public Consumption [a]	-0.151	-0.179	-0.160	-0.175	-0.158	-0.185
	(0.292)	(0.303)	(0.289)	(0.300)	(0.292)	(0.303)
Trade Openness [a]	-0.090	-0.057	-0.093	-0.066	-0.089	-0.057
	(0.173)	(0.180)	(0.171)	(0.178)	(0.173)	(0.180)
Constant	0.007	0.007	-0.010	-0.009	0.002	0.002
	(0.012)	(0.012)	(0.013)	(0.013)	(0.014)	(0.014)
Observations	903	903	903	903	903	903
Number of Countries	21	21	21	21	21	21
R^2	0.010	0.007	0.031	0.027	0.011	0.008
F-statistic	1.304	0.995	4.041	3.798	1.355	1.066
Fixed Effects	C	C, Y	C	C, Y	C	C, Y

[a] Cyclical component, obtained using the Hodrick-Prescott filter ($\lambda = 6.25$). Standard errors in parentheses. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

The OLS estimates presented in Table 2, however, are likely to suffer from endo-

geneity issues due to reverse causality and missing variables. They are therefore likely to be biased and cannot be interpreted as causal relations. The next step consists in adopting an instrumental variable approach, which is able to adress this problem, by predicting civil conflict intensity in each country based on the aggregate intensity in its neighbouring countries.

Table 3 reports the 2SLS estimates obtained from first stage equation (7) and second stage equation (8). Estimates in column (1) show an absence of relation between civil violence and RER misalignment. The second stage coefficient is positive and statistically significant, but the p-value associated with the F-value is greater than 5 percent, indicating that the group of explanatory variable does not show a significant relationship with the dependent variable. Furthermore, the relevance condition for the instrument is not met since the first stage results indicate that civil violence is not correlated with civil violence in neighbouring countries and that civil violence is not reliably predicted by the instrument and the control variables.

Column (2) in Table 3 shows the 2SLS estimates of the effect of civil war intensity on RER misalignment when civil war in neighbouring countries is used as an instrument. While the OLS estimates indicated a positive and significant relationship, the 2SLS estimate show an absence of relationship since the second stage coefficient is not significantly different from 0 and the p-value associated with the F-stat does not allow to reject the null hypothesis that all coefficients are equal to 0. The first stage estimates show a negative correlation between the explanatory variable and the instrument, but the p-value associated with the F-stat indicates again that the instrument and the control variables do not predict reliably civil war intensity. The relevance condition of the instrument is therefore not fulfilled in the case of civil war.

Column (3) in Table 3 reports the 2SLS estimates and show that civil conflicts intensity in Arab League members, Turkey and Iran do lead to an increase in RER misalignment, *i.e.* tend to overvalue the RER. The first stage estimates show a positive relation between the instrument and the explanatory variable: a 1 unit increase in civil conflict intensity in neighbouring countries is associated with a 0.07 unit increase in civil conflict intensity domestically. This correlation is significant at the 1 percent level, and the instrument along with the control variable are jointly significant in predicting civil conflicts intensity since the p-value associated with the F-stat is lower than 5 percent.

Table 3 – Effects of Civil Conflicts on Real Exchange Rate Misalignment - IV Approach

	Real Exchange Rate Misalignment (Index)		
	(1)	(2)	(3)
Second stage: Dependent variable is Real Exchange Rate Misalignment			
Civil Violence	2.911**		
	(1.431)		
Civil Warfare		-0.144	
		(0.206)	
Total Civil Conflicts			0.236***
			(0.064)
Commodity Terms of Trade [a]	-0.437	-0.370	-0.768**
	(0.299)	(0.329)	(0.387)
Productivity [a]	0.212	0.230	0.371*
	(0.197)	(0.226)	(0.192)
International Interest Rate [a]	-0.015	-0.009	-0.001
	(0.014)	(0.014)	(0.013)
Net Foreign Assets [a]	0.183	0.185	0.252
	(0.302)	(0.313)	(0.318)
Public Consumption [a]	-0.267	-0.076	-0.368
	(0.296)	(0.289)	(0.294)
Trade Openness [a]	-0.195	-0.019	-0.047
	(0.197)	(0.194)	(0.188)
R^2:	0.011	0.006	0.022
F-Stat (p-value)	0.292	0.681	0.014
First stage: Dependent variable is	*Civil Violence*	*Civil Warfare*	*Total Civil Conflict*
Civil Violence in Neighbouring Countries	-0.023		
	(0.016)		
Civil Warfare in Neighbouring Countries		-0.051***	
		(0.019)	
Total Civil Conflicts in Neighbouring Countries			0.067***
			(0.014)
Observations:	829	829	809
Number of Countries	21	21	21
Fixed Effects:	C	C	C
R^2:	0.011	0.006	0.022
F-Stat (p-value)	0.893	0.099	0.001

[a] Cyclical component, obtained using the Hodrick-Prescott filter ($\lambda = 6.25$). Standard errors in parentheses. The constant is included but not reported. The control variables are included in the first-stage but not reported. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.

The p-value associated with the F-stat of the second stage, reported in the upper part of Table 3 column (2), is also lower than 5 percent, indicating that civil conflicts and the cyclical components of the RER determinants have a statistically significant relationship with RER misalignment. The estimated coefficient of civil conflicts is positive and statistically significant: a 1 unit increase in civil conflict intensity leads to a 0.24 unit increase in the RER misalignment index. Endogeneity issues have been removed from this 2SLS estimate, allowing therefore for a causal interpretation of the relationship. The results show that an increase in civil conflicts intensity leads to an increase in the RER misalignment: the RER tends to be overappreciated as a result of civil conflicts.

Columns (1) and (2) from Table 3 show that distinguishing between civil conflicts subcategories does not provide useful information to identify the relationship with RER misalignment. The type of civil conflict might not be correlated with the type of civil conflict in neighbouring countries, as suggested by the first stage estimates. However, the reason may also be that the categorisation of civil conflicts itself, which necessarily entails some degree of subjectivity, is not relevant to assess their effects on RER misalignment. Aggregating the different types of civil conflicts allows to overcome these issues and identify the effect of civil conflicts on RER misalignment, as indicated by the results in column (3).

Human losses are the first and direct consequence of civil conflicts. From an economic standpoint, this loss in human capital combines with losses in physical capital to hamper the future growth path and development prospects of the country. These consequences of civil conflicts have legitimately attracted much attention and have been intensively studied. However, civil conflicts affect long-term prospects in several other ways.

Following the tradition of Acemoglu et al. (2005), among others, many consider that institutions are a fundamental determinant of long-term growth. The definition of these institutions can be quite vague, but the fact that they are affected by path dependence and therefore show a high level of time persistence is a common view. Because the end of a civil conflict and the initial stages of the post-conflict transition define a new, or renewed, distribution of power and set the foundations of the institutions that will ensure its stability (see for example Fergusson et al., 2021), the economic conditions and the social context that prevail during these crucial periods may weigh heavily on their outcome and may be determinant to ensure sustainable growth and long-term development.

RER overvaluation resulting from civil conflicts can therefore have enduring economic impacts, way beyond the business cycle. ElBadawi and Refaat (2015) show that

RER undervaluations tend to be pro-poor in normal times. Because the disorganised productive sector cannot meet the demand, imports are likely to play a significant role in the early stages of reconstruction, and this is particularly important for food products. The sharp nominal exchange rate depreciation arising from a RER overvaluation or, under a fixed exchange rate regime, the high inflation and the probably high black market premium would represent a heavy burden on the poorest and directly threaten their very subsistence. The resulting discontent and social unrest could threaten the post-conflict transition itself, or indirectly shape the emerging institutions in a way that tends to allocate efforts and capacities to security organs at the cost of reconstruction and growth promotion, leaving an enduring print on the development prospects of the country.

7 Conclusion

This paper estimates RER misalignments in Arab League member countries, Iran and Turkey between 1970 and 2018, and uses an instrumental variable approach to study how RER misalignment is affected by civil conflicts. It contributes to the literature on the macroeconomic effects of civil conflicts by assessing the monetary and financial consequences of such conflicts, in a region that has received relatively little attention. It also contributes to the literature on RER misalignment by identifying a new determinant of its short-term dynamics in developing countries.

The results show that civil conflicts lead to an increase in the RER misalignment index in the region, indicating that the currency tends to be overvalued in such a situation. Since the expected transmission channels have contradictory effects, the results suggest that the consequences of high public spending during the conflict and the inflationary effects of supply shortages, particularly those concerning basic goods, dominate the other mechanisms.

Because RER overvaluations are detrimental to exports and structural change, they impede to create the jobs needed to reduce unemployment and increase incomes, threatening both the post-conflict transition and the long-term development prospects of the country. Therefore, economic policy during a post-conflict transition should aim at correcting these imbalances aggressively. In the short-term, a form of tolerance towards the black-market might be necessary if shortage in basic goods persist and subsistence requirements are binding. It can act as a social buffer and give time to implement necessary, and welfare-costly, measures in the short-term. To ease inflationary pressures, the public budget should be tightly controlled and reassigned to secure the supply of basic goods to the population, through imports and the recovery of the

productive sectors, and to reconstruct vital infrastructure that promote growth. If subsistence is threatened, foreign aid might be necessary. To avoid further overvaluation and a lasting deterioration of competitiveness (Rajan and Subramanian, 2011), aid in kind could be appropriate, provided that it is temporary so that it does not harm the recovery of the agricultural sector. During the post-conflict transition, the combination of some form of nominal exchange rate management with a monetary policy that aims at controlling inflation should also help stabilize the real exchange rate and provide foundations for future growth.

This paper finds that civil conflicts lead to RER overvaluation in Arab League members, Iran and Turkey, and a future section is expected to provide deeper insights on the underlying transmission mechanisms. Additional empirical work could also investigate whether this relation is verified in other regions that have suffered civil conflicts, and assess RER dynamics during post-conflict transitions. Finally, further work that seek to identify additional short-run determinants of RER misalignment in developing countries could provide interesting insights and useful policy recommendations

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Appendix

A Country List and Data Sources

Table A.1 – List of Countries Included in the Main Regression Analysis

Arab League members	Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Morocco, Mauritania, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates, Yemen
Other countries	Iran, Turkey

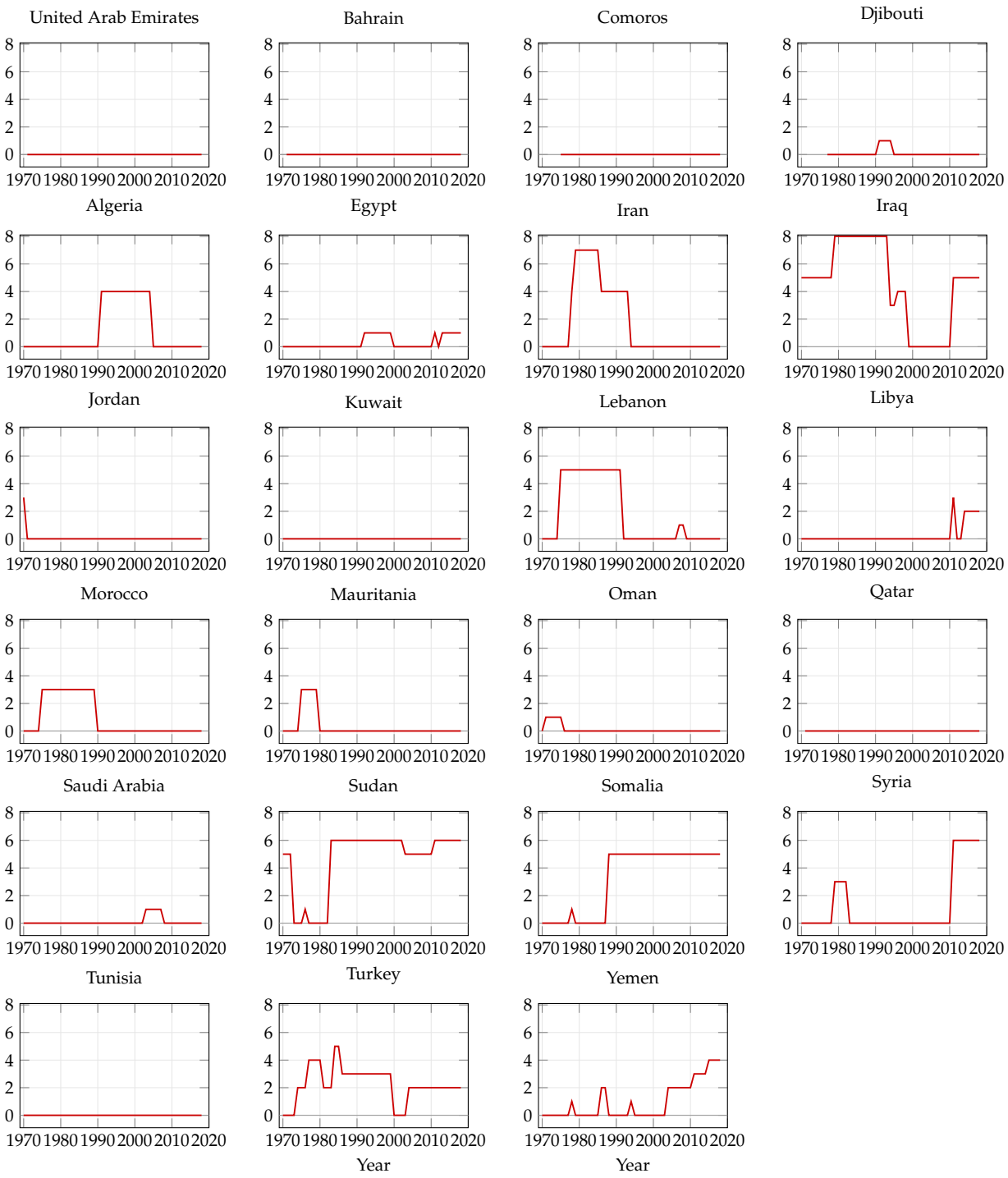
Note: Libya, Palestine and Somalia are excluded from the sample because missing data impedes to obtain the equilibrium RER and RER misalignment. Furthermore, Palestine is not included in the Major Episodes of Political Violence dataset.

Table A.2 – List of Variables and Sources

Variable:	Source:
Real Exchange Rate Determinants:	
Real effective exchange rate	Darvas (2012)
Commodity terms of trade	Gruss and Kebhaj (2019)
U.S. 1-year trasury constant maturity rate	Federal Reserve Economic Data
Net foreign assets	World Bank - WDI (2020)
Productivity index	Constructed from World Bank - WDI (2020)
Public consumption	Penn World Tables version 9.1 (Feenstra et al., 2015)
Trade openness	Penn World Tables version 9.1 (Feenstra et al., 2015)
Civil Conflict:	
Civil violence	Major Episodes of Political Violence (Center for Systemic Peace)
Civil war	Major Episodes of Political Violence (Center for Systemic Peace)
Civil conflict (total)	Major Episodes of Political Violence (Center for Systemic Peace)

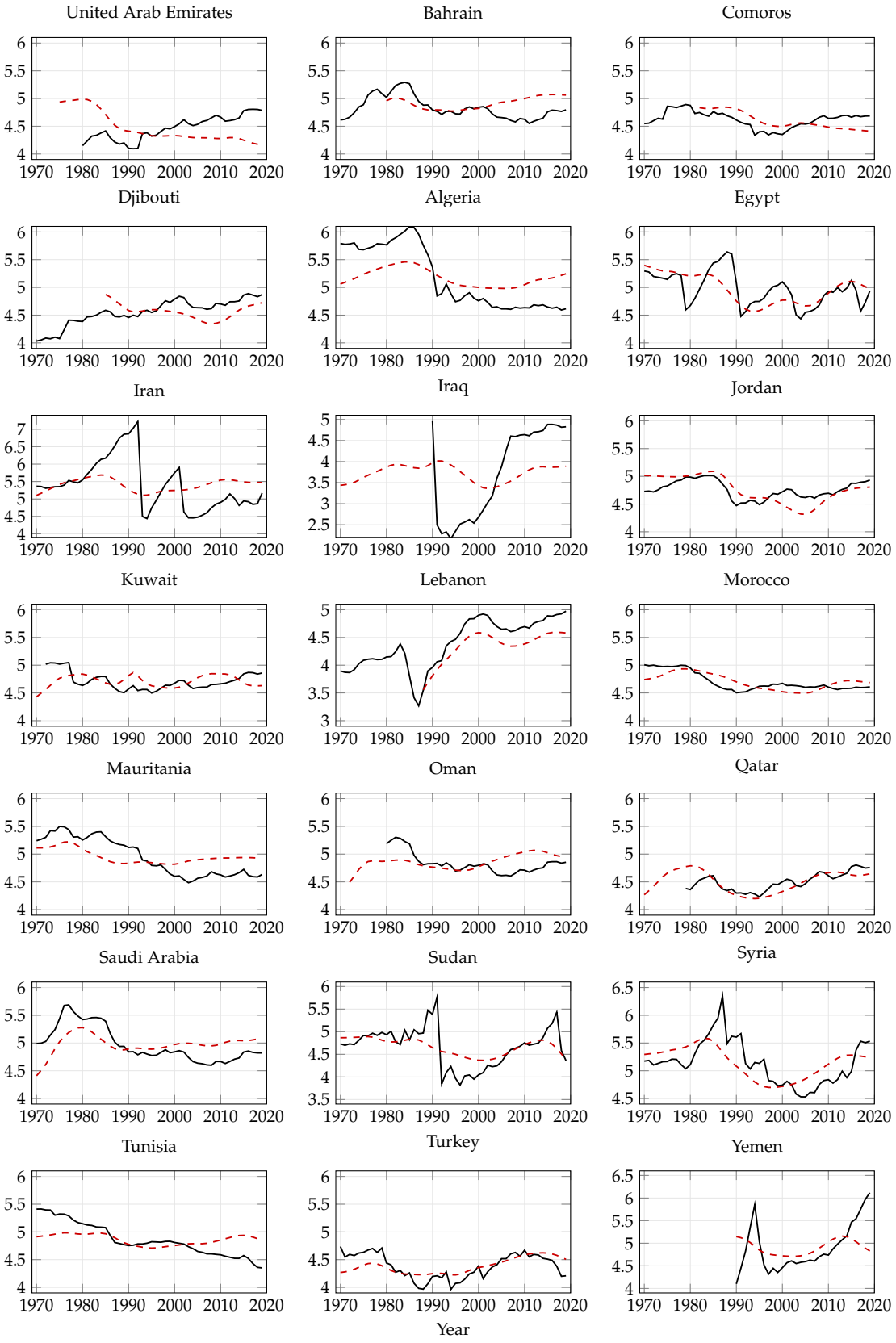
B Additional Stylized Facts

Figure B.1 – Total Civil Violence, by Country



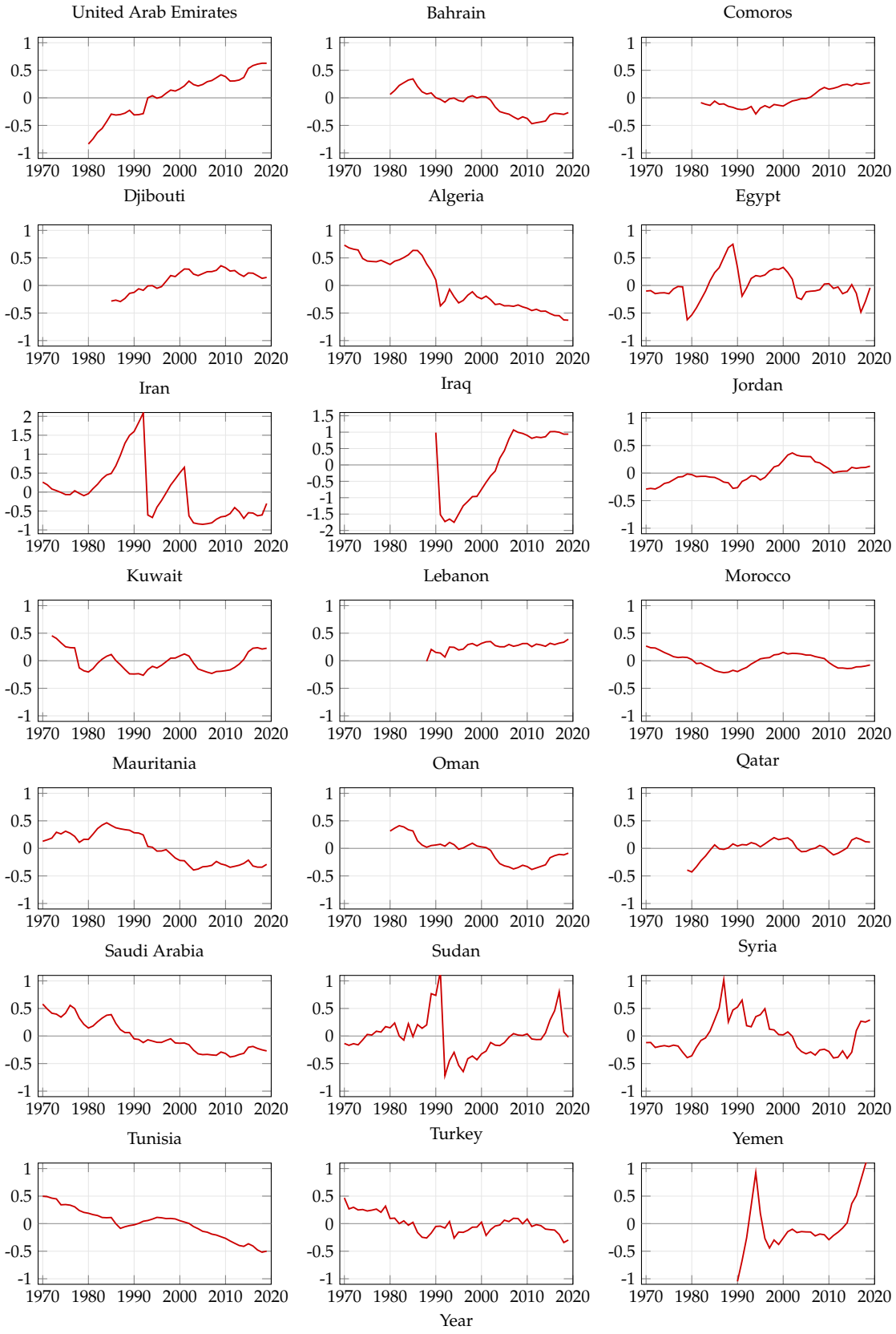
Source: Center for Systemic Peace, elaboration by the author. The country-year conflict intensity index takes values between 0 and 10.

Figure B.2 – Real Exchange Rate and Equilibrium Real Exchange Rate, by Country



Source: Darvas (2012), calculations and elaboration by the author. The black plain lines show the real effective exchange rate (in logarithm) and the red dashed lines show the equilibrium real exchange rate, obtained following the procedure detailed in Section 3.

Figure B.3 – Real Exchange Rate Misalignment, by Country



Source: calculations and elaboration by the author. The real exchange rate misalignment series are obtained following the procedure detailed in Section 3.

C Additional Regressions

Table C.1 – Effects of Civil Conflicts on Real Exchange Rate Misalignment - IV Approach excluding Lebanon

	Real Exchange Rate Misalignment (Index)		
	(1)	(2)	(3)
Second stage: Dependent variable is Real Exchange Rate Misalignment			
Civil Violence	2.904**		
	(1.453)		
Civil Warfare		-0.143	
		(0.209)	
Total Civil Conflicts			0.218***
			(0.061)
Commodity Terms of Trade [a]	-0.446	-0.379	-0.773*
	(0.305)	(0.336)	(0.397)
Productivity [a]	0.224	0.241	0.3701*
	(0.204)	(0.234)	(0.199)
International Interest Rate [a]	-0.015	-0.010	0.003
	(0.014)	(0.015)	(0.013)
Net Foreign Assets [a]	0.193	0.206	0.330
	(0.368)	(0.382)	(0.399)
Public Consumption [a]	-0.282	-0.081	-0.223
	(0.309)	(0.301)	(0.299)
Trade Openness [a]	-0.223	-0.029	-0.048
	(0.210)	(0.206)	(0.200)
R^2:	0.011	0.006	0.022
F-Stat (p-value):	0.302	0.681	0.017
First stage: Dependent variable is	*Civil Violence*	*Civil Warfare*	*Total Civil Conflict*
Civil Violence in Neighbouring Countries	-0.023		
	(0.016)		
Civil Warfare in Neighbouring Countries		-0.051***	
		(0.019)	
Total Civil Conflicts in Neighbouring Countries			0.074***
			(0.014)
Observations:	798	798	778
Number of Countries	20	20	20
Fixed Effects:	C	C	C
R^2:	0.004	0.014	0.034
F-Stat (p-value):	0.897	0.106	0.000

[a] Cyclical component, obtained using the Hodrick-Prescott filter ($\lambda = 6.25$). Standard errors in parentheses. The constant is included but not reported. The control variables are included in the first-stage but not reported. * Significant at the 10 percent level, ** Significant at the 5 percent level, *** Significant at the 1 percent level.