

# R O M E

Research On Money in the Economy

No. 13-14 – October 2013

The Transmission of Oil and  
Food Prices to Consumer Prices  
– Evidence for the MENA countries

Ansgar Belke and Christian Dreger

ROME Discussion Paper Series

"Research on Money in the Economy" (ROME) is a private non-profit-oriented research network of and for economists, who generally are interested in monetary economics and especially are interested in the interdependences between the financial sector and the real economy. Further information is available on [www.rome-net.org](http://www.rome-net.org).

ISSN 1865-7052

# Research On Money in the Economy

Discussion Paper Series  
ISSN 1865-7052

No 2013-14, October 2013

## The Transmission of Oil and Food Prices to Consumer Prices – Evidence for the MENA countries\*

*Ansgar Belke and Christian Dreger*

*Prof. Dr. Ansgar Belke*  
University of Duisburg-Essen  
Department of Economics  
Universitaetsstr. 12  
D-45117 Essen  
e-mail: [ansgar.belke@uni-due.de](mailto:ansgar.belke@uni-due.de)

and  
Deutsches Institut für Wirtschaftsforschung (DIW)  
Mohrenstraße 58  
D-10117 Berlin

*Prof. Dr. Christian Dreger*  
Europa-Universität Viadrina Frankfurt/O.  
Faculty of Business Administration  
Große Scharnstr. 59  
D-15230 Frankfurt (Oder)

and  
Deutsches Institut für Wirtschaftsforschung (DIW)  
Mohrenstraße 58  
D-10117 Berlin  
e-mail: [cdreger@diw.de](mailto:cdreger@diw.de)

The discussion paper represent the authors' personal opinions and do not necessarily reflect the views of DIW Berlin.

NOTE: Working papers in the “Research On Money in the Economy” Discussion Paper Series are preliminary materials circulated to stimulate discussion and critical comment. The analysis and conclusions set forth are those of the author(s) and do not indicate concurrence by other members of the research network ROME. Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the author(s). References in publications to ROME Discussion Papers (other than an acknowledgment that the writer has had access to unpublished material) should be cleared with the author(s) to protect the tentative character of these papers. As a general rule, ROME Discussion Papers are not translated and are usually only available in the original language used by the contributor(s).

ROME Discussion Papers are published in PDF format at [www.rome-net.org/publications/](http://www.rome-net.org/publications/).

Please direct any enquiries to the current ROME coordinator  
Prof. Dr. Albrecht F. Michler,  
Heinrich-Heine-University of Duesseldorf, Department of Economics, Universitaetsstr. 1,  
Build. 24.31.01.01 (Oeconomicum), D-40225 Duesseldorf, Germany  
Tel.: ++49(0)-211-81-15372  
Fax: ++49(0)-211-81-15261  
E-mail: [helpdesk@rome-net.org](mailto:helpdesk@rome-net.org)  
[michler@uni-duesseldorf.de](mailto:michler@uni-duesseldorf.de)

## **Abstract**

This paper investigates the effects of global oil and food price shocks to consumer prices in Middle East-North African (MENA) countries using threshold cointegration methods. Oil and food price shocks increase domestic prices in the long run, whereby the impact of food prices dominates. While global prices are weakly exogenous, consumer prices respond to deviations from the equilibrium relationship. The short run adjustment pattern exhibits asymmetries and is particularly strong after positive shocks. Downward rigidities on wages may play a crucial role in this regard, as the relatively weak reactions of consumer prices after negative shocks are related to labour market institutions and public subsidies. The more rigid the regulations the more pronounced are the asymmetries. Robustness checks show that international price shocks do not affect GDP growth.

**JEL-Classification: C22, E31, Q02**

**Keywords:** Oil and food price transmission, asymmetric error correction, MENA region

*Corresponding author*

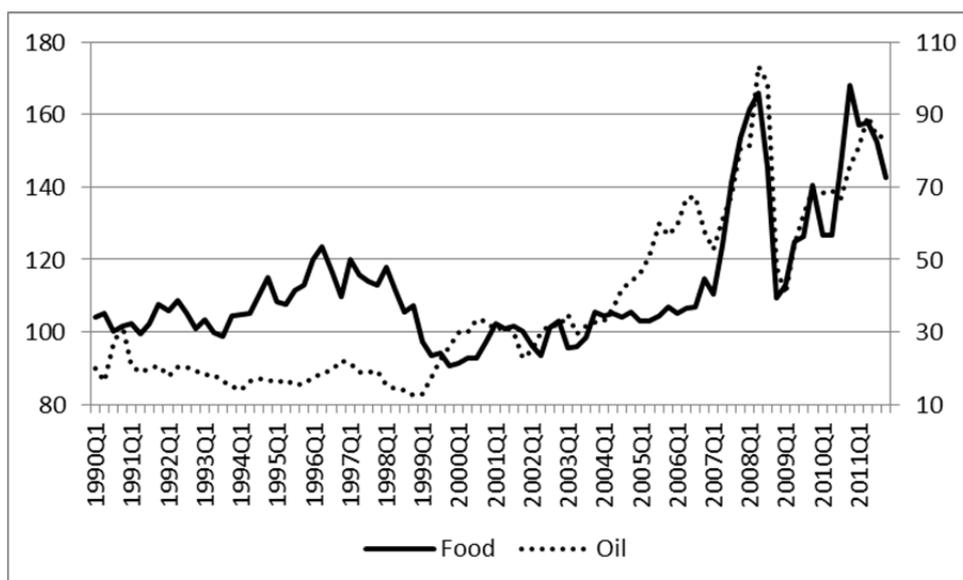
Christian Dreger, Deutsches Institut für Wirtschaftsforschung (DIW Berlin), Mohrenstraße 58, D-10117 Berlin, e-mail: cdreger@diw.de.

\* We are grateful to Joseph Awad for excellent research assistance and to participants in the 2013 European Economics and Finance Society (EEFS) Conference in Berlin for valuable comments.

## 1 Introduction

In the pre-crisis period of globalization, the rapid integration of huge emerging market countries such as China and India into the world economy led to high demand in global food and energy markets (IMF, 2008). The depreciation of the US-dollar caused further upward pressure: While international prices are often denominated in dollar, many producers calculate the price in their own currency. Oil and food prices have moved in parallel in recent years (Figure 1). This pattern is probably also driven by legislative mandates to use cropland for the production of biofuels and the increasing role of commodities in international asset portfolios (Bakhat and Wuerzburg, 2013, Zilberman et al., 2013). While the global financial crisis led to a decline in the world demand for commodities, causing oil and food prices to fall, they started to rise again thereafter.

Figure 1: Oil and food prices



Note: IHS Global Insight (oil, dashed line, right axis), Food and Agriculture Organization of the United Nations (food, solid line, left axis).

Rocketing oil and food prices can affect the real side of the economy, depending on the degree of their transmission to the domestic price level. Price increases may depress the purchasing power of private households and can trigger production losses, as firms will choose labour and capital input to match the shifts in relative prices. In the case of price decreases, a reversal is expected, given that the adjustment pattern is symmetric. The effects should be especially visible in low-income net importing countries. As food rep-

resents a relatively large share of the consumption baskets of private households, accelerating prices can lead to increasing poverty and political instability. For instance, high and volatile food prices have contributed to social unrest in the eve of the Arab Spring (Breisinger, Ecker and Al Riffai, 2011). By exploring the causes and consequences of high food prices, especially in developing countries, Dewbre, Giner, Thompson and von Lampe (2008) have highlighted the importance of price transmission which is at the centre of our paper.

The remainder of the paper is organized as follows. Section 2 reviews the policy reactions to oil and food price shocks that have been implemented in the countries considered in the analysis. Section 3 provides a discussion the econometric methodology. Moreover, it presents the data and the results. In section 4, we deliver the outcome of some robustness checks. Among others, it turns out that international prices do not affect GDP growth. Finally, Section 5 concludes with some policy recommendations.

## **2 Policy reactions to oil and food price shocks –quantifying the pass-through**

The degree of price transmission can differ across countries, depending on whether own resources can be mobilized to mitigate the effects. Policy responses may also shape the outcome (Timmer, 2008). In case of price hikes, governments can react by rising subsidies or improved safety nets to protect poor households. Export restrictions might be implemented to stimulate supply at domestic markets. Wage-price spirals may occur in countries with wage and price indexation. To combat the rising inflation pressure, central banks may tighten their monetary policy stance, but with adverse effects on the real economy. Countries with international reserves may react by appreciating their currencies. However, an appreciation hurts firms engaged in export-oriented activities and hampers the build-up of import-competing industries. While such policies could dampen the adverse effects of food and oil price shocks, they can contribute to higher instability in international markets and decrease the incentives of domestic farmers to respond with higher production. In addition, policies are not sustainable, if they imply a deterioration of public budgets.

This paper investigates the impacts of global food and oil prices on consumer prices for a sample of MENA countries: Algeria, Egypt, Jordan, Libya, Morocco, Syria and Tunisia. The selection is motivated by data availability. All countries considered are net food

importers. Due to strong population growth, the vulnerabilities will likely increase in the future. The region is the most food import dependent region in the world. Food dependency ratios, i.e. net imports over private consumption exceed 50 percent on average, with substantial variation across countries (Ianchovichina, Loening and Wood, 2012). Moreover, Algeria is blessed with natural resources. Therefore, the impacts can be studied for resource abundant and resource scarce economies. Among the developing world, the MENA region is outstanding for its extensive use of price subsidies and controls. Hence, insights into the effectiveness of these measures can be obtained.

Previous studies looked at the impact of commodity prices, mostly from the perspective of industrial (Kilian (2008a, 2008b) or oil exporting countries (Esfahani, Mohaddes and Pesaran, 2012). Few results are available for non-oil exporting emerging countries. In a mixed sample of ten countries, De Gregorio, Landerretche and Neilson (2007) found a decline in the pass through from oil price inflation to consumer price inflation. The decrease is smaller than in industrial countries, probably due to wage price spirals or a less efficient use of energy. In contrast to oil prices, food prices did not receive much attention until the price hikes of 2007/08.

Based on reduced form VARs, Ferrucci, Jiménez-Rodríguez and Onorante (2010) concluded that international commodity price inflation is the main determinant of producer and consumer food price inflation in the euro area, with a pass-through coefficient of 0.3. According to the IMF (2008) study, the impact of oil price inflation exceeds its counterpart from food price inflation for advanced economies. For emerging markets, the ordering is reversed, i.e. food price inflation becomes more important due to different second round effects. The evidence is scarce for MENA countries. Following Ianchovichina, Loening and Wood (2012) a one percent increase of global food prices raises domestic food prices by 0.2 to 0.4 percent. For some countries like Egypt and Morocco, the price transmission exhibits significant asymmetries, as price increases have stronger absolute effects on domestic inflation than price decreases. Similar to the IMF (2008), the authors fit autoregressive models to inflation rates. Therefore, the results are potentially biased, as they ignore cointegration relationships between international and domestic price levels.

Therefore, the focus of this paper is on cointegration between international and domestic prices. To account for the previous finding of asymmetries, a nonlinear adjustment pattern towards the long run is considered.<sup>1</sup> According to our results, both oil and food price shocks increase domestic prices in the long run, and the elasticity of food prices is larger. While global prices are shown to be weakly exogenous, consumer prices respond to deviations from the long run. Hence, conditional error correction equations can be specified to determine domestic consumer price inflation. The adjustment pattern towards equilibrium is characterized by asymmetries and particularly strong after positive shocks. The feedback coefficients are related to labour market institutions. The more rigid the institutions the more pronounced the asymmetries. The effects are similar for resource abundant and resource scarce economies. This may be seen as an indication of the relevance of the resource curse hypothesis for Algeria (Sachs and Warner, 1999).

### **3 Data, econometrics and empirical results**

We start with cointegration and weak exogeneity tests (Johansen 1988, 1991, Kremers, Ericsson and Dolado, 1992, Urbain, 1992). Based on this information, we estimate conditional error-correction models (ECMs) in the second step. By estimating symmetric and asymmetric variants of ECMs we acknowledge that transaction costs, trading rules, or policy changes may invalidate the linearity assumption. Although the linearity restriction should not have an impact on the long run in infinite samples, it could produce misleading inference over a finite time span.<sup>2</sup>

#### **3.1 Data**

Our data source is IHS Global Insight and The World Bank. The data used in the empirical model include

- Seasonally adjusted quarterly consumer price index data measured by local currencies and base year 2005=100, IHS.

---

<sup>1</sup> We finally decided to set the threshold equal to zero in order to be able to differentiate between positive and negative shocks. A value of zero would approximately also result from the application of the Hansen-Seo testing procedure for two-regime threshold cointegration in vector error-correction models (Hansen and Seo, 2002). The results are available on request from the authors.

<sup>2</sup> Several approaches take non-linearities into account. See Enders (2001), Enders and Granger (1998), Enders and Siklos (2001) and Hansen and Seo (2002). For a deeper discussion of these asymmetry issues in error-correction models see Belke, Beckmann and Verheyen (2013).

- Quarterly oil price data per barrel (Brent) in USD, base year 2005=100, IHS.
- Quarterly World Bank food price data based on nominal USD and 2005=100
- Bilateral exchange rates (Local currency per USD), IHS.

Following the results of standard unit root tests and also the consensus established in the literature, we consider all variables used in our investigation as integrated of order 1. The sample ranges from the first quarter of 1990 to the fourth quarter of 2011. We investigate five countries: Algeria, Egypt, Jordan, Morocco and Tunisia.

## **3.2 Results**

### **3.2.1 Cointegration analysis (Johansen method), impacts on prices**

#### **The bivariate case – consumer prices and food versus oil prices**

We begin with the presentation and discussion of the empirical results gained from *bivariate* cointegration exercises based on the Johansen method (Johansen, 1988, 1991). We display the results of our bivariate cointegration analysis in Tables 1 and 2. Table 1 examines the relationship among consumer prices (CPI) and food prices expressed in national currency, whereas Table 2 assesses the relation between CPI and oil prices in national currency.

As a main result, cointegration is usually detected and the long run impact of food prices turns out to be stronger than that of oil prices. The estimated food price elasticities are about twice as large as oil price elasticities. The consumer price index (CPI) reacts with the correct sign to restore deviations from equilibrium. Moreover, international prices are weakly exogeneous, except of Egypt and Tunisia. This does, however, not imply that Egypt and Tunisia affect global market prices, as international prices are measured in local currency. Hence, evidence based on inflation models is likely biased, as the cointegrating relationship is ignored.

Table 1: Cointegration analysis (Johansen method) - CPI and food prices (in national currency)

	Lag	Trace	B(Food)	F(CPI)	F(Food)
Algeria	2	38.04 (0.000)	0.546 (0.034)	-0.084 (0.015)	0.097 (0.086)
Egypt	2	22.33 (0.004)	1.037 (0.084)	-0.017 (0.007)	0.128 (0.050)
Jordan	1	15.51 (0.050)	0.886 (0.143)	-0.027 (0.009)	0.053 (0.045)
Morocco	1	25.55 (0.001)	0.250 (0.127)	-0.034 (0.007)	0.050 (0.053)
Tunisia	2	18.48 (0.017)	0.516 (0.053)	-0.014 (0.005)	0.239 (0.083)

Table 2: Cointegration analysis (Johansen method) - CPI and oil prices (in national currency)

	Lag	Trace	B(Oil)	F(CPI)	F(Oil)
Algeria	2	20.07 (0.010)	0.166 (0.076)	-0.029 (0.007)	0.017 (0.069)
Egypt	2	14.04 (0.082)	0.555 (0.064)	-0.018 (0.007)	0.184 (0.090)
Jordan	1	22.76 (0.003)	0.377 (0.038)	-0.045 (0.011)	0.228 (0.135)
Morocco	1	29.72 (0.000)	0.129 (0.032)	-0.040 (0.008)	0.170 (0.147)
Tunisia	2	14.91 (0.061)	0.257 (0.030)	-0.015 (0.005)	0.402 (0.182)

*Note:* Bilateral models, variables in logs. International prices transformed into domestic currency by spot exchange rates to the US-dollar (average of period). B(Food) and B(Oil) are long-run elasticities. F(CPI) is the feedback coefficient in the error correction equation for CPI inflation, F(Food), F(Oil) the corresponding parameter in the error correction equation for international price inflation. Trace statistic for null of no cointegration. Figures in parentheses are  $p$ -values for the trace statistic and standard errors otherwise. The lag length for the underlying VAR in levels is determined by the SBC. VAR includes a trend not restricted to cointegration relationship.

### **The trivariate case – decomposing international prices**

We continue with the presentation and discussion of the empirical results gained from *trivariate* cointegration exercises, i.e. by decomposing the international price measured in domestic currency into the nominal exchange rate and the international price in US-dollar. Hence, we now deal with the long-run relation between three variables in which no variable is exogenous a priori.

We display the results of our trivariate cointegration analysis in Tables 3 and 4. Table 3 examines the relationship among consumer prices (CPI), the exchange rate (local currency per USD) and food prices in USD, whereas Table 4 assesses the relation between consumer prices (CPI), the exchange rate (local currency per USD) and oil prices in USD.

Table 3: Cointegration analysis (Johansen method) - CPI, exchange rate (LC per USD) and food prices (USD)

	Lag	Trace	B(ExRate)	B(Food)	F(CPI)
Algeria	1	37.75 (0.011)	-0.019 (0.007)	0.641 (0.326)	-0.018 (0.003)
Egypt	2	30.83 (0.038)	0.158 (0.036)	1.238 (0.174)	-0.032 (0.007)
Jordan	1	26.90 (0.104)	5.661 (4.404)	0.986 (0.201)	-0.019 (0.006)
Morocco	1	32.50 (0.011)	-0.003 (0.036)	0.181 (0.126)	-0.031 (0.006)
Tunisia	2	29.84 (0.050)	0.625 (0.090)	0.429 (0.054)	-0.016 (0.007)
		F(ExRate)	F(Food)		
Algeria		0.481 (0.488)	0.010 (0.015)		
Egypt		0.079 (0.087)	-0.018 (0.016)		
Jordan		-0.003 (0.002)	0.036 (0.032)		
Morocco		-0.343 (0.257)	0.072 (0.054)		
Tunisia		0.106 (0.072)	0.208 (0.112)		

Table 4: Cointegration analysis (Johansen method) - CPI, exchange rate (LC per USD) and oil prices (USD)

	Lag	Trace	B(ExRate)	B(Oil)	F(CPI)
Algeria	1	32.18 (0.026)	0.201 (0.038)	0.110 (0.879)	0.003 (0.001)
Egypt	2	30.46 (0.042)	-0.233 (0.091)	1.063 (0.181)	-0.008 (0.004)
Jordan	1	34.81 (0.012)	4.304 (1.450)	0.331 (0.029)	-0.063 (0.015)
Morocco	1	33.57 (0.018)	-0.003 (0.023)	0.120 (0.034)	-0.039 (0.007)
Tunisia	2	27.45 (0.091)	-0.181 (0.202)	0.319 (0.052)	-0.014 (0.004)
		F(ExRate)	F(Oil)		
Algeria		0.164 (0.094)	-0.002 (0.007)		
Egypt		-0.183 (0.051)	0.130 (0.047)		
Jordan		-0.002 (0.005)	0.294 (0.188)		
Morocco		-0.420 (0.307)	0.202 (0.151)		
Tunisia		-0.051 (0.040)	0.365 (0.132)		

*Note:* Empirical models are trivariate, as they also include the nominal exchange rates (ExRate), measured as units of local currency per US dollar (average of period). International price denominated in USD. B(...) denotes the long-run parameters in the cointegrating relationship, F(...) the feedback coefficients.

Basically, the results of the bivariate models displayed in Tables 1 and 2 are confirmed by the results displayed in Tables 3 and 4. One arrives nearly at the same conclusions if the international price in local currency is decomposed into its two ingredients. Espe-

cially in the food price model (Table 3), only the consumer price index (CPI) adjusts, while nominal exchange rates and the international price are weakly exogenous in all cases. The only exceptions from this rule can be found in the oil price model for Egypt and Tunisia.

This leads us to the same interpretation as in Tables 1 and 2. The differences between the food price and the oil price model seem to decrease slightly if the nominal exchange rate is included in the cointegrating relationship. The corresponding parameter often enters with a positive sign in the food price model (except Algeria and Morocco), which indicates a long-run depreciation in response to food price shocks. In contrast, it enters with a negative sign in the oil price model (except Algeria and Jordan), which in turn suggests an appreciation. At the same time, our empirical evidence reveals that exchange rate movements do not serve as complete shock absorbers. Oil prices are not weakly exogenous in the case of Tunisia.<sup>3</sup>

### **3.2.2 Estimating error-correction models – symmetric versus asymmetric adjustment**

Based on the information gained in section 3.2.1, we proceed with estimating error-correction models. Given the results on weak exogeneity, we focus on conditional single equation models. Besides the models with a symmetric adjustment process (Table 5), asymmetries in the feedback mechanism are allowed (Table 6), depending on whether the (mean adjusted) error correction term is positive ( $EC > 0$ ) or negative ( $EC \leq 0$ ). The motivation of this setup is the finding of nonlinearities in some papers of the related literature such as International Monetary Fund (2008) and Ianchovichina et al. (2012).

We start with the discussion of the results from the estimation of the symmetric error correction models displayed in Table 5 below. The endogenous variable is domestic CPI inflation. The parameter EC represents the (mean adjusted) error correction term which has been calculated from the cointegrating relationships in Tables 1 and 2. According to the usual test statistics autocorrelation, and some other issues are not a problem at all. However, some less unambiguous results from the Cusum of Squares test or the Ramsey test really speak in favour of adopting an asymmetric ECM as the next step.

---

<sup>3</sup> We also experimented with the real exchange rate instead of the nominal rate and gained overall similar results.

Table 5: Symmetric error correction models – estimation results

Food price model – ECM regression of local consumer prices on world food prices

	Algeria	Egypt	Jordan	Morocco	Tunisia
Constant	0.015 (0.003)	0.012 (0.002)	0.012 (0.002)	0.009 (0.001)	0.009 (0.001)
$\Delta p_{t-1}$	0.323 (0.095)	0.626 (0.095)			0.373 (0.092)
$\Delta p_{t-2}$		-0.306 (0.090)			
$\Delta p_{t-4}$			-0.316 (0.092)	-0.327 (0.097)	-0.338 (0.093)
$\Delta \text{food}_t$	0.051 (0.019)	0.072 (0.015)	0.057 (0.018)	0.024 (0.013)	0.011 (0.006)
$\Delta \text{food}_{t-1}$	-0.034 (0.020)		0.051 (0.020)		
$EC_{t-1}$	-0.085 (0.015)	-0.026 (0.006)	-0.025 (0.008)	-0.052 (0.008)	-0.024 (0.006)
R2	0.703	0.606	0.403	0.349	0.414
QM (1)	0.775	0.981	0.330	0.847	0.468
QM (4)	0.291	0.622	0.845	0.945	0.589

Oil price model – ECM regression of local consumer prices on world oil prices

	Algeria	Egypt	Jordan	Morocco	Tunisia
Constant	0.011 (0.003)	0.013 (0.002)	0.011 (0.002)	0.009 (0.001)	0.007 (0.001)
$\Delta p_{t-1}$	0.380 (0.103)	0.723 (0.103)	0.126 (0.101)		0.477 (0.092)
$\Delta p_{t-2}$	0.153 (0.100)	-0.349 (0.101)			
$\Delta p_{t-4}$			-0.298 (0.094)	-0.306 (0.091)	-0.233 (0.089)
$\Delta oil_t$			0.025 (0.009)	0.010 (0.006)	
$EC_{t-1}$	-0.029 (0.007)	-0.019 (0.006)	-0.043 (0.012)	-0.067 (0.009)	-0.014 (0.006)
R2	0.689	0.476	0.290	0.372	0.340
QM (1)	0.861	0.925	0.363	0.797	0.716
QM (4)	0.284	0.962	0.550	0.976	0.552

*Note:* The endogenous variable is domestic CPI inflation. All variables are specified in logs, p is CPI, and food and oil are international food and oil prices, both expressed in national currency. The parameter EC represents the (mean adjusted) error correction term which has been calculated from the cointegrating relationships in Tables 1 and 2. R<sup>2</sup> is the modified R-squared, and QM stands for the modified Portman-teau statistic for autocorrelation in the residuals up to the specified lag length. The figures in parentheses after the regression coefficients denote standard errors; the entries for QM are p-values..

The error correction terms displayed in Table 5 almost always turn out to be highly significant with the correct sign. The food price models often have a better fit. The contemporaneous impact of international inflation on domestic inflation is higher in case of food prices.

We are able to fit conditional single equation conditional error correction models because of the results on weak exogeneity. There are a few exceptions, particularly for Egypt and Tunisia, where international prices seem to be not weakly exogenous. This does not necessarily imply, however, that these countries can affect world prices, as international prices are denoted in domestic currency. In principle, the exchange rate may react to deviations from the long run, causing a rejection of the assumption on exogeneity. Moreover, we could argue that a bivariate error correction model for Egypt and Tunisia does not lead to different conclusions with respect to domestic inflation.

Let us now turn to the estimation results for asymmetric ECM specifications displayed in Table 6. The empirical evidence conveyed in this table does not indicate substantial improvement over Table 5. Nonetheless, the response to negative error-correction terms, seems to be higher, with the exception of Algeria, a MENA country with less rigid labour markets (Angel-Urdinola and Arvo Kuddo, 2010, Campos and Nugent, 2011). A negative error correction term implies that the CPI is below its long run equilibrium value. Such a constellation can occur after positive shocks in international prices. Instead, the response to positive error correction terms is often insignificant as for instance for Egypt. Here, the international price has declined, but the CPI did not adjust accordingly. Hence, this finding might indicate among others rigidities to downward price adjustments, probably driven by wage rigidities.

Table 6: Asymmetric error correction models – estimation results

Food price model - ECM regression of local consumer prices on world food prices

	Algeria	Egypt	Jordan	Morocco	Tunisia
Constant	0.017 (0.004)	0.010 (0.003)	0.011 (0.003)	0.007 (0.002)	0.008 (0.002)
$\Delta p_{t-1}$	0.319 (0.096)	0.591 (0.097)			0.359 (0.092)
$\Delta p_{t-2}$		-0.298 (0.089)			
$\Delta p_{t-4}$			-0.314 (0.092)	-0.344 (0.096)	-0.354 (0.093)
$\Delta \text{food}_t$	0.052 (0.019)	0.076 (0.015)	0.059 (0.018)	0.019 (0.013)	0.013 (0.006)
$\Delta \text{food}_{t-1}$	-0.035 (0.020)		0.050 (0.020)		
$EC > 0_{t-1}$	-0.105 (0.031)	-0.016 (0.008)	-0.020 (0.016)	-0.017 (0.022)	-0.010 (0.011)
$EC < 0_{t-1}$	-0.077 (0.019)	-0.043 (0.014)	-0.032 (0.019)	-0.075 (0.016)	-0.042 (0.013)
R <sup>2</sup>	0.701	0.611	0.397	0.365	0.423
QM (1)	0.791	0.823	0.310	0.793	0.508
QM (4)	0.341	0.637	0.857	0.916	0.526

Oil price model - ECM regression of local consumer prices on world oil prices

	Algeria	Egypt	Jordan	Morocco	Tunisia
Constant	0.017 (0.005)	0.012 (0.003)	0.008 (0.002)	0.010 (0.001)	0.007 (0.001)
$\Delta p_{t-1}$	0.361 (0.103)	0.718 (0.104)	0.054 (0.101)		0.463 (0.096)
$\Delta p_{t-2}$	0.126 (0.101)	-0.346 (0.101)			
$\Delta p_{t-4}$			-0.375 (0.095)	-0.304 (0.092)	-0.248 (0.094)
$\Delta oil_t$			0.023 (0.009)	0.011 (0.006)	
$EC > 0_{t-1}$	-0.060 (0.024)	-0.015 (0.012)	-0.006 (0.018)	-0.072 (0.023)	-0.010 (0.009)
$EC < 0_{t-1}$	-0.023 (0.008)	-0.024 (0.012)	-0.109 (0.028)	-0.065 (0.015)	-0.019 (0.012)
R2	0.692	0.476	0.341	0.365	0.334
QM (1)	0.793	0.925	0.252	0.788	0.632
QM (4)	0.327	0.962	0.668	0.975	0.650

*Note:* See Table 5. Asymmetric adjustment to the long run is allowed, depending on whether the (mean adjusted) error correction term is positive ( $EC > 0$ ) or negative ( $EC \leq 0$ ).

This view is underlined by the observation that the non-GCC MENA countries investigated by us, on average, display a high realization of the Employing Workers index (EWI) from the World Bank Doing Business dataset, compared with international standards. This strictness of employment regulation index represents the only source of consolidated data available on labor regulation in MENA countries. A higher value of this index indicates more rigidity in the labor law (Angel-Urdinola and Arvo Kuddo, 2010).

Nevertheless, one must take into account that employment laws in MENA remain subject to evasion, weak enforcement, and in many cases do not affect the large informal sector. Informality, defined as the share of employment not contributing to a pension scheme, is lowest among the MENA countries for Egypt – a country for which we identified a clear asymmetric error correction in the wake of price shocks.

Another piece of evidence supporting our view is that in Egypt labor regulation is perceived by firms as a major constraint while this is to a lesser extent true for other MENA countries like Jordan, Algeria and Morocco (Angel-Urdinola and Arvo Kuddo,

2010, Campos and Nugent, 2011). Finally, countries like Egypt rank highest in the LAMRIG ranking developed by Campos and Nugent (2011) using a de jure index of MENA labour market rigidity.

The evidence gained by us is, thus, overall consistent with the rare results on asymmetries in the pass-through of international price shocks in MENA countries, especially Egypt, in the literature summarized in section 2.

## 4 Robustness checks

### 4.1 Adapting the sample period: excluding the Arab Spring

With an eye on the potential incidence of the Arab Spring, the revolutionary wave of demonstrations and protests, riots, and civil wars in the Arab world which began on 18 December 2010, on our results, we also check whether our cointegration results hold for a shorter sample ranging from 1990Q1 to 2010Q4. We do not feel in need to include Jordan in this exercise, because the impacts of the Arab spring appear to be more indirect yet. We display the results of cointegration tests for the bivariate case and the limited sample in Tables 7 and 8 below.

Table 7: Cointegration tests shortened sample - CPI and food prices, national currency

	Lag	Trace	B(Food)	F(CPI)	F(Food)
Algeria	2	26.17 (0.001)	0.427 (0.060)	-0.058 (0.013)	-0.082 (0.073)
Egypt	2	16.05 (0.026)	0.919 (0.091)	-0.031 (0.009)	-0.008 (0.053)
Morocco	1	30.85 (0.000)	0.360 (0.104)	-0.043 (0.008)	0.102 (0.066)
Tunisia	2	15.92 (0.043)	0.491 (0.063)	-0.015 (0.006)	0.223 (0.091)

Table 8: Cointegration tests shortened sample - CPI and oil prices, national currency

	Lag	Trace	B(Oil)	F(CPI)	F(Oil)
Algeria	2	20.04 (0.001)	0.142 (0.084)	-0.029 (0.007)	0.010 (0.068)
Egypt	2	11.10 (0.205)	0.472 (0.065)	-0.025 (0.008)	0.036 (0.081)
Morocco	1	32.00 (0.000)	0.145 (0.029)	-0.051 (0.009)	-0.010 (0.179)
Tunisia	2	17.27 (0.027)	0.238 (0.028)	-0.016 (0.005)	0.480 (0.180)

Note: Bilateral models, variables in logs. International prices transformed into domestic currency by current exchange rates. B(Food) and B(Oil) are the long-run parameters. F(CPI) is the feedback coefficient in the error correction equation for the CPI change, F(Food), F(Oil) the corresponding parameter in the error correction equation for the change in the international price. Trace statistic for the null of no cointegration. Figures in parentheses are  $p$ -values for the trace statistic and standard errors otherwise. The lag length for the underlying VAR (in levels) is determined by the SB criterion. VAR includes a trend not restricted to cointegration relationship.

As for the complete sample period, there is usually evidence of cointegration and the impact of food prices is stronger than that of oil prices. The national consumer price index always reacts with the theoretically expected sign to restore deviations from equilibrium. World prices such as food and oil prices turn out to be weakly exogeneous, except of Tunisia.

The results of the trivariate models lead us to the same conclusions as in Tables 7 and 8. They just corroborate our analysis based on the full sample period. Again, differences between the food price and the oil price model tend to decrease slightly if the nominal exchange rate appears in the cointegrating relationship. The corresponding parameter often enters with a positive sign in the food price model, again indicating a long-run depreciation in response to food price shocks. In contrast, it enters with a negative sign in the oil price model (except Algeria), which suggests an appreciation. Oil again does not appear to be weakly exogeneous in the Egypt and Tunisian case.

Table 9 - Cointegration tests shortened sample - CPI, exchange rate (LC per USD) and food prices (USD)

	Lag	Trace	B(ExRate)	B(Food)	F(CPI)
Algeria	1	52.34 (0.000)	1.013 (0.049)	0.427 (0.071)	0.046 (0.018)
Egypt	2	30.02 (0.047)	0.154 (0.038)	1.345 (0.218)	-0.032 (0.007)
Morocco	1	36.70 (0.007)	-0.224 (0.321)	0.123 (0.136)	-0.041 (0.008)
Tunisia	2	27.92 (0.081)	0.682 (0.101)	0.448 (0.058)	-0.020 (0.008)
		F(ExRate)	F(Food)		
Algeria		0.036 (0.061)	-0.040 (0.072)		
Egypt		0.032 (0.087)	-0.015 (0.038)		
Morocco		-0.075 (0.034)	0.094 (0.067)		
Tunisia		0.063 (0.074)	0.255 (0.128)		

Table 10 - Cointegration tests shortened sample - CPI, exchange rate (LC per USD) and oil prices (USD)

	Lag	Trace	B(ExRate)	B(Oil)	F(CPI)
Algeria	1	37.46 (0.005)	1.763 (0.201)	0.247 (0.142)	0.015 (0.004)
Egypt	2	28.16 (0.076)	-2.002 (0.593)	1.553 (0.272)	-0.008 (0.004)
Morocco	1	39.78 (0.003)	-0.108 (0.192)	0.122 (0.033)	-0.041 (0.008)
Tunisia	2	27.30 (0.095)	-0.227 (0.237)	0.314 (0.056)	-0.013 (0.004)
		F(ExRate)	F(Oil)		
Algeria		0.065 (0.017)	0.025 (0.044)		
Egypt		-0.022 (0.009)	0.105 (0.036)		
Morocco		-0.079 (0.037)	0.031 (0.174)		
Tunisia		-0.049 (0.034)	0.354 (0.133)		

*Note:* See Tables 7 and 8. Models are trivariate, as they also include nominal exchange rates (ExRate), measured as units of local currency per US dollar. International prices are denominated in USD.

## **4.2 Impacts of international price shocks on GDP growth?**

We now check whether there is an impact of international price shocks on real GDP in MENA countries and, if it exists, whether it is more pronounced than that on domestic consumer prices. In other words, we assess whether real GDP is a significant transmission channel of foreign price shocks on domestic “politics”. Our motivation is that the presumed effect of the global oil and food prices on the local inflation is at least partly driven by the assumption that the global price fluctuations of those two commodities are widely affecting the business cycles of the local markets in the region. Oil and food price fluctuations may affect the local markets cycles via three channels: the significant importance of oil incomes in Algeria, the significant cost of the intervention policies (subsidies and strategic food reserves) in the region to insulate the local markets and the effects of the inter-region linkages and the outer-world linkages on the region’s business cycles. To be conservative and consistent with the previous robustness check, we continue to use the limited sample period up to 2010Q4 and leave out Jordan.

### **Cointegration tests**

As in the preceding sections, we start with a battery of cointegration tests to empirically investigate the impact of changes in international prices on local real GDP in a couple of selected MENA countries (Tables 11 and 12). We then change our focus from level to growth relationships and come up with an analysis of Granger Causality (Tables 13 and 14).

Table 11: Cointegration tests - real GDP and food prices, national currency

	Lag	Trace	B(Food)	F(YR)	F(Food)
Algeria	2	13.05 (0.113)	0.540 (0.098)	-0.005 (0.002)	0.145 (0.052)
Egypt	2	7.12 (0.563)	0.489 (0.142)	-0.002 (0.002)	0.129 (0.063)
Morocco	6	9.94 (0.285)	0.550 (0.371)	0.012 (0.007)	0.096 (0.048)
Tunisia	2	4.83 (0.826)	0.515 (0.253)	-0.003 (0.003)	0.085 (0.048)

Table 12: Cointegration tests - real GDP and oil prices, national currency

	Lag	Trace	B(Oil)	F(YR)	F(Oil)
Algeria	2	10.63 (0.234)	0.234 (0.025)	-0.010 (0.005)	0.610 (0.227)
Egypt	2	5.25 (0.782)	0.298 (0.066)	-0.002 (0.002)	0.282 (0.137)
Morocco	1	15.75 (0.046)	0.362 (0.039)	0.018 (0.016)	0.679 (0.242)
Tunisia	2	11.55 (0.180)	0.346 (0.028)	-0.002 (0.004)	0.454 (0.140)

Note: See Tables 7 and 8. Instead of the CPI, real GDP (in domestic currency) is used (YR).

Cointegration is not detected in Tables 11 and 12, especially not for food prices. Nor is there a long-run impact of international price shocks on real output, even not for Algeria, although this country is blessed with natural resources. As the cointegration tests fail, the other parameters are irrelevant.<sup>4</sup> These effects also hold if international prices are measured in US-dollar and the nominal exchange rate enters the long-run relationship.<sup>5</sup>

### Granger Causality tests

The lack of a long run impact of international prices on real GDP does not imply that there is no short-run response. The latter can be determined by Granger Causality tests (Granger 1969). The null hypothesis of no causality is tested between the *growth rates* of real GDP and the corresponding *change* in international prices. Year-on-year rates are considered in Tables 13 and 14, and quarter-on-quarter rates in Tables 15 and 16.

<sup>4</sup> In principle, we could have substituted the relevant entries by an NA (not available).

<sup>5</sup> This table is available on request.

Table 13: Granger Causality tests - food model (yoy)

Direction of causality	Lag length	Food prices to real GDP	Real GDP to food prices
Algeria	6	1.369 (0.242)	1.792 (0.116)
Egypt	6	0.540 (0.776)	0.459 (0.836)
Morocco	6	0.559 (0.762)	0.641 (0.697)
Tunisia	6	1.586 (0.167)	0.935 (0.477)

Table 14: Granger Causality tests - oil model (yoy)

Direction of causality	Lag length	Oil prices to real GDP	Real GDP to oil prices
Algeria	6	0.620 (0.713)	0.580 (0.745)
Egypt	6	1.846 (0.105)	0.351 (0.907)
Morocco	6	2.054 (0.072)	0.458 (0.837)
Tunisia	6	1.644 (0.151)	0.603 (0.727)

Table 15: Granger Causality tests - food model (qoq)

Direction of causality	Lag length	Food prices to real GDP	Real GDP to food prices
Algeria	1	5.143 (0.026)	5.415 (0.023)
Egypt	1	0.116 (0.891)	1.625 (0.204)
Morocco	5	0.467 (0.799)	0.979 (0.437)
Tunisia	5	1.124 (0.356)	1.031 (0.407)

Table 16: Granger Causality tests - oil model (qoq)

Direction of causality	Lag length	Oil prices to real GDP	Real GDP to oil prices
Algeria	1	0.509 (0.478)	0.753 (0.388)
Egypt	1	0.368 (0.546)	0.503 (0.481)
Morocco	5	1.950 (0.098)	0.479 (0.791)
Tunisia	1	0.227 (0.635)	0.673 (0.415)

*Note:* Granger F statistic is displayed,  $p$ -values are put in parentheses. The lag length is determined by the SB criterion.

Again, we do not find any impact of nominal prices on real GDP, even not in the short run.<sup>6</sup>

## 5 Conclusions and policy recommendations

Seen on the whole, we would like to stress the policy relevance merging from our empirical results.

The asymmetric error-correction identified in the paper, i.e. the lower reaction of domestic consumer prices after negative shocks in international prices, points to rigidities to downward price adjustments. From this perspective, extended price subsidies are the consequence which may lead to fiscal problems in the respective MENA countries. They can also contribute to higher instability in international markets due to biased incentives to food producers. What is more, exchange rate movements do not serve as complete shock absorbers in MENA countries. Finally, the estimated food price elasticities are about twice as large as oil price elasticities. This implies that the impact of food prices dominates.

The result of asymmetric error correction, i.e. the lower reaction of domestic consumer prices after negative shocks in international prices, deserves special attention. The reason for the high policy relevance of this result is illustrated in the following. Intervention policies in the MENA region countries are very common and include subsidies and

---

<sup>6</sup> It may be argued that real prices might be a better choice. The results are available on request, but with an eye on the lack of a long-run relation, we feel legitimized to concentrate on the inflation reaction.

food strategic reserves. Energy and food subsidies have been used to be for decades, the major part of the social security safety net in the region (Albers and Peeters, 2011). According to IMF data, food subsidies have been estimated about 0.7 percent of GDP of the MENA countries in 2011. Energy subsidies have cost about \$240 billion in 2011, which is equal to about 8.5 percent of the regional GDP or 22 percent of the government revenue and account for about 50 percent of the global energy subsidies.

Other intervention tools are the food strategic reserves. The MENA region countries now hold more than 13 percent of global wheat stocks and 15 percent of global wheat trade. It is suggested that this strategy can reduce the variability of domestic wheat prices and, despite some failures, can insulate the region countries from off-shore price disturbances (Larson et al., 2012). By comparing the adjustment pattern across countries, our analysis provides an indirect evaluation of the success of policies implemented to cushion the domestic economies from global price shocks.

In this vein, we feel legitimized to consider government interventions to be just another economic characteristic affecting pass-through to the local inflation. In some definition, for a country to be considered as food secure, it is supposed to generate sufficient foreign exchange from exports to finance food imports (Breisinger et al. 2010). However, keeping domestic prices and imports of food as stable as possible is not just about importing enough food, but also using interventions based on food stocks and price subsidies on imported food. Those massive interventions will cost even more in case of global price fluctuations. For instance, the government will have to double the subsidy paid per unit of imported food in case of a shock doubling the world food price in order to keep imports at levels prevailing at the old international prices (Ianchovichina et al. 2012).

Regardless of the assumption that food and oil prices fluctuating simultaneously, MENA oil-exporting countries, such as Algeria and the Gulf Council countries not considered in our study, should benefit on the macro level in case of rising oil prices, having more fiscal space to cover the food imports and the costs of interventions. The situation in the MENA oil-importing countries will differ and its fiscal space will depend also on other factors including its relations with the region and the outer world through remittances and trade.

We conclude with some final remarks about the identification of further research areas. In spite of the legitimized focus on the Arab Spring since turn-of-year 2010/11, one should not forget the Union for the Mediterranean partnership, which was initiated with the Barcelona process in 1995. It aims at the establishment of free trade agreements in the area and tries to promote regional interdependences (Canova and Cicarelli, 2011). Consequently, an interesting question in the context of this paper is whether an increase in trade and regional interdependencies would change the nature and features of the pass-through of international price movements to the Mediterranean. Moreover, the high linkage between the GCC countries and the other countries in the MENA region through the financial flows and remittances should have a bearing on the degree of the pass-through of international price shocks on domestic prices and GDP (Ilahi and Shendy, 2008). We leave these questions to further research.

## **References**

- Albers R, Peeters M (2011) Food and energy prices - Government subsidies and fiscal balances in South Mediterranean countries. Economic Papers 437, European Economy, European Commission, Brussels, February.
- Angel-Urdinola DF, Kuddo A. (2010) Key Characteristics of Employment Regulation in the Middle East and North Africa. SP Discussion Paper 1006. Social Protection and Labor, The World Bank, Washington/DC, July.
- Bakhat M, Wuerzburg K (2013) Price relationships of crude oil and food commodities. Working Paper WP FA06/2013. Economics for Energy, Vigo, web: [www.eforenergy.org](http://www.eforenergy.org).
- Baltzer K (2013) International to domestic price transmission in fourteen developing countries during the 2007-08 food crises. WIDER Working Paper 2013/031, United Nations University.
- Belke A, Beckmann J, Verheyen F (2013) Interest rate pass-through in the EMU - New evidence from nonlinear cointegration techniques for fully harmonized data. In: Journal of International Money and Finance 37:1-24.

Breisinger C, Ecker O, Al Riffai P (2011) Economics of the Arab Awakening: From revolution to transformation and food security. IFPRI Policy Brief 18, Washington.

Campos NF, Nugent JB (2011) Labor Market Rigidity in MENA: How to Measure It? What Does It? Is MENA Different? How and Under What Circumstances?. Paper presented at the 86th Annual Conference of the Western Economic Association International (San Diego). June 29-July 3, 2011.

Canova F, Cicarelli M (2011) Cyclical fluctuations in the Mediterranean basin. ECB Working Paper 1367. Frankfurt/Main, August.

De Gregorio J, Landerretche O, Neilson C (2007) Another pass-through bites the dust? Oil prices and inflation. Working Papers Central Bank of Chile 417, Santiago, Chile.

Demeke M, Pangrazio G, Maetz M (2008) Country responses to the food security crisis: Nature and preliminary implications of the policies pursued. Rome, Agricultural Policy Support Service, FAO.

Dewbre J, Giner C, Thompson W, Lampe MV (2008) High food commodity prices: Will they stay? Who will pay?. *Agricultural Economics* 39:393-403.

Diouf J (2008): High food prices Causes and possible actions. Food and Agriculture Organization of the United Nations (FAO), Rome.

Esfahani HS, Mohaddes K, Pesaran MH (2012) An empirical growth model for major oil exporters. *Journal of Applied Econometrics*. doi: 10.1002/jae.2294.

Granger CWJ (1969) Investigating causal relations by econometric models and cross-spectral methods. *Econometrica* 37:424-438.

Hansen BE, Seo B (2002) Testing for two-regime threshold cointegration in vector error-correction models. *Journal of Econometrics* 110:293 – 318.

Headey D, Fan S (2008) Anatomy of a crisis: The causes and consequences of surging food prices. *Agricultural Economics* 39:375-391.

Ianchovichina E, Loening J, Wood C (2012) How vulnerable are Arab countries to global food price shocks?. World Bank Policy Research Working Paper 6018.

Ilahi N, Shendy R (2008) Do the Gulf oil-producing countries influence regional growth? The impact of financial and remittance flows. IMF Working Paper WP/08/167. Washington/DC, July.

IMF (2008) Is inflation back? Commodity prices and inflation. In World Economic Outlook: Financial stress, downturns and recoveries. October:83-128.

Johansen S (1988) Statistical Analysis of Cointegration Vectors. Journal Of Economic Dynamics and Control 12(2-3):231-254.

Johansen S (1991) Estimation and Hypothesis Testing of Cointegrated Vectors in Gaussian Vector Autoregressive Models. Econometrica 59(6):1551-1580.

Kilian L (2008a) The economic effects of energy price shocks. Journal of Economic Literature 46:871-909.

Kilian L (2008b) Exogenous oil supply shocks: How big are they and how much do they matter for the US economy?. Review of Economics and Statistics 90:216-240.

Larson DF, Lampietti J, Gouel C, Cafiero C, Roberts J (2012) Food security and storage in the Middle East and North Africa. The World Bank Policy Research Working Paper 6031. The World Bank, Washington/DC.

Sachs JD, Warner AM (1999) The big push, natural resource booms and growth. Journal of Development Economics 59:43-76.

Timmer CP (2008) Causes of high food prices. ADB Economics Working Paper Series 128. Asian Development Bank, Manila.

Urbain JP (1992) On weak exogeneity in error correction models. Oxford Bulletin of Economics and Statistics 54:187-207.

World Bank (2011) *Sustaining the Recovery and Looking Beyond*. Washington, DC.

Zilberman D, Hochman G, Rajagopal D, Sexton S, Timilsina G (2013) The impact of biofuels on commodity food prices: assessment of findings. American Journal of Agricultural Economics 95:275-281.

**The following ROME Discussion Papers have been published since 2007:**

- |   |      |  |  |
|---|------|--|--|
| 1 | 2007 | Quo vadis, Geldmenge? Zur Rolle der Geldmenge für eine moderne Geldpolitik                                       | Egon Görgens<br>Karlheinz Ruckriegel<br>Franz Seitz  |
| 2 | 2007 | Money and Inflation. Lessons from the US for ECB Monetary Policy   | Ansgar Belke<br>Thorsten Polleit                     |
| 3 | 2007 | Two-Pillar Monetary Policy and Bootstrap Expectations  | Peter Spahn  |
| 4 | 2007 | Money and Housing – Evidence for the Euro Area and the US  | Claus Greiber<br>Ralph Setzer                        |
| 5 | 2007 | Interest on Reserves and the Flexibility of Monetary Policy in the Euro Area                                     | Ulrike Neyer   |
| 1 | 2008 | Money: A Market Microstructure Approach  | Malte Krueger  |
| 2 | 2008 | Global Liquidity and House Prices: A VAR Analysis for OECD Countries   | Ansgar Belke<br>Walter Orth<br>Ralph Setzer          |
| 3 | 2008 | Measuring the Quality of Eligible Collateral   | Philipp Lehmbecker<br>Martin Missong                 |
| 4 | 2008 | The Quality of Eligible Collateral and Monetary Stability: An Empirical Analysis                                 | Philipp Lehmbecker                                   |
| 5 | 2008 | Interest Rate Pass-Through in Germany and the Euro Area  | Julia von Borstel                                    |
| 1 | 2009 | Interest Rate Rules and Monetary Targeting: What are the Links?  | Christina Gerberding<br>Franz Seitz<br>Andreas Worms |
| 2 | 2009 | Current Account Imbalances and Structural Adjustment in the Euro Area: How to Rebalance Competitiveness          | Ansgar Belke<br>Gunther Schnabl<br>Holger Zemanek    |
| 3 | 2009 | A Simple Model of an Oil Based Global Savings Glut – The “China Factor” and the OPEC Cartel                      | Ansgar Belke<br>Daniel Gros                          |
| 4 | 2009 | Die Auswirkungen der Geldmenge und des Kreditvolumens auf die Immobilienpreise – Ein ARDL-Ansatz für Deutschland | Ansgar Belke   |

5	2009	Does the ECB rely on a Taylor Rule? Comparing Ex-Post with Real Time Data	Ansgar Belke Jens Klose
6	2009	How Stable Are Monetary Models of the Dollar-Euro Exchange Rate? A Time-varying Coefficient Approach	Joscha Beckmann Ansgar Belke Michael Kühl
7	2009	The Importance of Global Shocks for National Policymakers – Rising Challenges for Central Banks	Ansgar Belke Andreas Rees
8	2009	Pricing of Payments	Malte Krüger
1	2010	(How) Do the ECB and the Fed React to Financial Market Uncertainty? The Taylor Rule in Times of Crisis	Ansgar Belke Jens Klose
2	2010	Monetary Policy, Global Liquidity and Commodity Price Dynamics	Ansgar Belke Ingo G. Bordon Torben W. Hendricks
3	2010	Is Euro Area Money Demand (Still) Stable? Cointegrated VAR versus Single Equation Techniques	Ansgar Belke Robert Czudaj
4	2010	European Monetary Policy and the ECB Rotation Model Voting Power of the Core versus the Periphery	Ansgar Belke Barbara von Schnurbein
5	2010	Short-term Oil Models before and during the Financial Market Crisis	Jörg Clostermann Nikolaus Keis Franz Seitz
6	2010	Financial Crisis, Global Liquidity and Monetary Exit Strategies	Ansgar Belke
7	2010	How much Fiscal Backing must the ECB have? The Euro Area is not the Philippines	Ansgar Belke
8	2010	Staatliche Schuldenkrisen – Das Beispiel Griechenland	Heinz-Dieter Smeets
9	2010	Heterogeneity in Money Holdings across Euro Area Countries: The Role of Housing	Ralph Setzer Paul van den Noord Guntram B. Wolff
10	2010	Driven by the Markets? ECB Sovereign Bond Purchases and the Securities Markets Programme	Ansgar Belke

11	2010	Asset Prices, Inflation and Monetary Control – Re-inventing Money as a Policy Tool	Peter Spahn
12	2010	The Euro Area Crisis Management Framework: Consequences and Institutional Follow-ups	Ansgar Belke
13	2010	Liquiditätspräferenz, endogenes Geld und Finanzmärkte	Peter Spahn
14	2010	Reinforcing EU Governance in Times of Crisis: The Commission Proposals and beyond	Ansgar Belke
01	2011	Current Account Imbalances in the Euro Area: Catching up or Competitiveness?	Ansgar Belke Christian Dreger
02	2011	Volatility Patterns of CDS, Bond and Stock Markets before and during the Financial Crisis: Evidence from Major Financial Institutions	Ansgar Belke Christian Gokus
03	2011	Cross-section Dependence and the Monetary Exchange Rate Model – A Panel Analysis	Joscha Beckmann Ansgar Belke Frauke Dobnik
04	2011	Ramifications of Debt Restructuring on the Euro Area – The Example of Large European Economies' Exposure to Greece	Ansgar Belke Christian Dreger
05	2011	Currency Movements Within and Outside a Currency Union: The Case of Germany and the Euro Area	Nikolaus Bartzsch Gerhard Rösl Franz Seitz
01	2012	Effects of Global Liquidity on Commodity and Food Prices	Ansgar Belke Ingo Bordon Ulrich Volz
02	2012	Exchange Rate Bands of Inaction and Play-Hysteresis in German Exports – Sectoral Evidence for Some OECD Destinations	Ansgar Belke Matthias Göcke Martin Günther
03	2012	Do Wealthier Households Save More? The Impact of the Demographic Factor	Ansgar Belke Christian Dreger Richard Ochmann
04	2012	Modifying Taylor Reaction Functions in Presence of the Zero-Lower-Bound – Evidence for the ECB and the Fed	Ansgar Belke Jens Klose

05	2012	Interest Rate Pass-Through in the EMU – New Evidence from Nonlinear Cointegration Techniques for Fully Harmonized Data	Joscha Beckmann Ansgar Belke Florian Verheyen
06	2012	Monetary Commitment and Structural Reforms: A Dynamic Panel Analysis for Transition Economies	Ansgar Belke Lukas Vogel
07	2012	The Credibility of Monetary Policy Announcements: Empirical Evidence for OECD Countries since the 1960s	Ansgar Belke Andreas Freytag Jonas Keil Friedrich Schneider
01	2013	The Role of Money in Modern Macro Models	Franz Seitz Markus A. Schmidt
02	2013	Sezession: Ein gefährliches Spiel	Malte Krüger
03	2013	A More Effective Euro Area Monetary Policy than OMTs – Gold Back Sovereign Debt	Ansgar Belke
04	2013	Towards a Genuine Economic and Monetary Union – Comments on a Roadmap	Ansgar Belke
05	2013	Impact of a Low Interest Rate Environment – Global Liquidity Spillovers and the Search-for-yield	Ansgar Belke
06	2013	Exchange Rate Pass-Through into German Import Prices – A Disaggregated Perspective	Joscha Beckmann Ansgar Belke Florian Verheyen
07	2013	Foreign Exchange Market Interventions and the \$-¥ Exchange Rate in the Long Run	Joscha Beckmann Ansgar Belke Michael Kühl
08	2013	Money, Stock Prices and Central Banks – Cross-Country Comparisons of Cointegrated VAR Models	Ansgar Belke Marcel Wiedmann
09	2013	3-Year LTROs – A First Assessment of a Non-Standard Policy Measure	Ansgar Belke
10	2013	Finance Access of SMEs: What Role for the ECB?	Ansgar Belke
11	2013	Doomsday for the Euro Area – Causes, Variants and Consequences of Breakup	Ansgar Belke Florian Verheyen
12	2013	Portfolio Choice of Financial Investors and European Business Cycle Convergence – A Panel Analysis for EU Countries	Ansgar Belke Jennifer Schneider

- |    |      |   |   |
|----|------|---|---|
| 13 | 2013 | Exports and Capacity Constraints – A Smooth Transition Regression Model for Six Euro Area Countries | Ansgar Belke<br>Anne Oeking<br>Ralph Setzer |
| 14 | 2013 | The Transmission of Oil and Food Prices to Consumer Prices – Evidence for the MENA countries        | Ansgar Belke<br>Christian Dreger            |