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Financial Internet Quarterly „e-Finanse" 2018, vol. 14/ no. 4, s. 67-76

DOI: 10.2478/fiqf-2018-0028

eFinanse
financial internet quarterly

THE IMPACT OF QUANTITATIVE EASING ON EMERGING MARKETS – LITERATURE REVIEW

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Abstract

The article presents the results of the review of the empirical literature regarding the impact of quantitative easing (QE) on emerging markets (EMs). The subject is of interest to policymakers and researchers due to the increasingly larger role of EMs in the world economy and the large-scale capital flows occurring after 2009. The review is conducted in a systematic manner and takes into consideration different methodological choices, samples and measurement issues. The paper puts the summarized results in the context of transmission channels identified in the literature. There are few distinct methodological approaches present in the literature. While there is a consensus regarding the direction of the impact of QE on EMs, its size and durability have not yet been assessed with sufficient precision. In addition, there are clear gaps in the empirical findings, not least related to relative underrepresentation of the CEE region (in particular, Poland).

JEL classification: E52, E58
Keywords: quantitative easing, emerging markets, portfolio balance channel, monetary transmission, spillovers

Received: 29.08.2018 Accepted: 14.12.2018

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Introduction

In recent years, emerging markets (EMs) have become an ever-more important part of the world economy, accounting for 58% of global GDP (in PPP) in 2016, as compared to 36% in 1990 (IMF, 2017). The increase in the size of these economies was followed by rapid increase in the volume of trade and capital flows, as well as rising economic complexity. Yet, emerging market economies are not their own masters, as key economic and financial variables are influenced by various spillovers from developed economies (developed markets, DMs). Among those, spillovers from central bank policies stand out. Due to the existence of numerous interlinked transmission channels and the emergence of unconventional monetary policy in DMs in 2008, the issue is of interest to researchers.

The literature on central bank spillovers to EMs can be seen as an outcrop of earlier lines of research regarding EM crises (Calvo & Reinhart, 2002; Calvo et al., 2004), contagion (Allen & Gale, 2000; Forbes & Rigobon, 2002; Pericoli & Sbracia, 2003) and determinants of capital flows in and out of EMs (Calvo et al., 1993; 1996). After the global financial crisis, focus has shifted towards the impact of unconventional monetary policies (with emphasis on asset purchase programmes, known as quantitative easing, QE) conducted by DM central banks on EM economies and EM financial variables. However, to the author's knowledge, a systematic review of this issue has not yet been published.

The issue is relevant not only to researchers, but also to policymakers both in EMs and DMs. For the latter, the importance of monetary policy spillovers lies in the need to accurately plan and design macroprudential policies. In addition, monetary policy in EMs must often consider the impact of external events and circumstances (such as monetary policy in major DMs) on financial markets and the effectiveness of domestic transmission of monetary policy. Spillovers and vulnerability of various countries and their asset classes to QE is also relevant for investors who want to measure risk accurately. All of the above apply to Poland (and, in general, the Central-Eastern Europe region; CEE) as well. Poland is often considered to be an emerging market (Morck et al., 2000; Avora & Cerisola, 2001; IMF, 2007), especially by financial market practitioners. In addition, its proximity to the euro area and the strength of economic and financial ties to European DMs makes the country susceptible to side effects of monetary easing and tightening in the euro area.

The aim of this paper is to assess the current state of knowledge regarding central bank spillovers to EMs. Such an analysis will be conducted both from a methodological and a material standpoint. The former pertains to the data and methods used in the literature, the latter – to the estimated impact of DM central bank policies on EM economies and financial markets. I hypothesize that the existing literature is incomplete, i.e. not all available methods are utilized and there is a material imbalance in the treatment of major geographical areas. However, despite this shortage of methodological consensus, key findings across the literature are similar.

The paper contributes to the literature in two ways: first, it offers the broadest structured summary of methodological and empirical aspects of QE research; second, it highlights avenues for further study. The remainder of the paper is organized as follows: I start with the description of data and methods employed thereafter; next, the paper turns to the discussion of possible channels through which QE impacts EMs; in the subsequent two chapters I perform comparative and statistical analysis to assess the state of the literature regarding the impact of QE on EMs.

Data and methods

Quantitative easing is a semi-colloquial term used with reference to the purchase of financial assets by central banks. It was pioneered by the Bank of Japan in the early 2000s (Ito, 2006), but it has become much more popular since 2008, when several major central banks (in particular, the U.S. Federal Reserve (Fed), the Bank of England (BoE) and the European Central Bank (ECB)) embarked on such programmes on their own (Bernoth et al., 2015). QE typically aims at raising economic growth, easing domestic financial conditions and ensuring the return of inflation to central bank's target over the medium term (Bernanke, 2012). Since 2008, QE has been studied extensively and multiple studies assessed its effectiveness in achieving domestic policy goals (Chen et al., 2011; D'Amico & King, 2011; Gagnon et al., 2011; Wright, 2012). QE is a part of broader suite of instruments collectively known as unconventional monetary policy, yet the extent to which central bank balance sheets expanded in the aftermath of the crisis and the popularity of this

instrument justify the intense focus QE has received.

There is no precise, universally accepted definition of an EM country. Most definitions include: intermediate income, fast economic growth (implying catching up), institutional transformation and open economy (IMF, 2017; MSCI, 2017; S&P, 2017). In general, there is no universally accepted list of countries that constitute the EM universe, nor are any of them compatible with classifications based on income per capita (for instance, Taiwan and Hong Kong are often considered to be EMs, despite boasting higher GDP per capita than Portugal or Greece). Without deciding on certain marginal cases, one can reasonably include several groups of countries in EM: Latin America, from Mexico to Chile; Eastern Asia excluding Japan; South-Eastern Asia (Malaysia, Indonesia, Thailand, Singapore); India; Turkey; South Africa; Central and Eastern Europe, including Russia. Due the rapid proliferation of QE during the global financial crisis, I restrict the analysis to the 2008-2017 period.

In this article, I gathered 74 journal articles, working papers and reports pertaining to impact of DM monetary policy on emerging market economies. Of these, 22 deal with QE, covering 22 separate EM countries and 4 groups of EM countries of varying definitions. I use comparative and statistical analysis to summarize their findings and classify them according to several criteria: choice of source countries, choice of recipient countries, choice of variables, measurement of QE impact. This allows us to cover a diverse group of studies and matches the key methodological choices made by the authors themselves.

Transmission of QE to emerging markets – possible channels

In general, monetary policy has goals and transmission channels related to domestic economic activity, market mechanisms and the behaviour of economic agents. A textbook list of channels through which conventional monetary policy influences aggregate output and inflation would include: credit, exchange rate, interest rate, asset price and expectation channels. In the case of QE, the list is usually broader and consists of: credit, exchange rate, bank lending, asset price, expectations, portfolio balance, signalling and risk premium (Bernanke, 2012; Krishnamurthy & Vissing Jorgensen, 2011; 2013). Domestic monetary policy transmission is, however, only a partial description of the effects of monetary policy instruments, as some of them affect other countries. Justifiably, external transmission of monetary policy has received relatively less attention, since it is usually unintentional (it takes the form of spillovers) and depends on the conditions in both the recipient and the source country.

Bearing these general considerations in mind, it should not be surprising that channels through which QE affects EMs have been grouped into several typologies (e.g. Calvo et al., 2004; Ehrmann & Fratzscher, 2006; Ehrmann et al., 2011; Landau, 2013; Chen et al., 2014). Even though the exact typologies differ between authors, one can reasonably outline three major types of channels through which unconventional monetary policy spills over to the EM countries: macroeconomic, behavioral and financial.

The macroeconomic channels are related to trade, capital and banking ties between EMs and developed countries. These channels operate primarily due to the effects of DM monetary policy on domestic conditions in DMs (e.g. by raising demand, it also raises imports of goods and services from EM countries tied by trade links). Somewhat reluctantly, one can include the exchange rate channel (capturing the effects of QE on bilateral exchange rate) in this group.

Behavioral channels include the following: confidence, risk-taking, signaling and sentiment. Their operation is preconditioned on the ability of QE to influence the behavior of relevant economic agents and their willingness to spend, take risk or invest (therefore, on central bank credibility).

Financial channels are associated with asset prices and the effect of their changes. In the simplest version, monetary policy of DM central banks spills over to EM when asset prices are raised and, due to wealth effects, their EM-based owners raise their consumption in response. Changes in asset prices themselves also convey information, influencing economic activity (changes in interest rates are the most obvious example). Finally, by affecting relative asset prices, QE is forcing asset holders to adjust their portfolios, usually by purchasing riskier assets, including EM. The latter channel is known as portfolio balance channel.

Methods and means of measuring impact

In this section, the methodological state-of-the-art of research on the impact of QE on EMs is analysed. Its four key features are outlined: (1) choice of the source (or donor) country, (2) the sample of recipient countries, (3) choice of financial and macroeconomic variables studied and (4) methods of measuring the impact.

Choice of source countries

Since 2008, asset purchase programmes have been launched by central banks in several countries, including the United States, United Kingdom, Euro area, Japan, Switzerland and Sweden. The broad literature on the impact of unconventional monetary policy is, however, centred around the Fed and studies taking other central banks' actions are far less common. As far as international spillovers of unconventional monetary policies are concerned, the literature is even less diverse.

To my knowledge, no study has looked at the impact of BoE, BoJ and SNB's unconventional policies on EMs. While the ECB's extensive array of asset purchase programmes and other non-standard instruments has received some attention from researchers (Rivolta, 2014; Bernoth et al., 2015; Haitsma et al., 2016), the number of relevant studies is moderate at best. Thus, the vast majority of research on the international effects of QE pertains to the Fed's several QE programmes conducted since 2008.

Choice of recipient countries

The focus on the spillovers of the Fed's policies understandably translates into the choice of emerging markets studied. As a result, the attention given to each major EM country of group of countries deviates from these countries' share in overall GDP, capital or international trade flows. Existing literature on the impact of QE on emerging markets is focusing primarily on selected countries from Eastern and South-Eastern Asia and Latin America (Dooley & Hutchison, 2009; Chua et al., 2013; Rai & Suchanek, 2014). It is understandable given the size of their trade and financial links with the United States, the role of the US dollar and historical legacy (earlier literature on EM crises and capital flows also focused on the same countries, in part due to their long history of crises and defaults). In several cases (Rai & Suchanek, 2014; Gilchrist et al., 2016) samples of EM countries are extended to include countries from outside the two above mentioned regions, namely, Turkey, South Africa, Russia and the CEE region (i.e. Poland, Czech Republic, Hungary and other countries – the exact choice often varies). The latter is most often represented in studies focusing on the ECB's policies (Buttner et al., 2009; Halova & Horvath, 2015; Kucharcukova et al., 2016; Bluwstein & Canova, 2016) – again, it is understandable given the extent and the strength of those countries links to the euro area. Overall, it must be concluded that the attention given to the CEE region is relatively low.

The detailed list of countries to be included in each analysis appears to be heavily influenced by data availability (in both temporal and spatial dimensions) and comparability issues. The widest sample has been employed by (Rai & Suchanek, 2014) and includes 19 countries. Most often research samples are one of convenience, i.e. are drawn from well-known datasets validated and maintained by international organizations, such as the International Finance Statistics dataset from the IMF.

Choice of variables

In line with the typology of transmission channels, three broad categories of variables used to estimate the impact of QE on emerging markets have been identified:

1) Financial variables, i.e. exchange rates (either bilateral, usually vis-à-vis the US dollar, or trade-weighted indices), interest rates (short term interbank rates, government bond yields) and equity indices.
2) Macroeconomic variables, i.e. GDP, inflation, unemployment rate and industrial production, among others.
3) Variables derived from balance of payment statistics, i.e. capital and financial cross-border flows (either net bilateral flows or inflows and outflows taken into account separately).

The diversity is compounded by different ways of measurement applied to the same variable by different authors – at the same time, it reduces the overall cohesion and comparability of the existing literature. In particular, variables can be expressed as levels (Büttner et al., 2009; Banerjee et al., 2016), log-levels (Chua et al., 2013; Lin

et al., 2014; Rai & Suchanek, 2014) or impulse responses (Chua et al., 2013; Dedola et al., 2015; Halova & Horvath, 2015).

Measuring the impact of QE

There is no universally agreed upon method of measuring QE for the purpose of econometric modelling. The programmes have been expressed either as dummy variables (equal to 1 on the day of announcement or launch - (Aizenmann et al., 2014; Lin et al., 2014; Fratzscher et al. 2018)), in levels (value of financial asset purchased under a QE programme within a certain timeframe – see Barroso (2013) as a useful illustration), as a function of the yield curve (Chen et al. (2014) uses principal components of yields associated with signalling or portfolio balance channels of monetary policy transmission) or indirectly, as changes in money supply or financial conditions indices. It is also largely dependent on the choice of methods. Broadly speaking, there are two classes employed in the literature.

First, there are event studies (Fama et al., 1969; Binder, 1998), i.e. regressions (standard ordinary least squares (OLS) (Rai & Suchanek, 2014; Aizenmann et al., 2014) or an instrumental variables (IV) setting (Moore et al., 2013)) of target variables on a set of control variables and a dummy associated with the monetary policy event (typically the announcement of a programme or other important statement). The regression equation is estimated using daily data and takes the form of:

$$R_{it} = \alpha_i + \sum_{j=1}^{J} \beta_{ij} R_{jt} + \sum_{k=1}^{K} \gamma_{ik} D_{kt} + \varepsilon_{it} \qquad (1)$$

where R_{it} = financial variable,

α_i = intercept,

β_{ij} = parameters capturing market and economic fundamentals,

γ_{ik} = estimated impact of events studied,

R_{jt} = market and economic fundamentals (e.g. stock index, benchmarks),

D_{kt} = dummy variables associated with events studied.

Second, vector autoregressions and structural vector autoregressions (VARs and SVARs, respectively) (Lütkepohl, 2005) are often used to estimate the impact of QE on EM economies (Barroso et al., 2013; Bhattarai et al., 2015; Dedola et al., 2015; Halova & Horvath, 2015; Bluwstein & Canova, 2016). The advantage of VAR methodology (the functional form is shown by the equation below) is the possibility of assessing the direction, magnitude and the persistence of the impact using impulse response functions (IRFs) (Lütkepohl, 2005). However, the shapes of the IRFs are often different and in some cases, there is no consensus on whether the impact of QE is permanent or transitory. Comparability of various studies is also limited for the same reasons.

$$y_t = c + \mathbf{A}_1 y_{t-1} + \mathbf{A}_2 y_{t-2} + \ldots + \mathbf{A}_k y_{t-k} + \mathbf{e}_t \qquad (2)$$

where u = vector of dependent variables,

A_i = parameter matrices.

The impact of QE on emerging markets – summary of the results

In this section, the results of available studies regarding the impact of QE on emerging markets are discussed. Consistent with the previous typology of target variables, it is divided into three parts: the impact on financial variables, on macroeconomic variables and on financial and capital flows (balance of payments related variables).

Impact on financial variables

QE is associated with appreciation of EM currencies vis-à-vis the currency of source country (in most cases, the US dollar) – despite the few exceptions of single countries in multi-country settings, this result can be seen as a consensus. The typical effect size is 0.2-0.6% (Chen et al., 2014; Rai & Suchanek, 2014; Kucharcukova et al., 2016; Fratzscher et al., 2018) and is slightly asymmetric since the impact of tapering-related announcement is visibly smaller than the impact of announcements associated with monetary easing via QE (Chua et al., 2013). Most estimates are statistically significant. Cross-country variation remains significant and easily exceeds 100% of mean impact. Fig. 1 plots the median estimated impact (after standardization and adjustment to the size of the shock) for the three key financial variables along with the 90% confidence interval.

As far as bond yields are concerned, a vast majority of studies considered ((Chen et al., 2014) is a notable exception) found a negative impact from QE announcements and actual purchases ((Chua et al., 2013;

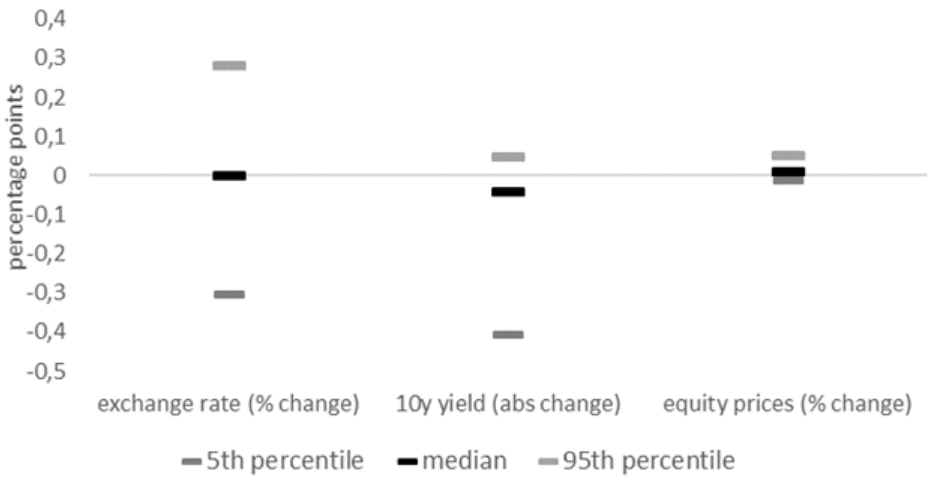
Bowman et al., 2014; Fratzscher et al., 2018)). This pertains primarily to 10-year yields, as papers of shorter duration were studied less often: Gilchrist et al. (2016) used 2-year yields as well and found that, while direction of QE impact is uniform along the whole yield curve, the 2-year sector is the least likely to register a statistically significant effect. Almost a half of the studies looked at announcements related to tapering, thereby presenting the impact of monetary tightening via QE reversal. The impact of QE on bond yields was also confirmed by measuring the effect on a broad emerging market bond index (EMBI) (Bhattarai et al., 2015). QE also led to lower credit default swap (CDS) spreads, but the impact is found to be statistically insignificant for most EM countries (Dooley & Hutchison, 2009; Aizenmann et al., 2014; Bluwstein & Canova, 2016).

EM equity prices are raised by QE and, conversely, lowered by negative QE-related shocks (tapering). The estimated impact of QE on equity prices is in the 0.4-2.2% range (Chua et al., 2013; Bhattarai et al., 2015; Fratzscher et al., 2018), with mean impact at 1.3%. The impact of tapering shocks (Rai & Suchanek, 2014) was estimated to be -2.4% on average, with significant cross-country variation (from -0.3% to -5.2%).

Impact on macroeconomic variables

QE conducted by the Fed has a positive impact on real economic variables in EMs, i.e. it raises GDP and industrial output, and lowers unemployment rate. The estimates are, however, highly heterogeneous with respect to measurement issues, the shape of impulse response functions (all studies were conducted using VAR methodology) and country selection. (Chua et al., 2013) found that a positive shock to US money supply (one standard deviation) raises EM GDP by 0.2%. Barroso et al. (2013) as well as Halova & Horvath (2015) estimate the impact of US QE on economic activity at 0.4%. QE in the US also raises inflation, while monetary tightening dampens it (Chua et al., 2013; Bhattarai et al., 2015; Barroso et al., 2016) – the per-unit impact is estimated at 0.2-0.4%. The presented sample of empirical studies also includes three studies measuring the effect of ECB's unconventional policies on the CEE region (Halova & Horvath, 2015; Bluwstein & Canova, 2016; Kucharcukova et al., 2016) – all found monetary tightening to be negative for GDP in the region (from -0.3 to -0.4%), industrial output (between -0.2 and -0.1%) and for inflation (from -0.3 to 0.1%).

Figure 1: The impact of QE on financial variables



Source: Author's own elaboration

Impact on financial and capital flows

Effects of QE on balance of payments data has been of interest to researchers due to a clear relation to the portfolio balance channel and a long tradition of research on capital flows and emerging market crises. Empirical studies analyse the financial accounts of EMs in a detailed fashion, but there is little overlap between them, limiting their comparability.

The impact of QE on total capital flows to EM was estimated at approx. 2% by (Bhattarai et al., 2015), while the impact of policy normalization equals 1.8% of EM GDP (Dahlhaus & Vasistha, 2014). According to Lin et al. (2014), QE boosted total financial flows by 2.9% (impact varies between the subsequent US asset purchase programmes) and portfolio flows by 1.8%. It is unclear how this effect can be decomposed between bond and equity flows. While Fratzscher et al. (2018) find a negative impact of QE announcements on bond fund inflows, Lin et al. (2014) estimate that asset purchases raised bond inflows by 1.5%. It is unlikely that this discrepancy can be traced back to behavioural differences between fund managers and other portfolio investors. Methodological differences (event study and regression involving actual weekly purchases in the former case and panel regression in the latter) are more likely to account for this, as financial flows are typically much slower to adjust than financial market variables. Even weekly data used by Fratzscher et al. (2018) fails to capture this effect. Equity flows, on the other hand, are generally found to be positively associated with QE – the average impact of asset purchases across available studies is 3.9%. Finally, as Burger et al. (2018) note, QE (working through US interest rate levels) can be associated with higher US-based investment into EM bond markets.

Discussion

The literature on the impact of quantitative easing on emerging markets is quite extensive, but there is little agreement when it comes to methodological choices. While a diverse set of empirical tools is welcome, the differences in approaches greatly reduces the comparability of studies. In addition, several gaps have been identified.

Extant research is US-centric, focusing on the impact of the Fed's QE programmes at the expense of other major central banks, such as the ECB, BoJ and BoE. While this is to some extent justified by the role of the United States and the US dollar in global financial and capital markets, the disproportion must be judged to be high as the impact of certain central banks' (BoE and BoJ) policies on EMs has never been studied. The US-centric nature of the research also biases the choice of recipient countries. By necessity, Latin America and East Asia receive the most attention, while the CEE region remains underrepresented.

As noted, the two most common methodological approaches are event studies and VAR modelling. In the former setting, only announcements and direct reactions of financial market variables matter for the estimate of the impact. Use of daily data and – in most cases – lack of control over expectations prior to announcements (efficient markets should only react to new information) are the two most often-cited limitations of this approach. It can be argued that to the extent that modern monetary policy is conducted in an open, transparent way, adjustment of financial variables to monetary policy shocks might occur well before official and final announcements, severely underestimating the impact of QE. On the other hand, VAR methodology usually takes into account the size and the timing of the programme, ignoring expectations altogether, but VAR is strictly a theoretical (Lütkepohl, 2005). Both approaches are complimentary. Finally, it is worth noting that in a VAR setting, unconventional monetary policy shocks are usually symmetrical and most authors choose to present the impact of QE as the impact of monetary tightening – the underlying assumption of symmetry might not be valid, though, and there is very little precedent for "reverse QE", i.e. selling financial assets to tighten monetary policy (Board of Governors, 2017).

In addition, assessment of the impact of QE on EM capital flows is focused on net financial flows, thereby preventing researchers from e.g. establishing whether the QE-induced change in net flows as a result of foreign investors purchasing more EM assets or EM investors selling foreign assets. A shift to gross flows would both enrich the literature and tie it more closely to its theoretical underpinnings.

Last but not least, it must be noted that in some instances the choice of variables used to measure the impact of QE can lead to ambiguous interpretations, e.g. a change in bond yield can be a result of a shift in interest

rate expectations or a change in risk or term premia – each indicates a different transmission channel. Therefore, it is advisable to transform variables in a way that ensures unambiguous results – yield curve modelling is such a technique (Christensen & Rudebusch, 2012).

Conclusions

Drawing from many avenues of research economic literature has followed the changes the global financial crisis has brought to monetary policy. The impact of QE on EMs is one of the new strands in the literature. To assess its state, 78 articles and working papers were gathered and a meta-analysis of their results was conducted. Empirical evidence suggests that QE raises output and inflation in EMs, while at the same time lowering bond yields, raising equity prices and increasing net equity flows. The strength of the impact varies across studies and different methodological approaches lead to limited comparability of results. However, as shown in the paper, there are important gaps that need to be filled to further the understanding of the role QE is playing in EM financial markets, the real economy and capital flows.

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