POLICY BRIEFING 04|2020

German Economic Team
UKRAINE

Exchange rate dynamics and trade: An empirical assessment

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Executive summary

- Significant nominal appreciation of UAH over USD by 16% in 2019
- Increase of real effective exchange rate (REER) by 42% Apr 2018 – Dec 2019
- Increase is roughly half due to nominal appreciation vs currencies of trade partner, in other half to higher inflation in Ukraine (real appreciation)
- Economic theory suggests this should weaken exports as the competitiveness of UA declines and strengthen imports as import prices decrease
- Econometric SVAR analysis of Ukrainian macro data shows that a 1% REER increase on average leads to the following effects (after four quarters):
  - An *increase* in the trade balance deficit by 0.15% of GDP
  - An *increase* of imports by 0.61%
  - An *increase* of exports by 0.28% (without re-exports: *0.00*%)
- According to our model, holding REER artificially constant after Q2 2018, the trade balance would be 4.5% of GDP higher in Q1 2020
- But: REER reflects the interaction of several economic variables and is not a normal “shock” by itself
- Hence: No clear policy implications, except to continue inflation targeting

Structure

Executive summary

1. Introduction
2. Exchange rate and trade balance dynamics
3. Empirical assessment

a) Methodology

b) Impulse response functions

c) Model results

4. Impact of recent appreciation on the trade balance

Annex

1. Introduction

Background

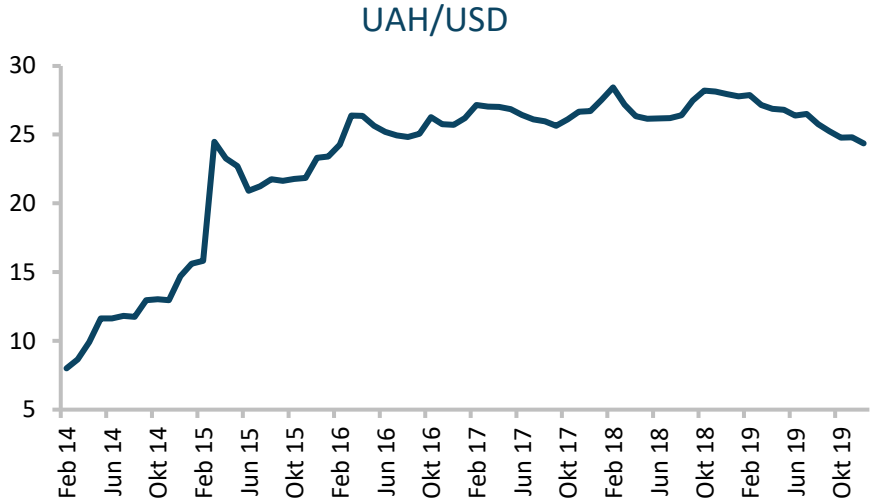
- Significant nominal appreciation of the hryvnia in 2019 (+16% vs. USD), mainly due to inflow of foreign capital into domestic bond market
- Increase of the real effective exchange rate (REER) by 42% since 2018 due to rising real wages, remittances
- As appreciation caused decrease of inflation, NBU responded by cutting its policy rate to bring inflation into the target corridor

➢ What is the effect of the nominal and real appreciation on trade?

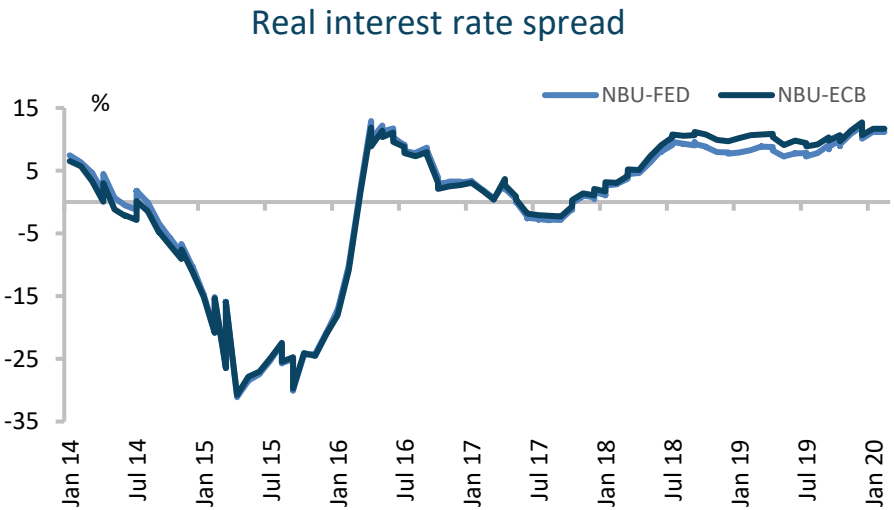
Content of this Policy Briefing

- Review of recent exchange rate and trade dynamics
- Technical, econometric assessment of the impact of changes in the REER on exports, imports and the trade balance (SVAR model)
- Analysis in terms of *real effective*, not *nominal bilateral* exchange rate
- No forecast of exchange rate
- No discussion of monetary/fiscal policy

2. Exchange rate dynamics (1/2)



Source: National Bank of Ukraine



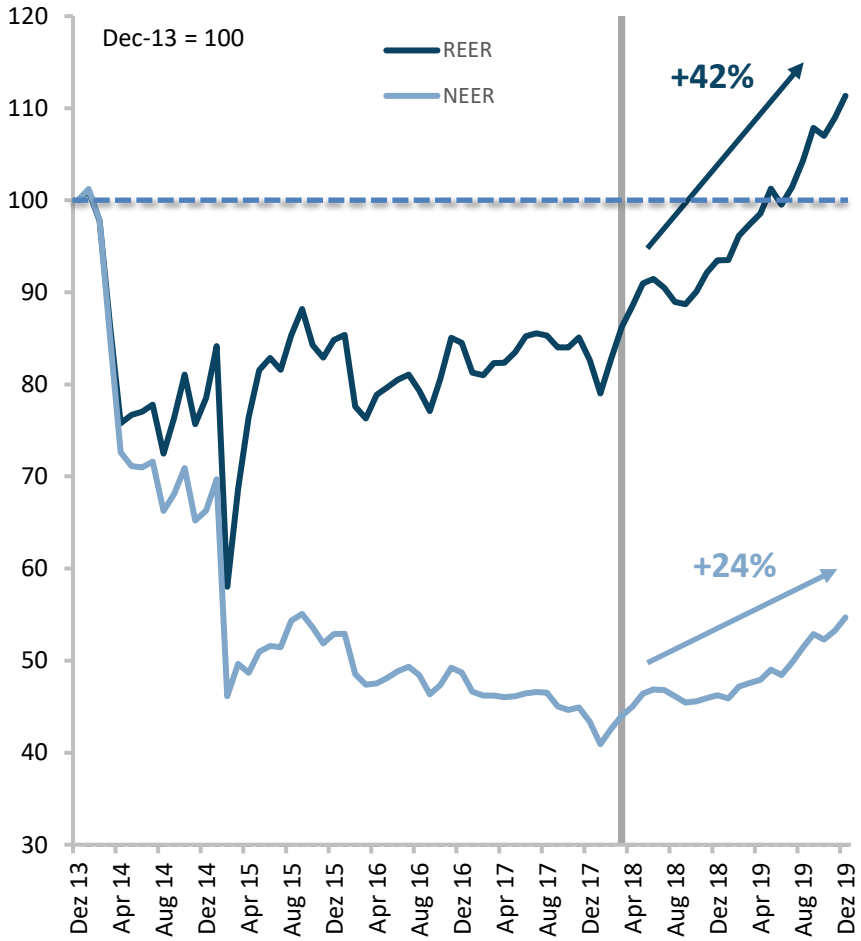
Source: ECB, FED. NBU, GET calculations

- 2014-2015: strong depreciation of the hryvnia (ca. 200%)
  - Exchange rate became floating
  - Inflation close to 50%
- Since 2016, relative stable exchange rate
  - Macroeconomic stabilization, prudent fiscal policy
  - Normalization of inflation and adoption (de-jure) of inflation targeting
- In 2019: significant appreciation vs. USD (+16%) due to high capital inflows (into local bonds) as interest rates remain attractive for foreign investors

➢ **Strong appreciation pressure due to significant improvement of the macro situation**

2. Exchange rate dynamics (2/2)

Real and nominal effective exchange rate



Source: National Bank of Ukraine, GET calculations

- Real effective exchange rate („REER“) as an indicator of international competitiveness

Phase 1 (2014-2017)

- Strong real and nominal effective depreciation of the hryvnia
- Increase of int. comp. helped to offset weak trade dynamics during 2014/2015

Phase 2 (since 2018)

- **Real effective appreciation of 42%** between Jan-18 and Dec-19, **exceeding the nominal UAH appreciation in 2019**
- 24 pp of the REER growth were due to relative changes of the UAH compared to currencies of the main trading partners (NEER)
- 18 pp can be attributed to relative changes in the inflation level

➢ **Appreciation is fuelling fears of losing competitiveness**

➢ **What is the effect on the trade balance of Ukraine?**

2. Trade balance dynamics

Source: IMF, National Bank of Ukraine; Note: Trade in goods

- Trade balance traditionally negative (since late 2005 - i.e. 15 years)
- Recent dynamics: Imports grow faster than exports
  - 2019: 5.8% (EX) vs. 6.3% (IM)
  - 2018: 9.4% (EX) vs. 15.3% (IM)
- In theory, strong REER appreciation should increase trade deficit
- Impact of appreciation 2018/2019 not clearly visible in data

➢ **Econometric analysis necessary to determine whether recent REER appreciation had effect on trade balance**

3. Empirical assessment

- **Key question:** How do FX movements affect the trade balance (exports and imports) of Ukraine?
- **Textbook trade theory**
  1) Increase in REER of the home country (i.e. real appreciation).
  2) Domestic households can get more imported goods in exchange for a unit of domestic goods. Exported goods become more expensive for foreign households.
  3) Domestic households buy more imports while foreign households purchase relatively less domestic goods (exports).
  4) If foreign and domestic demands for imports and exports are elastic, an appreciation of the REER has a negative impact on the trade balance.
- However, other factors such as domestic shocks and interest rate spreads may have an impact on the trade balance

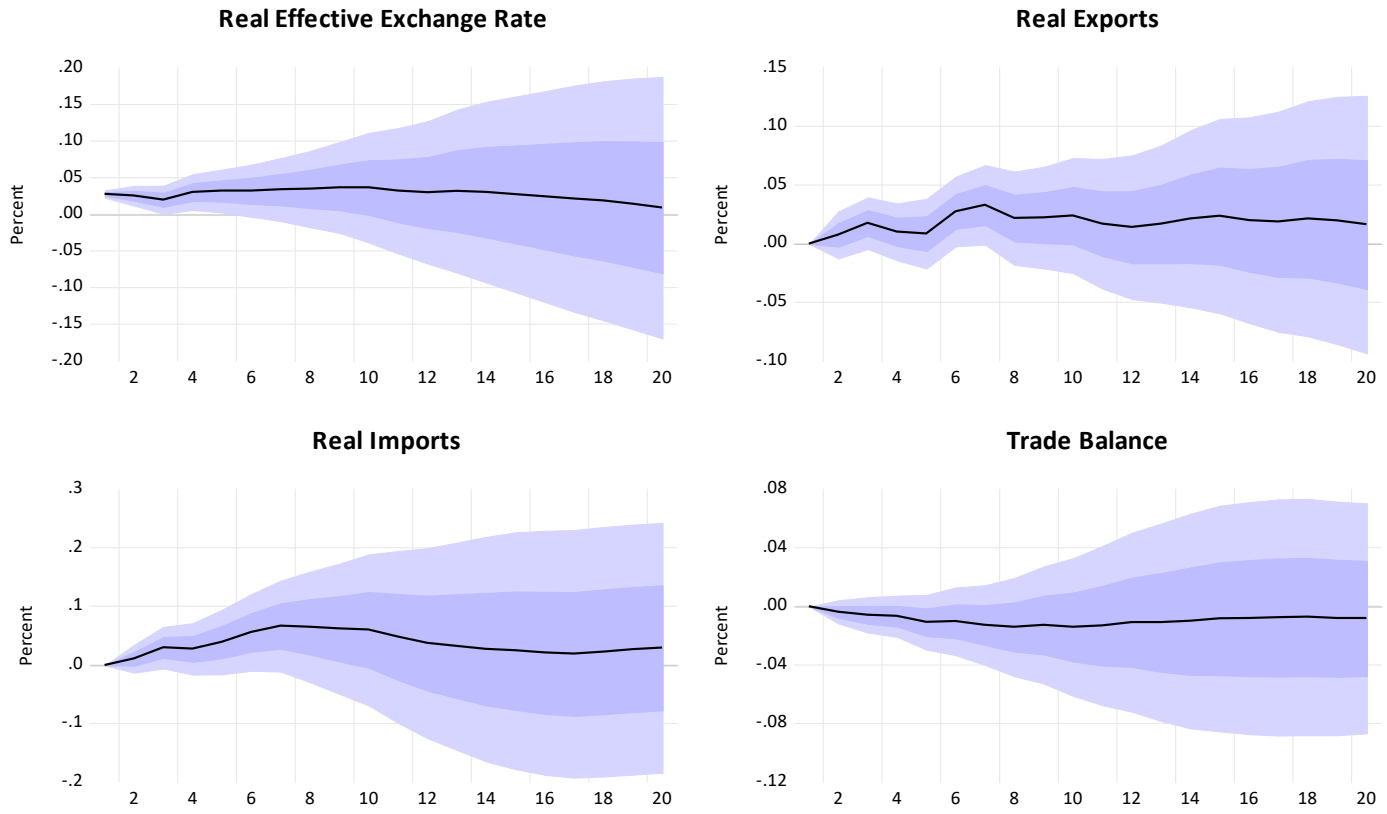
➢ **Empirical question:** What is the effect of a REER "shock" on the trade balance, holding all other shocks constant?

3. a) Methodology

- *Vector Auto Regressive* (VAR) models are an important tool to uncover relations between macroeconomics variables
- Especially *Impulse-Response-Functions* (IRF) are widely used to model how variables react to specific shocks over time
- As variables are often linked contemporaneously, additional identifying restrictions are applied through a *Structural Vector Auto Regressive* (SVAR) approach
- **Analysis employs an SVAR model** (based on Schmitt-Grohe and Uribe, 2018) with *terms of trade (TOT)*, *interest rate spreads*, *trade flows*, *GDP*, *consumption*, *investment* and *REER*
- Other model characteristics:
  - Seasonally adjusted quarterly data from Q2 2001 to Q1 2020
  - Variables in log-levels with the inclusion of a trend
  - Specification of control dummies (e.g. 3Q2009: Financial crisis, 3Q2014: Crimea annexation, 2Q2015: Switch to inflation targeting)
- Identification assumption of an REER shock for the IRF:
  - REER is contemporaneously affected by TOT, trade flows, financial markets

3. b) Impulse response functions

Impact of a one standard deviation shock in REER on trade aggregates



Source: GET calculations; Note: Light shaded area: 95% confidence interval, dark shaded area: 68% confidence interval

- REER has a significant impact on the trade balance in the short run (1-2 years)
- Impact of the REER shock disappears in the long-run

3. c) Economic impact of a 1% increase of the REER

1 % increase of the REER on average…

… **increases** exports by **0.28%** and imports by **0.61%** after one year

… **reduces** the trade balance to GDP ratio by **0.15 pp** (on average) after one year and by **0.30 pp** after two years

Cumulative effect obtained from the Impulse response functions

Impact on …	after 4 quarters	after 8 quarters
Exports	0.28*	0.22*
Exports w/o re-exports[2]	0.00	– 0.04
Imports	0.61**	1.22**
TB/GDP	– 0.15*	– 0.30*
GDP[1]	0.18*	0.39*
Consumption[1]	0.41*	0.79**
Investment[1]	0.22	0.05

Source: GET calculations

*Note: *significant at 68%;** significant at 95%, [1] mean coefficients from estimating the model with exports, adjusted exports, imports and TB/GDP, [2] As no re-export data is available for Ukraine, we estimate re-exports using lagged imports as a proxy, as recommended by the literature. The proxy is based on the assumption that imported goods are stored for a while before being re-exported.*

4. Impact of recent appreciation on the trade balance

Impact of recent REER increase:

- Previous analysis concerned impact of 1% change on trade balance when all variables are in long-term average
- Model impact of recent appreciation by considering counterfactual scenario where REER is artificially held constant after Q3 2018
- According to our model, the trade balance would have then been 4.5% of GDP lower in Q1 2020 or 3.5% on average since Q3 2018

Caveats:

- The real effective exchange rate results from the interaction of several domestic and external economic dynamics, not a classic “external shock”
- Holding REER constant is artificial in the model and for illustration only as all macroeconomic variables normally co-determine each other in the SVAR model context (mechanism suspended here)

Consequences for policy:

- REER is not a target variable for monetary policy, especially as changing the central bank policy rate has opposite effects on inflation and the exchange rate
- Risk: Excessive monetary policy response to nominal appreciation destabilises inflation
- Hence no clear policy implication of REER increase itself, except to continue inflation targeting by NBU, keep inflation in 5% +/- 1% corridor to avoid destabilisation

About the German Economic Team

The German Economic Team (GET) advises the governments of Ukraine, Belarus, Moldova, Georgia and Uzbekistan regarding the design of economic policy reform processes and a sustainable development of the economic framework. As part of the project we also work in other countries on selected topics.

In a continuous dialogue with high-level decision makers of the project countries, we identify current problems in economic policy and then provide concrete policy recommendations based on independent analysis.

In addition, GET supports German institutions in the political, administrative and business sectors with its know-how and detailed knowledge of the region's economies.

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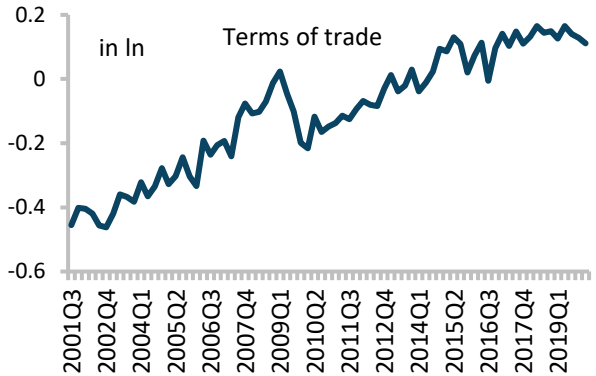
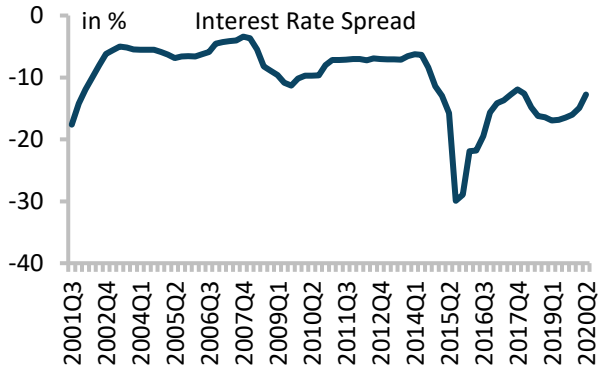
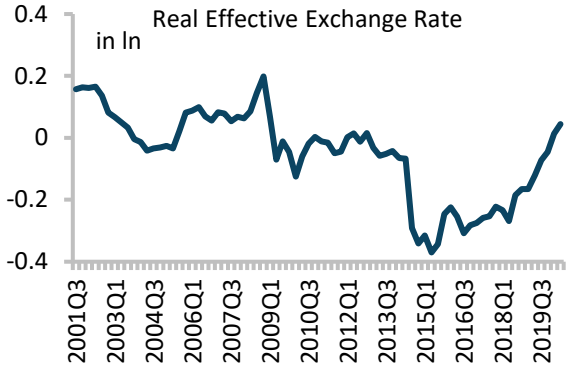
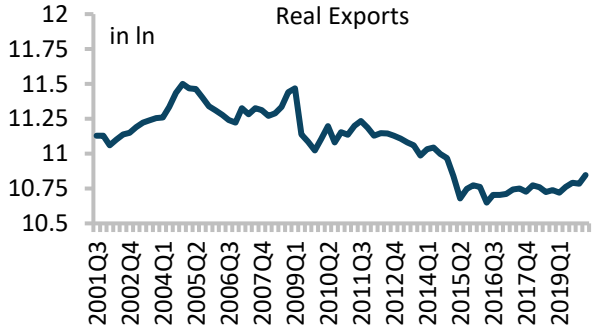
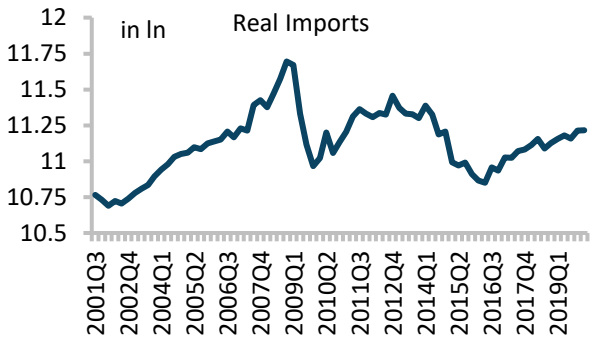
ANNEX: Data used in the model

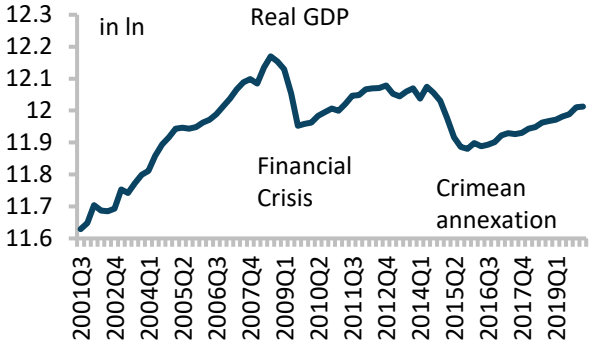


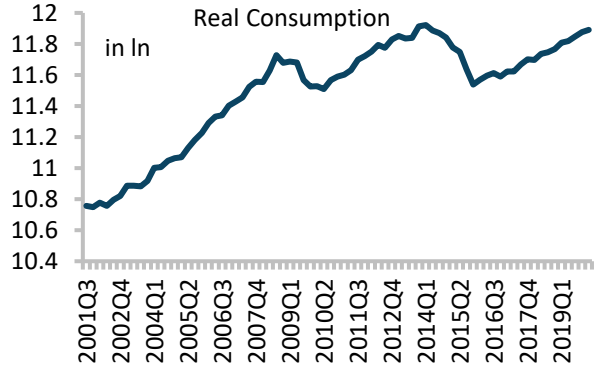


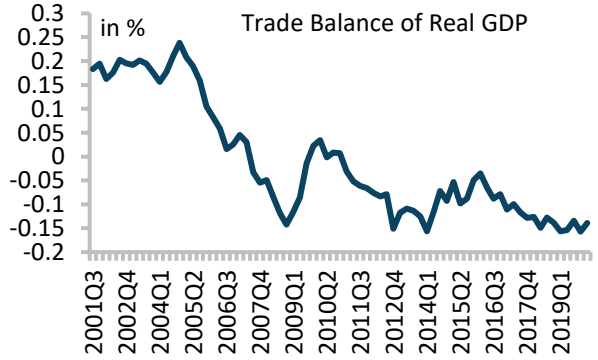


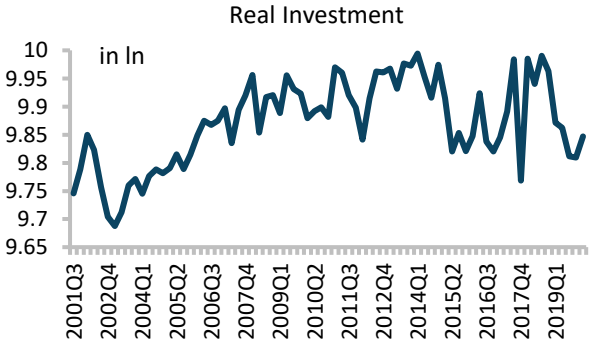






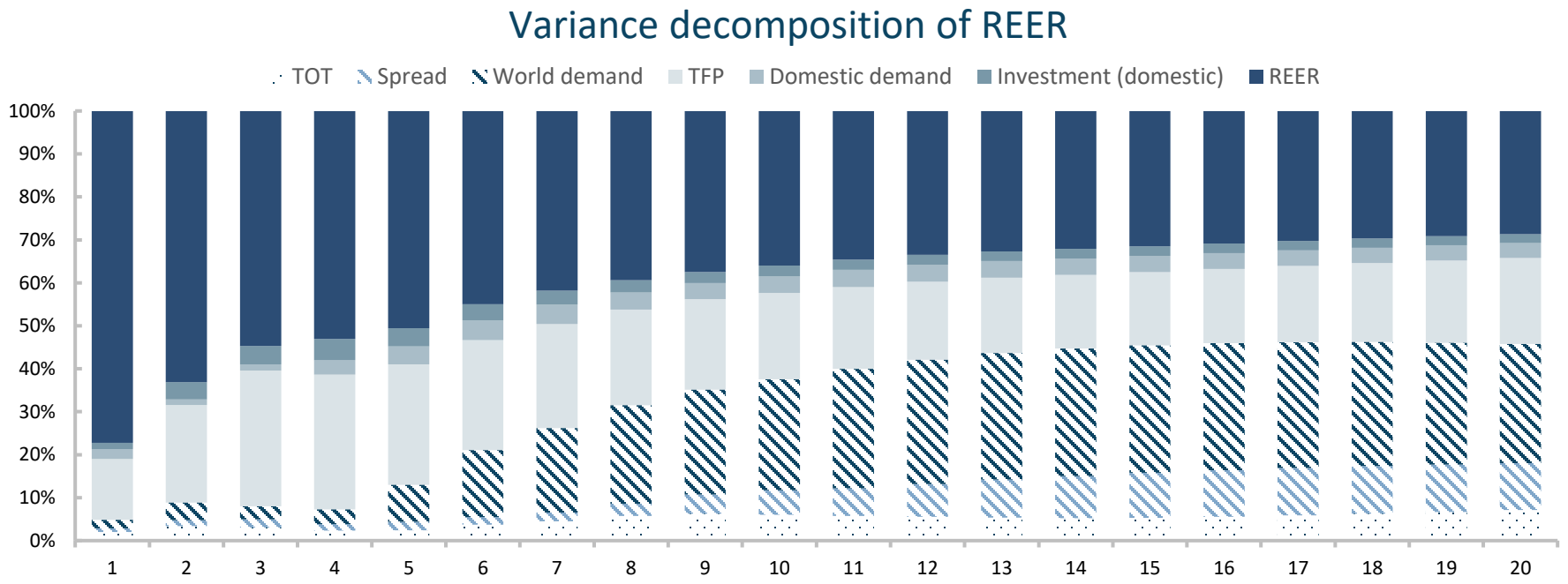






Source: GET calculations; except for real effective exchange rate, all variables are seasonally adjusted

ANNEX: What affects the REER?



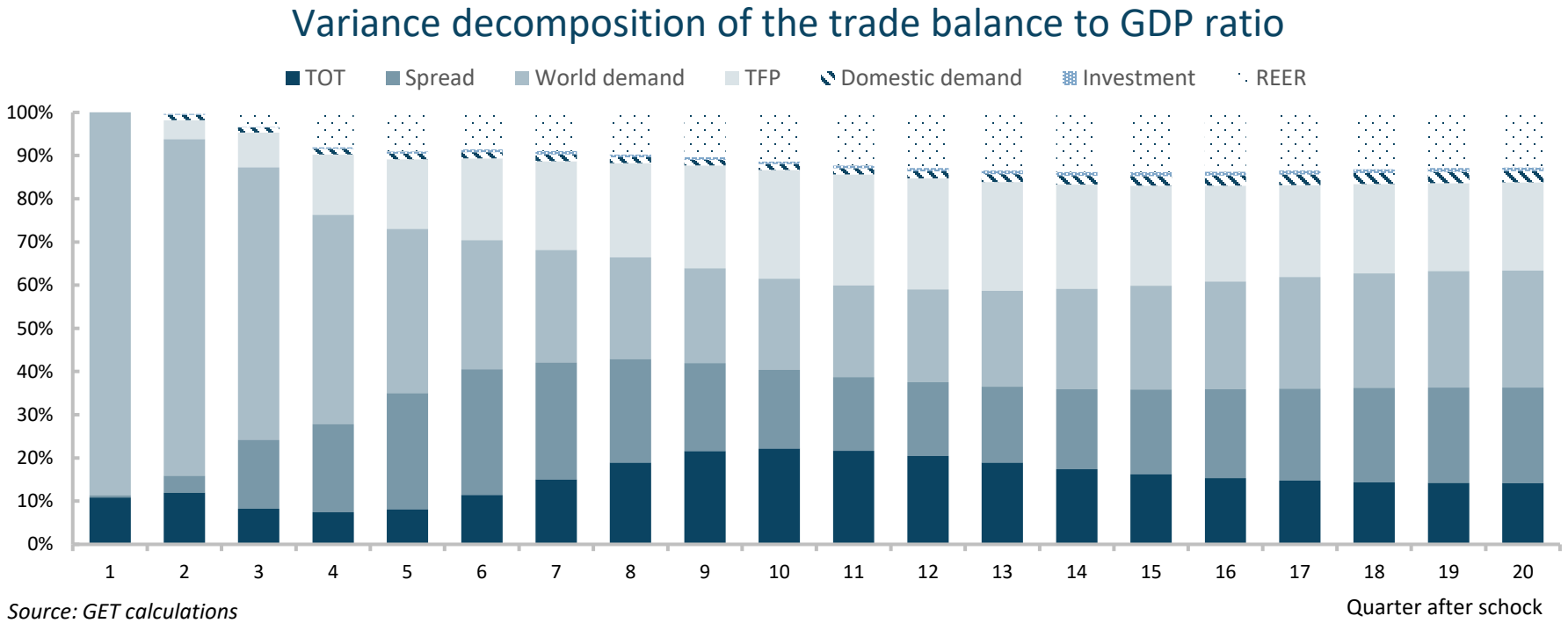
Source: GET calculations

REER is mainly driven by …

… **REER shocks** (up to 80%), which also incorporate foreign CPI shocks (not already considered in TOT) and foreign nominal exchange rate policy) in the short run (1 year)

… and **supply, demand** and **ToT** shocks (up to 50%) in the long run (5 years).

ANNEX: What affects the trade balance?



Source: GET calculations

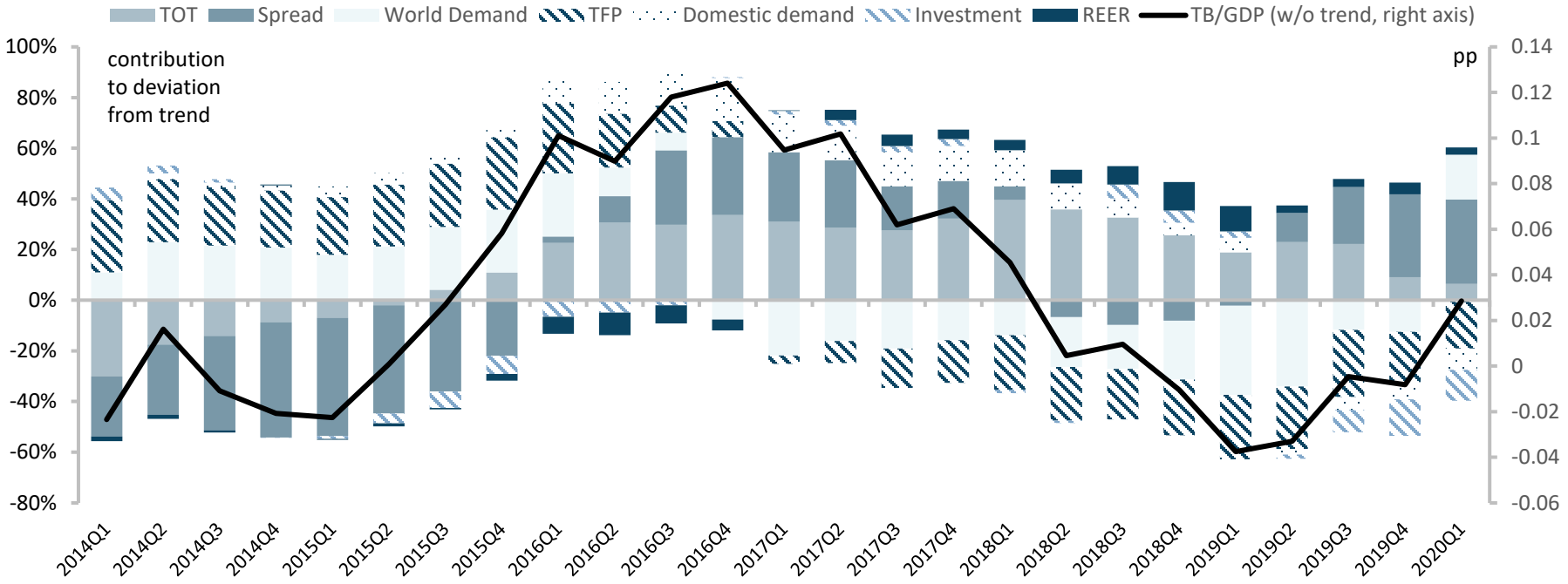
Trade Balance to GDP is mainly driven by…

… **world demand shocks** (48%), **int. financial markets** (20%, spread shocks) and **domestic TFP shocks** (14%, i.e. Crimea annexation) in the short run (1 year)

… and **world demand shocks** (27%), **spread shocks** (22%) and **domestic TFP shocks** (20%) still being the main factors in the long run (5 years)

ANNEX: What is responsible for fluctuations in the TB?

Historical variance decomposition of the trade balance to GDP ratio



Source: GET calculations; Note: TB to GDP ratio shows only the deviations from the trend

Fluctuations in the trade balance to GDP ratio …

… were mainly caused by **TOT**, **world demand**, **domestic TFP** and **spread shocks**

… were nearly unaffected by **investment**, **domestic demand** and **REER shocks**

… were recently caused by **negative world demand** and **TFP shocks,** but somewhat **compensated by TOT and spread shocks**