

# Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague

Student:	Bc. Anastasiia Naletova
Advisor:	Prof. Ing. Evžen Kočenda, M.A., Ph.D., DSc.
Title of the thesis:	Exchange Rate Volatility Effect on Trade Balance in the Czech Republic

## **OVERALL ASSESSMENT** (provided in English, Czech, or Slovak):

### **Contribution**

The topic of this master's thesis is interesting and relevant to the further economic cooperation of the Czech Republic, i.e. small open economy with independent monetary policy using flexible exchange rate arrangement under inflation targeting framework.

The thesis is divided into seven chapters. After the introduction the author concentrates on the literature review, i.e. empirical one (especially on both negative and positive effects of exchange rate volatility on foreign trade) and theoretical one (approaches to trade balance and exchange rate relationship). The third chapter is concentrated on the history of foreign trade of the Czech Republic and the next chapter is engaged in the interpretation of data. The fifth chapter describes applied methodology (especially realized volatility and gravity model). Estimation results are presented in the following chapter. The final chapter concludes.

The referee's main comments to this master's thesis are set out below:

- Theoretical part
  - Most of the theoretical discussion focuses on the relationship between exchange rates and the trade balance – specifically, whether and how currency depreciation boosts exports and depresses imports (section 2.2). However, relatively little attention is paid to the relationship between exchange rate volatility and trade (i.e. the focus of the empirical part).
  - The theoretical channels through which ER volatility may affect trade are reviewed only briefly (pp. 5-6). However, even this discussion considers merely the relationship between ER volatility and trade volumes, not trade balance. The author does not explain why higher volatility increases the transaction costs for domestic exporters *more* than for foreign exporters (in order to affect trade balance), or indeed propose any other theoretical link between trade balance and ER volatility.
- Empirical part
  - The chosen measure of exchange rate volatility (realised return volatility) is well-defended and in line with standard practice in the relevant literature
  - The choice of a gravity model is less intuitive. Gravity models are typically used to explain trade volumes, but I haven't seen one being used for trade balance. It is clear why the usual variables such as GDP, distance, common border/language/currency etc. predict the volume of bilateral trade flows (exports/imports/total trade), but it is far less clear to me why the same variables should also determine the relative size of exports and imports. Unhelpfully, the author does not provide an explanation – merely states that “the international trade gravity equation in its basic form is defined in equation (4) and in the analysis exports are replaced with trade balance”. In Table 4 on p. 51, the author expects that the coefficient estimates should have the same sign as would be expected if the dependent variable was export volumes. But that is hardly intuitive. Why should the Czech Republic, for example, have a larger trade surplus with countries that are closer to it? Why should it have a bigger surplus with larger economies than smaller ones (consider China...)?
  - Perhaps unsurprisingly, the author obtains results that contradict her expectations: distance *increases* trade balance, while the trading partner's GDP *decreases* it. The analysis also suggests that exchange rate volatility *increases* trade balance, which is also contrary to the author's expectations. Moreover, the results are highly unstable across model specifications.

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- Relation between theoretical and empirical part
  - How theoretical approaches (chapter 2.2) are related to empirical part?
  - Why in theoretical foundations of gravity equation work of Anderson and van Wincoop is missing? See Anderson 1979, Anderson and van Wincoop 2003, AER – this is usually considered as theoretical foundations of gravity equation.
  - The author does not focus on trade balance but on export to import ratio! I would suggest to state this clearly at least in the empirical part, otherwise “log of trade balance” is very confusing because trade balance could be both positive and negative.
  - All expected signs of explanatory variables described in this thesis are true for gravity equation estimated for exports (or trade in levels more broadly). But the author estimates her model for export to import ratio. This changes completely the interpretation of results which should be re-written accordingly. Below is the explanation.
  - The author uses a log-linear form of gravity equation which under some simplifications could be obtained from the theoretically grounded gravity model (see work by Anderson and Van Wincoop quoted above). In its log liner form gravity equation could be written as:

$$\ln(X_{ij}) = a_0 + a_1 \ln(\text{GDP}_i) + a_2 \ln(\text{GDP}_j) + a_3 \ln(\text{dist}_{ij}) + \dots + e_{ij}^X \quad (1)$$

Because exports of one country are imports for another, imports have the same determinants as exports:

$$\ln(M_{ij}) = b_0 + b_1 \ln(\text{GDP}_i) + b_2 \ln(\text{GDP}_j) + b_3 \ln(\text{dist}_{ij}) + \dots + e_{ij}^M \quad (2)$$

In this thesis the author uses log of export to import ratio as depended variable. In order to obtain ratio we should subtract  $M_{ij}$  from both sides of (1). Replacing on the ride side  $\ln(M_{ij})$  by (2) we obtain:

$$\ln(X_{ij}/M_{ij}) = (a_0 - b_0) + (a_1 - b_1) \ln(\text{GDP}_i) + (a_2 - b_2) \ln(\text{GDP}_j) + (a_3 - b_3) \ln(\text{dist}_{ij}) + \dots + e_{ij}^X - e_{ij}^M \quad (3)$$

Based on (3) positive or negative significant regression coefficient only shows how the given determinant is important for exports compared to imports. Insignificant coefficient could mean similar impact for both export or model misspecification.

- The author replaces missing trade by very small value. Given that she estimates trade as log of ratio this could lead to huge outliers and distort of estimates. It should be good to know how many missing values were replaced by a very small value.
  - Sample selection is slightly unclear. Author argues that 53 countries were selected according to their relevance (p. 27). List of countries (appendix A) includes Afghanistan, Andorra, Maldives, Nepal, Paraguay, Yemen with 0 trade share but excludes 5 of top-20 trade partners like China, Japan, South Korea, Romania, Russia (CZSO tables on foreign trade). Many European countries are missing; Belarus, Bulgaria, Estonia, Latvia, Lithuania, Slovenia. There no Kazakhstan or India. The author should take into account: less representative selected sample is less intuitive could be results.
- Why the author uses quarterly data? Usually the usage of higher frequency is rationalized by the need to estimate on subsamples or on a small set of cross-sections (in that case one

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needs to have long time series). This is not the need for the present study. Data on quarterly frequency could be volatile and / or have a poor quality. Yearly frequency seems being more appropriate in her case.

- The conclusion posits that “Positive relationship between exchange rate volatility and trade balance is reasoned by the presence of opportunity for generating profit from increased currency risk. Also, rise of exchange rate volatility allows for greater trade gains as the value of exports to the global market increases.” I find this unconvincing, partially because of my concerns about the empirical analysis. But also the theoretical channel is not particularly compelling. Why are exports more valuable when there is more volatility (given volatility is defined as either depreciation or appreciation)? Is there any evidence that Czech exporters dynamically adjust output to profit from currency volatility (but foreign exports don't...)?

## Methods

The referee finds these methods appropriate for the aim of the master thesis.

## Literature

The literature review is on standard level, i.e. includes both original sources of literature and current applied studies oriented to analysed countries.

## Manuscript form

The manuscript form is also on standard level.

## Summary and suggested questions for the discussion during the defence

This master thesis is generally quite well-balanced; it consists of both theoretical and empirical parts, with interesting results (which were not so easy for the referee to follow), an interesting literature survey, and appropriate techniques for empirical analysis (which could be prepared more accurately in another way).

1. *Why the author did not try some model with separate equations for export and import simultaneously introduced into the model?*
2. *Why are exports more valuable when there is more volatility (given volatility is defined as either depreciation or appreciation)?*
3. *Is there any evidence that Czech exporters dynamically adjust output to profit from currency volatility (but foreign exports don't...)?*

***In my view, the thesis fulfils the requirements for a master thesis at IES, Faculty of Social Sciences, Charles University, I recommend it for the defense and suggest a grade B.***

*The results of the Urkund analysis do not indicate significant text similarity with other available sources.*

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**SUMMARY OF POINTS AWARDED** (for details, see below):

<b>CATEGORY</b>	<b>POINTS</b>
<i>Contribution</i> (max. 30 points)	25
<i>Methods</i> (max. 30 points)	25
<i>Literature</i> (max. 20 points)	16
<i>Manuscript Form</i> (max. 20 points)	15
<b>TOTAL POINTS</b> (max. 100 points)	<b>81</b>
<b>GRADE</b> (A – B – C – D – E – F)	<b>B</b>

**NAME OF THE REFEREE:** *Prof. Luboš Komárek*

**DATE OF EVALUATION:** *7.9.2020*

*Digitálně podepsáno (7.9.2020)*  
*Luboš Komárek*

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**Referee Signature**

