**Vysoká škola ekonomická v Praze**
**Fakulta financí a účetnictví**
**Katedra měnové teorie a politiky**

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**Vysoká škola ekonomická v Praze**
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# Post China 16:
# Konkurence pro čínský export

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# Anotace

Tato diplomová práce se zabývá konkurenceschopností exportu Číny na světovém trhu v kontextu vývoje čínské ekonomiky. Hlavním tématem práce je otázka, zda Čínský export ztrácí své dominantní postavení ve prospěch skupiny rozvíjejících se zemí označovaných jako Post China 16. V první kapitole jsou představeny makroekonomické ukazatele, jejichž vývoj ovlivňuje konkurenceschopnost dané ekonomiky při exportu. V druhé kapitole je analyzován vývoj těchto ukazatelů v ekonomikách označovaných jako Post China 16. Analýza se zabývá otázkou, zda vývoj těchto ukazatelů naznačuje změny v konkurenceschopnosti Číny a vybraných rozvíjejících se ekonomik. Závěrečná kapitola obsahuje ekonometrický model, který testuje vliv vybraných ukazatelů na vývoj exportu napříč jednotlivými sektory ekonomik zemí ze skupiny Post China 16. Tento model potvrzuje, že vybrané ukazatele převážně ovlivňují export tak, jak předpokládá teorie. Dále se ukazuje, že vliv na některá odvětví je větší než na jiná. Závěry modelu jsou však limitovány nedostatky v použitých datech.

**Klíčová slova:** Čína, export, jednotkové mzdové náklady, produktivita práce

# Abstract

This thesis examines the evolution of China's economy and the competitive position of its exports in the international market. The thesis explores whether China is losing its competitive edge in export to the group of developing countries called Post China 16. First chapter identifies macroeconomic variables that significantly influence exports of a specific economy. Second chapter discusses the development of selected economic variables in Post China 16 economies. It studies whether the development of selected variables reveals possible changes in the competitive position of China and selected developing countries. Final part of the thesis develops an econometric model that tests the influence of selected variables on development of exports across several industries of The Post China 16 economies. Results confirm that most of the variables influence exports as the theory predicts and that the influence is higher in some industries than others. However, the model has limitations due to the shortcomings of the data.



**Keywords:** China, export, unit labor costs, labor productivity

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# Introduction

The aim of this thesis is to examine the evolution of China's economy and the competitive position of its exports in the international market. The idea for the thesis comes from the publisher and the intelligence provider Stratfor Global Intelligence who suggests that a group of developing countries will slowly take China's place as manufacturing hubs of the future. They call them The Post China 16. China's fast growth and rapid development in the last 30 years has been partly fueled by a combination of low wages and disorderly business environment in which export-oriented companies have thrived. But as wages and other costs grow, the economy starts to rebalance itself and shifts to a different model of growth. The thesis explores whether China is losing its competitive edge in export to the so called Post China 16 economies. Stratfor Global Intelligence expects this transition to start with the low skilled and labor intensive industries such as garment, mobile phone assembly and other manufacturing dependent on cheap labor. The group of "Post China 16" countries includes Peru, Philippines, Indonesia, Dominican Republic, Nicaragua, Kenya, Mexico, Uganda, Vietnam, Cambodia, Laos, Sri Lanka, Tanzania, Bangladesh, Myanmar and Ethiopia. Stratfor's central idea is that China's position in manufacturing has to be gradually replaced not by one country but by a multitude of countries due to its sheer size. More than 1.1 billion people lived in Post China 16 countries combined in 2014 compared with China's 1.36 billion according to the World Bank estimates.

This idea is the central focus of the thesis. Firstly, the aim of the thesis is to identify macroeconomic variables that significantly influence exports of a specific economy. First chapter of the thesis reviews recent studies relevant to this question and describes how different variables influence competitiveness of exports in the international market. Then the thesis aims to analyze the development of selected variables in Post China 16 economies and China itself. The thesis seeks to assess whether development of the selected variables reveals possible changes in the competitive position of Post China 16 economies. This topic is covered in the beginning of the second chapter. It discusses the development of selected economic variables in Post China 16 economies. Finally, the thesis aims to develop an econometric model in order to test the influence of selected variables on development of exports across several industries of the Post China 16 economies. Its goal is to find out whether exports of certain industries respond differently

to the development of selected variables. The remaining part of the second chapter reviews the data used in the calculation, analyzes the data and discusses key findings. Are exports of above mentioned developing countries significantly influenced by specific macroeconomic variables? Do different categories of exports react differently? Increased sensitivity of different industries to development of specific macroeconomic variables might reveal industries that are expected to follow in the footsteps of those mentioned in The Post China 16 report. Such findings could also serve policymakers as a tool to identify distressed industries, should a specific macroeconomic variable develop adversely.

# 1 Theoretical Framework

## 1.1 Evolution of China's economy

China's position in the world economy is unique and a rapidly evolving one. The same applies to the domestic economic sistuation in China. Fan, et al. (2013, p. 12) analyze past and present macroeconomic trends in China's economy. China's fast growth in the period between 1980 and 2011 was mainly export-led with growth of exports that averaged 20% annually during 1980-2011. This growth was further accelerated by China's entry to WTO in 2001. Economic growth described above is largely due to reforms that China applied to its economic model since the end of the 1970's. Rana (2012, pp. 97-99) compares and contrasts the reform process in China and in other Asian countries. Reforms in China started with agriculture and light industry. Farmers were allowed to trade with land tenure rights and sell produce above the defined quota for market prices. Improved agricultural production freed labor force for newly reformed rural light industry. This type of production put pressure on other state owned enterprises to reform as well, because productivity in reformed light industry was growing. Transition to the market oriented economy was gradual and began at a microeconomic level. On the other hand, several other South Asian countries followed standard approach that placed trade and industrial reforms first. (Rana, 2012, p. 100) Reforms in South Asian countries targeted improved fiscal discipline through higher revenues of the state achieved by a broader tax base. Liberalization of financial system has followed, coupled with lower tariffs, cancelation of price controls and flexible exchange rate regimes. Author's key point is that design and sequencing of economic reforms have influenced the rapid subsequent development of China and slower growth of Asian countries which followed a different order of the reforms. Author concludes that less developed South Asian countries are still in need of agricultural, industrial and institutional reforms on microeconomic level. (Rana, 2012, p. 106) This diverging trajectory of growth has impacted exports in the region as well. Chu (2005, p. 15) notes that rising Chinese exports to the United States after China's admission to The World Trade Organization in 2001 have largely displaced exports of other Asian countries to the United States. Reforms have also impacted China's exchange rate regime. Zhang (1999, pp. 4-6) reviews history of China's foreign exchange rate regime. His analysis is mentioned further in this study when exchange rate is discussed in more detail. Although it is an important and recurring

topic in the economic research, exchange rate regime is just one of many areas of China's economy that are undergoing a rapid transition. As a part of his analysis, Chu (2005, p. 15) presents an argument that other issues such as the aging population, under-funded pension and social security systems, education, health care and infrastructure are the main concern for policymakers in Beijing, not the exchange rate. (Chu, 2005, p. 15)

Issues mentioned above pose a challenge to the export-led and investment-led growth of the previous decades and mark an undergoing transition to consumption-led growth. This profound change in China's economy started to be more and more visible during the years that have followed after the Great Recession of 2008 and 2009. However, authors show that downward adjustment has begun even before the Great Recession. Several factors have played a role in this adjustment. Firstly, Fan, et al. (2013, pp. 13-15) mention that China has benefited from its abundant labor supply of migrant workers from rural areas. This benign factor ceased to exist as the supply of additional migrant workers was depleted along with declining total working–age population. Integration of China's labor force into the world economy has been a disruptive event with a profound impact on other countries and sparked debates particularly in the United States. According to the Heckscher-Ohlin theorem supply of cheap labor from low income countries into the international economic system should lower real wages in developed economies. However, the real wages in the Unites States did not fall thanks to the productivity growth that started at the end of 1980s. Detailed observations reveal that the wage gap between the low-skilled and high-skilled members of the labor force has increased since then. Integration of the former Soviet Union, China and India into the international division of labor has contributed to the frequency of job changes in developed economies. Additionally, the labor share of GDP has decreased due to technological progress that has made substitution of labor by capital possible in new areas of the economy. (Woo, 2011, pp. 25-27) Technological changes described above emerge over time and their impact on society is gradual and manifests itself in the long-run. On the contrary, macroeconomic shocks and their effects usually have a severe impact in the short-run. And such was the effect of the Great Recession of 2008 and 2009 as well. Start of the Great Recession of 2008 and 2009 did not impact China as severely as the United States. However, negative influence of the crisis spread to the Chinese economy through various transmission channels. Direct effects of the recession were deflected with a large fiscal stimulus - real growth of fixed asset investment was above 30% in China during 2009. Loose monetary

policy followed with decreasing bank deposit reserve requirements ratio. Expansionary fiscal and monetary measures reacted to the difficult situation of export oriented industries as export of goods fell by 16% in 2009. (Fan, et al., 2013, pp. 18-19) Export oriented industries of China's economy experienced a severe contraction as demand from the United States and the EU decreased. Chinese authorities responded with a stimulus plan that would increase domestic demand and infrastructure spending. Contractionary monetary policy of the previous years was replaced with an expansionary monetary policy. (Sharma, 2012, pp. 118, 122, 125-126) Author warns about possible downsides of this approach that have clearly started to materialize in 2015 and 2016 and about the cost of ever expanding volume of China's foreign reserves.

*"If economic conditions deteriorate and these investments fail and put the repayment of the underlying debt in doubt, China will once again face the spectre of a sizable non-performing loans problem in the banking sector, unsustainable asset-price inflation (especially, in real estate and equity markets), and excess capacity."* (Sharma, 2012, p. 131)

Author suggests to limit the foreign exchange reserves and to strengthen its currency to increase consumers' real purchasing power. As the economy moves from investment-led and export-led growth to consumption-led growth two factors significantly influence this transition. Firstly, rising incomes in both urban and rural areas of China as well as the higher capacity of urban households to consume. Secondly, consumer confidence is being strengthened with improved pension funds and medical insurance. (Fan, et al., 2013, p. 23) Above mentioned studies examine past trends and adjustments that occurred in China during the economic transition the country underwent in the past. The challenges that China's economy and society will face in the future are studied extensively by Woo (2011). Author contributes to the discussion about China's economic transition with a thorough analysis of likely challenges that China's economy and society as a whole might face in the future. Probable obstacles include a banking crisis followed by a credit crunch, flaw in governance resulting in a social unrest, severe environmental damage or collapse of exports due to a trade war. (Woo, 2011, pp. 7, 8) Possibility of trade war and disruption to exports take us back to present situation and to the central topic of this thesis. Future of Chinese exports, the competition from the Post China 16 economies and competitiveness of China's economy are crucially influenced by several macroeconomic variables. These variables are defined in the following chapters.

Theoretical framework is followed by the review of relevant recent literature and research in this area.

## 1.2 Real exchange rate and exchange rate dynamic

Real exchange rate is a variable that influences competitiveness of exports of a given country in the international markets. Harberger (2008, p. 226) defines real exchange rate as an amount of country's own consumer baskets (defined by the CPI) or producer baskets (defined by the GDP deflator) needed to buy one basket of tradeable goods. Real exchange rate serves as an equilibrator of each country's trade and payments. Although it is the government or the central bank who might decide the nominal exchange rate, economic interaction among different participants in the economy determines the value of the real exchange rate. (Harberger, 2008, p. 227) Data on nominal exchange rate and consumer price index that are used in this thesis for the calculation of the real exchange rate index were retrieved from the database of The World Bank Group (The World Bank Group, 2015). Durčáková and Mandel (2010, p. 84) define real exchange rate with the following equation:

$$SR_{R,t+n} = SR_{t+n} * \frac{1 + p_{F(t,t+n)}}{1 + p_{D(t,t+n)}} \quad (1)$$

Where

$SR_{R,t+n}$ = real exchange rate

$SR_{t+n}$ = nominal exchange rate

$p_{F(t,t+n)}$ = inflation in the foreign economy

$p_{D(t,t+n)}$ = inflation in the domestic economy

Authors define the real exchange rate as the indicator of real purchasing power of a given currency. However, the real exchange rate index is a more commonly used measure. Real exchange rate index is defined by the following equation: (Durčáková & Mandel, 2010, p. 84)

$$I_{RER} = \frac{SR_{t+n}}{SR_t} * \frac{1 + p_{F(t,t+n)}}{1 + p_{D(t,t+n)}} \quad (2)$$

Where

$I_{RER}$ = real exchange rate index

$SR_{R,t+n}$ = real exchange rate

$SR_{t+n}$ = nominal exchange rate

$p_{F(t,t+n)}$ = inflation in the foreign economy

$p_{D(t,t+n)}$ = inflation in the domestic economy

Decrease of the value of the real exchange rate index denotes an increase of the real purchasing power of the currency. At the same time it leads to a decrease of competitiveness of the country's exports in the international market. This situation occurs when, ceteris paribus, domestic inflation is higher than foreign inflation or when domestic currency appreciates (a quantitative decrease in this case). On the contrary, when the foreign inflation is higher or when the nominal foreign exchange rate increases (depreciation in this case), real exchange rate depreciates. Depreciation of the real exchange rate translates to the increased competitiveness of products exported by the domestic economy to the international markets. (Durčáková & Mandel, 2010, pp. 84, 85) The calculation of the real exchange rate is straightforward. However, history of China's foreign exchange rate complicates the situation. China's currency, the renminbi, passed a significant milestone in its goal to be a truly global currency in 2015. The International Monetary Fund summarizes it with the following statement.

*"The Executive Board of the International Monetary Fund (IMF) today completed the regular five-yearly review of the basket of currencies that make up the Special Drawing Right (SDR). A key focus of the Board review was whether the Chinese renminbi (RMB) met the existing criteria to be included in the basket. The Board today decided that the RMB met all existing criteria and, effective October 1, 2016 the RMB is determined to be a freely usable currency and will be included in the SDR basket as a fifth currency, along with the U.S. dollar, the euro, the Japanese yen and the British pound."* (International Monetary Fund, 2015)

This development was anticipated by many economists and China's monetary policy as well as economic situation were studied in numerous recent research papers. Zhang (1999, pp. 4-6) reviews the history of the foreign exchange rate regime in China and analyses the impact of exchange rate reforms in China on the country's balance of trade. From 1949 to 1979 RMB was not convertible and acted merely as an accounting

tool. Reform in 1979 created a retention system under which domestic enterprises and local governments were allowed to buy back a proportion of their foreign exchange earnings at an official exchange rate and decide on the use of such funds. 1981 brought the dual exchange rate system with an official exchange rate set at 1.5 yuan per US dollar and the internal rate based on the cost of earning foreign exchange (originally set at 2.8 yuan per US dollar). These two systems converged in 1985 with only the internal rate remaining. (Zhang, 1999, p. 6) What followed was a system of swap centers where foreign funded enterprises and later domestic firms could trade the currency for market-determined swap rates. This meant in part return to dual exchange rates as the official exchange rate was still present next to the swap rate. The data suggests that authorities used such exchange rate adjustments to gradually devalue the yuan mainly to avoid inflationary pressures that are connected with a sudden devaluation. (Zhang, 1999, pp. 7, 8) On the 1st of January, 1994, the exchange rates were unified and market based with People's Bank of China determining the rate based on supply and demand. RMB became conditionally convertible on current account transactions and unified exchange rate originally moved to 8.7 yuan per US dollar, yet another devaluation. The rest of the convertibility restrictions on current account transactions were removed on the 1st of July, 1996, in order to comply with the WTO guidelines prior to China's accession to the organization. (Zhang, 1999, p. 11) The transition continued throughout the 1990's. Institute of World Economics and Politics at Chinese Academy of Social Sciences (2000) discusses the period that followed the 1994 deregulation of the foreign exchange. During this time China's currency was pegged to the dollar. As is the case with various issues in China, liberalization of the exchange rate did not follow a straightforward path. In the years leading up to the year 2000 the yuan/USD exchange rate remained unchanged which authors attribute mainly to the actions of the central bank. Central bank targeted exchange rate to stabilize the expectations about its value as well as inflation. Central bank focused on accumulation of foreign exchange reserves since 1993 and continued to do so in the wake of 1997 Asian financial crisis when China's economic stability came into question. Liberalization of the exchange rate was once again halted and central bank continued to intervene in the foreign exchange market. (Institute of World Economics and Politics, Chinese Academy of Social Sciences, 2000) Other institutional restrictions and regulations of that time included separate short term currency markets for domestic currency and foreign exchange, upper limits applied to maximum foreign exchange positions held by domestic banks and absence of forward or futures trading. Authors

identify these issues as areas in need of reform before increasing currency flexibility. (Institute of World Economics and Politics, Chinese Academy of Social Sciences, 2000) China sees the foreign reserves, strong current account and undervalued yuan as a tool to avoid pressure during an event such as the 1997 Asian financial crisis. This form of insurance against adverse shocks comes at a price. China has accumulated foreign exchange reserves in the form of US Treasury bills and bonds. These dollar denominated securities pay a low rate of return which is significantly lower than what foreign investors earn on their FDI's in China. (Frankel, 2006, pp. 255, 257-259) Moreover, Frankel (2006, p. 256) notes that further increase in foreign exchange reserves would not increase security any further.

Above mentioned review of the exchange rate history of China shows that during several time periods China was actually operating with dual nominal exchange rates with different regulations and separate function of each foreign exchange rate. Zhang (1999, p. 12) comments on this situation in the study where he develops a model in which trade balance expressed in local currency is used as a dependent variable and real exchange rate, domestic income and foreign income are used as independent variables. He uses the official exchange rate for the calculation of the real exchange rate and explains that majority of foreign trade was still conducted using the official exchange rate. (Zhang, 1999, p. 13) His results show only a small effect of real exchange rate on trade. Short-run dynamics of the trade balance are tested with lagged values of the exchange rate to reflect the adjustment suggested by the J-curve. However, the result does not show that Chinese economy follows a traditional J-curve. Author concludes that the economic system still does not respond to the market signals even after two decades of reform. (Zhang, 1999, pp. 15, 16) Real exchange rate responds to the inflow of foreign exchange to the economy. Harberger (2008, p. 225) studies real exchange rate and its implications for monetary policy. In one of his examples he summarizes how Mexico mismanaged its oil reserves after 1979 oil price boom. Mexico spent all of its oil proceeds and borrowed much more. Such actions led to significant appreciation of the real exchange rate. His another example is Russian economy during the period of 2000-2007. Nominal exchange rate between United States dollar and Russian ruble remained stable but the price level in Russia more than doubled. Central bank accumulated foreign reserves in exchange for rubles while at the same time trying to sterilize growth in the money supply. Even though the central bank and the government influenced the nominal exchange rate and the nominal money

supply, market forces determined the real exchange rate and real money supply. (Harberger, 2008, pp. 228, 229) Heerman (2015, pp. 1, 2) briefly analyzes influence of foreign exchange rate on agricultural exports of the United States. Author notes that real exchange rate is a measure used to evaluate export competitiveness of countries. Appreciation of the dollar against the currencies of the United States' trading partners caused the decrease of agricultural trade surplus in the US. However, author concludes that exchange rate is not the main determinant of exports that originate in a sophisticated advanced economy as the United States. Author states that agricultural exports of a developed economy compete on quality as well as other factors and that exchange rate mechanics are not the main influence. (Heerman, 2015, pp. 7,8) Previous statement might not apply to exports of Post China 16 economies. Real exchange rate is only one of many variables influencing export competitiveness of a given economy. Inconclusiveness of studies on relationship between real exchange rate, productivity and growth is reviewed by Özbilgin (2015, pp. 70, 75). Balassa-Samuelson theorem explains the causality from productivity to the real exchange rate. But for the opposite direction there is not a clear consensus in the literature. Author argues that productivity growth is achieved by structural reforms and that findings in the literature are conflicting about what the ultimate effect of appreciating or depreciating currency is.

As stated above, the real exchange rate is a variable that directly influences competitiveness of country's exports in foreign markets. However, its effect might not be clearly observed in an economic system that does not respond to market signals. Numerous authors also study effects of nominal exchange rate changes on trade flows. According to Hudson and Straathof (2010, pp. 370-371) nominal exchange rate volatility significantly influenced trade flows in the past. However, authors argue that the elimination of currency risks did not increase trade flows among the Eurozone countries. Their analysis uses nominal exchange rate and suggests that impact of exchange rate volatility on trade declined in the 1980s and this decline coincided with the introduction of currency swaps. Authors conclude that recent data do not suggest significant influence of exchange rate volatility on trade and question the beneficial effect of a monetary union intended to remove the exchange rate risk. (Hudson & Straathof, 2010, p. 371) Other authors use a different approach. Dinda (2014, p. 83) analyzes factors influencing China's exports and its economic integration with neighboring countries as well as with the world. Author uses nominal exchange rate of Hong Kong Dollar (with USD) as a proxy variable

instead of RMB foreign exchange rate (with USD). RMB foreign exchange rate is fixed and Hong Kong is the gateway of China's trade to the world. Author estimates that China's exports are sensitive to the exchange rate and its imports are substantially influenced by the subsequent export to the United States. (Dinda, 2014, p. 83) Kim (2012, p. 319) analyzes dynamics of trade balance and real exchange rate and mentions the changing composition of Korean exports in the study. Korean exports focused on light-industry products such as textiles and footwear of lower quality before the 1997 Asian financial crisis. (Kim, 2012, p. 327) Author uses a stationary VAR model with cointegration error to analyze Korea's trade balance. One of the results show that price shocks, not the nominal exchange rate shocks, significantly affect trade balance. Author argues that a levy imposed on imports would be more effective than foreign exchange market interventions in order to improve Korean trade balance. (Kim, 2012, p. 330) Dynamics of the real exchange rate and its effect on trade flows are the subject of numerous research studies. Authors study the relationship between real exchange rate dynamics and other variables. Foreign exchange rate regime is one of the variables that influences real exchange rate dynamics. Rodrigo and Magendzo (2011, p. 2) compare exchange rate regimes of Central American countries of which Dominican Republic, Nicaragua and Mexico are labelled by Stratfor Global Intelligence as Post China 16 countries. (Friedman, 2013) Rodrigo and Magendzo (2011, p. 3) study dynamics of the real exchange rate misalignments and exchange rate regimes. They find that real exchange rate is dependent negatively on relative productivity between traded and non-traded sector and terms of trade. (Rodrigo & Magendzo, 2011, pp. 26-27) Bahmani (2013, p. 451) studies influence of exchange rate volatility on demand for money. Data for 15 less developed countries suggest that uncertain environment created by exchange rate volatility directly impacts demand for money. Author adds, that in most countries, this effect is only transitory. Hooy and Baharumshah (2015, p. 92) analyze impact of real foreign exchange rate volatility on trade flows in East Asia. Among the countries they study, Philippines and Indonesia are part of Post China 16 countries. (Friedman, 2013) Hooy and Baharumshah (2015, p. 88) confirm that foreign demand is a key factor influencing exports of a country. Growth of foreign income positively influences real exports in all countries included in this study. (Hooy & Baharumshah, 2015, p. 88) However, their research shows that influence of exchange rate volatility on imports and exports of South East Asian countries is inconclusive and different for each country. They conclude that exchange rate regimes of countries in question are getting more flexible as

they continue to integrate into the international economy. Exchange rate volatility does not seem to have a clear intermediate impact on exports and imports. (Hooy & Baharumshah, 2015, p. 93)

## 1.3 Unit labor costs and productivity

OECD (2007) defines unit labor costs as a measure of the average cost of labor per unit of output. Unfortunately, this metric is not widely available for the Post China 16 countries analyzed in this thesis and it needs to be calculated from other variables. Unit labor costs are calculated as the ratio of labor costs to real output (real GDP). Other methods of calculating unit labor costs are the ratio of labor compensation to real GDP or the ratio between labor compensation per labor input worked and labor productivity. Unit labor costs represent the cost of labor that is used in generating output. Rising unit labor costs indicate increased compensation for labor's contribution to output. We can observe that there is a crucial relationship between increased compensation of labor and increased labor productivity. If the growth of labor compensation is higher than the growth of labor productivity it might decrease competitiveness of the given economy. Based on the definitions above unit labor costs can be described with the following equation:

$$ULCn = \frac{w_n * L}{\frac{GDP_n}{P}} \tag{3}$$

Where

$w_n$ = nominal wage

$L$ = number of persons employed

$GDP_n$ = nominal gross domestic product

$P$ = inflation

$ULCn$ = nominal unit labor costs

Gross domestic product can be theoretically calculated with three different approaches. These approaches are the production approach, the expenditure approach and the income approach. The income approach to gross domestic product calculation determines the GDP as the sum of incomes generated by production in the economy, for example the compensation which employees receive or the operating surplus of companies. (Callen, 2012) Wage data which would be needed to calculate the unit labor costs were unavailable for countries in question. Direct calculation of labor costs as a

product of persons employed and nominal wage cannot be used. In order to calculate ULC's based on definitions provided by the OECD and the theory behind calculating the GDP, the second approach is used - ratio of labor compensation to real GDP. Labor compensation is obtained as a product of nominal GDP and a share of total labor compensation in gross domestic product. Both of these variables are available for the time period used in this thesis (1991-2014) and countries in question. We can extend the equation (4) as follows:

$$ULCn = \frac{w_n * L}{\frac{GDP_n}{P}} = \frac{GDP_n * LS\%}{\frac{GDP_n}{P}} = LS\% * P \quad (4)$$

Where

$w_n$ = nominal wage

$L$ = number of persons employed

$GDP_n$ = nominal gross domestic product

$P$ = inflation

$LS\%$ = share of total labor compensation in gross domestic product

$ULCn$ = nominal unit labor costs

The measure of employment includes all citizens participating in an activity within the production boundary of the system of national accounts. This includes employees, self-employed as well as apprentices and members of the military. Total Economic Database takes into account all workers working in the country and it excludes citizens of the country employed abroad. This alteration is done in order to achieve compatibility with the measure of GDP which is tied to the territory of the specific economy. (Vries & Erumban, 2015, pp. 7, 8) In order to determine labor income's share of total GDP for each country and each year, The Conference Board uses sources such as National Accounts, third-party estimates and country specific estimates. They also rely on data from World Input Output Database and Penn World Tables. For a limited number of countries where sufficient data are available a more detailed approach is used. National accounts identify employees but do not include the income of self-employed workers. Income of self-employed workers is then imputed from the average compensation for employees with the following equation:

$$S_L = \frac{w_e * L_e}{Y} * \frac{L}{L_e} \quad (5)$$

Source: (Vries & Erumban, 2015, p. 21)

Where

$S_L$ = nominal income share of labor in GDP

$w_e$ = wage rate earned by employees

$L_e$ = total hours worked by employees

$L$ = total hours worked by all workers including self-employed workers

Y = nominal GDP

Equation (5) assumes equal wage rate and can be simplified to:

$$S_L = \frac{w_e * L}{Y} \quad (6)$$

Previous approach uses wage rate which is a variable that was unavailable for the ULC calculation. However, this approach is used only for several countries where all variables are available, whereas the share of total labor compensation in gross domestic product is a measure provided for most of the countries studied in this thesis. Therefore an equation using this variable is preferred when calculating the unit labor costs. Importance of the unit labor costs manifested itself during a European sovereign debt crisis that followed Great Recession of 2008 and 2009. Gouveia and Correia (2013, pp. 333, 341) analyze labor cost dynamics in the Euro area. They identify Spain as a country that lost competitiveness due to wage growth and decreasing relative labor productivity. Authors agree that unit labor costs are an accurate measure of competitiveness. Their analysis shows that changes in nominal unit labor costs among OECD countries got more synchronized from 1995 to 2011 and that slight labor cost convergences are starting to occur in the Euro area. Growth of nominal wages was faster in countries with low initial levels of nominal wages between 1995 and 2010. It is necessary to use unit labor costs and not wages directly when assessing competitiveness of a given economy. Larudee and Koechlin (1999, pp. 419-420) point out that wages can vary substantially among countries but the same does not apply to unit labor costs. While wages are not the only determinants of FDI flows, they are still important. Authors claim that net foreign direct investment flows from the high-wage country to the low-wage country will occur in spite of the same

average reported unit labor cost. However, Agenor (1996, p. 314) notes that effect of minimum wages on employment in developing countries is difficult to measure. Formal measures are not reliable because law is not strictly enforced. He uses Mexico as an example of a country where manufacturing workers are paid below the minimum wage. Low unit labor costs are a key factor that attracts foreign capital. (Zhang, 2004, p. 1) This was especially true for China after its liberalization began in 1978. However, unit labor cost are starting to be a concern for Chinese economy.

Labor productivity directly influences competitiveness of a given economy. OECD (2002) defines labor productivity as output per unit of labor input. In order to achieve economic growth economy either employs more workers or the current workers become more effective. Increased labor productivity can be achieved by accumulation of machinery and equipment. Other enhancements could stem from improved organization, physical and institutional infrastructure and improved human capital (skills of workers). Data on growth of labor quality, labor quantity, persons employed, share of total labor compensation in gross domestic product and growth of labor productivity per person employed were retrieved from The Conference Board Total Economy Database (The Conference Board, 2015). Total Economy Database contains annual data and was originally created by the Groningen Growth and Development Centre. Vries and Erumban (2015) provide detailed explanation of the sources and methods used when constructing the variables in the database.

Labor productivity measures efficiency with which the country can produce more output with the same effort. It can be measured as output per person: (Vries & Erumban, 2015, p. 11)

$$y = \frac{GDP}{L} \tag{7}$$

Where

$y$ = labor productivity

$L$ = number of persons employed

$GDP$ = real gross domestic product

Jefferson et al. (2006, p. 2) use industry and firm level panel data to study the productivity growth in China's economy. The productivity gap between an industrial worker and an agricultural worker has grown since the 1990 and the productivity of the

industrial worker was 7.1 times higher than the productivity of the agricultural worker in 2005. This large difference is caused partly by inadequate data that count migrant workers as agricultural workers. After the correction the ratio decreases to 4.47. (Jefferson, et al., 2006, pp. 8, 11, 16) Previous case illustrates that measuring productivity and productivity growth is challenging and data might not be reliable. Larudee and Koechlin (1999, p. 419) highlight inconsistencies in data when measuring productivity worldwide. Transfer pricing has significant ability to distort the data available. Export oriented multinational companies and their use of transfer pricing could substantially underreport the data on value added per worker in a low-wage developing country. This would mean that productivity gaps among different countries are much smaller and differences in unit labor costs significantly larger. (Larudee & Koechlin, 1999, p. 425) Duarte and Restuccia (2006, p. 195) study the productivity of countries relative to the United States between 1960 and 1996. Their findings suggest that disparity in labor productivity among the rich and poor countries is increasing. Labor productivity in different countries is diverging, not converging. Labor productivity is defined as output per worker. While China and India improved their productivity, Latin American countries, some of which belong to the Post China 16 group studied in this thesis, did not. Other measurement problems in international trade are connected with vertical specialization and labelling sectors as skilled-labor intensive or unskilled-labor intensive. Krugman (2008, pp. 107, 111, 123, 126) analyzes vertical specialization in international trade. Krugman notes that reduced barriers to trade are an important factor influencing growth of trade flows and uses Mexico's admission to NAFTA as an example. Growth of Mexican exports was also caused by country's liberalization in the period of 1995-1998 and by devaluation of the currency after the crisis in 1994. Another important factor influencing import from developing countries are trade costs. Their decline promotes specialization among countries. While the traditional export sectors of developing countries are industries like apparel, Krugman proposes that growth in exports of computers and electronics (labelled as a skilled-labor intensive industry) is misinterpreted. His findings suggest that growth of export of a particular industry in a developing country cannot be interpreted in a clear or universal way. Vertical and horizontal specialization within an industry signals that to describe an entire industry as a skilled or unskilled labor intensive might be misleading. He uses an example of microprocessor manufacture (supposedly skilled-labor intensive industry) with Intel's assembly and testing facilities that are located in China, Costa Rica, Malaysia, Philippines and Vietnam. Testing and assembly within one industry is done in

a developing country while circuits are printed in a developed country like the United States, Israel or Ireland. (Krugman, et al., 2008, p. 127) This observation captures the ongoing trend as Philippines and Vietnam are both on the Post-China 16 list.

*"All these examples suggest a data problem: numbers showing a rapid rise in developing country exports, and Chinese exports in particular, within sectors that are skill intensive in the United States need to be taken with large doses of salt."* (Krugman, et al., 2008, p. 128)

Krugman (2008, p. 135) concludes, that vertical specialization and low trade costs create a *"statistical illusion"* of *"apparent sophistication of developing country exports".* His finding has significant implications for this thesis. It would mean that industries need not to be divided into skilled-labor intensive or unskilled-labor intensive. Industries evolve and so do the inputs used in production. This evolution is explored by Cai and Zhang (2011, p. 276) who use input-output tables in their econometric analysis of off-shoring in China. Their results show that importing materials and services from other countries greatly improves productivity of analyzed industries. They further add that traditional labor intensive and resource intensive industries are becoming capital and technology intensive. Developing country's focus in all industries will be on unskilled and labor intensive tasks according to his analysis. This also implies that their exports are sensitive to labor costs and wages. Increasing labor costs make the exports less competitive, demand shifts elsewhere and exports fall. Whether impact of labor costs influences some industries more profoundly than the others is tested in an empirical part of this study.

Quality of labor represents an important variable that influences the competitiveness of a given economy. Total Economy Database (Vries & Erumban, 2015, pp. 13, 18) calculates this measure as a difference between labor's contribution to output growth rate and labor quantity growth rate defined by the following equation:

$$\Delta lnLQ = \Delta ln \sum_l L_l - \sum_l s_l \, \Delta lnL_l \qquad (8)$$

Where

$L_l$ = labor input belonging to each type of labor

$LQ$ = labor quality growth rate

$s_l$ = share in compensation of each type of labor

Share in compensation of each type of labor is calculated as follows (Vries & Erumban, 2015, pp. 13, 18):

$$s_l = \frac{P_{L,l}L_l}{\sum_l P_{L,l}L_l} \quad (9)$$

Where

$P_{L,l}$ = price of labor belonging to the each type of labor

$L_l$ = labor input belonging to each type of labor

First component of the equation (8) ($\Delta ln \sum_l L_l$) adds labor input growth rates across various groups of workers and it equals the growth of labor quantity measured by employment or hours worked across different types of workers. Second component of the equation (8) ($\sum_l s_l \, \Delta lnL_l$) weighs growth rate of different types of employment by the share of their compensation. Difference between the two components represents growth of labor quality and contains the effect of different composition of labor input. (Vries & Erumban, 2015, p. 14) In order to divide different types of workers into different skill types authors of The Total Economy Database use data on average years of schooling, data on share of different types of education attained by population above 15 years of age and total hours worked by employees of different skills (low, medium, high). (Vries & Erumban, 2015, p. 19) Marjit, et al., (2004, p. 298) develops theoretical framework to describe impact of trade on the wage gap between the skilled and unskilled labor in small developing economies. Using a multisector model in which intermediate goods can be traded authors conclude that absolute wage of the unskilled workers improves in all cases. However, the wage gap between skilled and unskilled labor can either grow or shrink. Similar conclusion is presented by Woo (2011, pp. 23, 24). Author states that allegations that China's exports lower the wage of labor and increase the unemployment in the United States are distorting facts. United States' unemployment decreased form 5.9% to 4.6% between 1996 and 2006 and the total compensation measured in 2005 prices rose from 48175 USD in 1996 to 55703 USD in 2005. China's imports are viewed unfavorably chiefly due to inadequacy of US social safety system and technological changes. Length of the median job tenure fell among various age groups of workers (33-44, 45-54, 55-64) and according to data presented by the author only United Kingdom had less generous social security system than the Unites States out of G7 countries in 2004. Export-oriented countries import intermediate goods as well as skilled labor in order to manufacture products for export and this factor can contribute to the rising inequality in some

developing countries. (Marjit, et al., 2004, p. 302) Although labor quality is an important factor, attractiveness of a given country for foreign FDI's is also influenced by labor market institutions. Delbecque, et al. (2014, p. 117) study labor market institutions and their influence on attractiveness of a specific country as a destination for French FDI's. Important negative factors reducing country's attractiveness include rigid employment laws, generous unemployment benefits, high minimum wage and centralized wage setting process. (Delbecque, et al., 2014, p. 118) Their results show that among these factors, minor changes in the minimum wage seem to be the least significant. (Delbecque, et al., 2014, p. 118) Empirical evidence shows that labor market rigidity is substantially more important and that labor market institutions influence the choice of FDI location. (Delbecque, et al., 2014, p. 129. 140)

## 1.4 Foreign direct investments and other capital flows

Foreign direct investment represents an acquisition of ownership in a company located in another economy. This acquisition of ownership is made with an intention to gain a long-lasting interest and form a relationship in which the investor has a substantial influence on the company. The share of voting rights acquired needs to exceed the threshold of 10% in order to be classified as a foreign direct investment. Foreign direct investment is an important factor that integrates the host country into the international economy. This integration is achieved by stable, long-term links between economies. Know-how and technology are transferred between the two economies and it enables the host economy to increase the presence of its products in international markets. (OECD, 2014, p. 88) Ghosh and Ramakrishnan (2012) add that composition of capital flows is crucial to the stability of the country's financial system. Foreign direct investments proved to be more stable and less susceptible to reversal of financing. Such reversal of financing might occur as a result of a crisis and subsequent flight of the investors. Conversely, short term investments such as bonds and equity are much more volatile. Bossworth and Collins (1999, pp. 145-146) provide an overview of the capital inflows to the developing countries. Authors use regression analysis and IMF balance of payments data to study consequences of capital flows to selected economies in Latin America and Asia. Before 1982 bank loans dominated the inflows with 57 out of 68 billion of U.S. dollars between 1978 and 1981. After the crisis of 1982 developing countries were mostly unable to obtain bank loans and total inflows fell to 24 billion of U.S. dollars between 1982 and 1989. Then the situation reversed and foreign direct investments represented

the most (40%) of total capital inflows to developing countries. (Bosworth & Collins, 1999, pp. 150-151). Nanfei Pei and Karin van der Esch (2004, p. 1) focus on the channels through which FDI's contribute to economic growth. They identify the entry of foreign financial institutions as a factor that improves stability and efficiency of the financial system of developing countries. These institutions partly act as a prudential supervision of the country's financial system. (Pei & Esch, 2004, p. 2) Benefits connected with MNC's entering the country are connected with the transfer of technology and stimulated productivity of local firms, suppliers, clients and competitors. Influence of FDI's on trade structure are two. Export oriented FDI's include the host country into international division of labor and FDI's focused on domestic market act as an import substitution. Country's labor market is affected as well. Foreign firms tend to absorb the pool of labor available and offer higher wages in economies operating at full employment. (Pei & Esch, 2004, p. 3). Nevertheless, they stress that dividends and payments to the parent company will exceed the initial FDI investment. Increased export capacity tends to have positive effects on the current account in the long run. (Pei & Esch, 2004, p. 4) Bosworth and Collins (1999, p. 151) study the relationship between different capital flows and conclude that types of capital flows (FDI, portfolio investment, and loans) do not seem to be correlated. Aggregated data also cover the differences between the types of capital flows. Authors conclude that FDI's greatly increase domestic investment. On the other hand, portfolio capital flows seem to have no tangible impact on investment. (Bosworth & Collins, 1999, p. 164) Authors (Bosworth & Collins, 1999, p. 148) exclude several countries which might for various reasons be responsible for double counting – Singapore, Hong Kong and Panama. Their analysis concerns capital inflows and outflows. The same is also true for trade flows in case of Hong Kong as trade flows from mainland China are double counted as Hong Kong's export as well. Hong Kong trade flows are therefore excluded from the empirical part of this thesis for similar reason why Bossworth and Collins exclude it from theirs. Alam et al. (2013, p. 516) test significance of possible determinants of FDI using annual time series for the period of 1985-2009. Ten OECD countries are included in this analysis. FDI determinants explored by the authors are market size, labor cost, labor productivity, corporate tax rate, trade openness, political stability, real effective exchange rate, inflation and quality of infrastructure. (Alam & Ali Shah, 2013, p. 519) Their results show that market size, labor costs and quality of infrastructure are significant factors which influence FDI's. Surprisingly, political stability does not seem to influence FDI's. (Alam & Ali Shah, 2013, pp. 521, 522) Similar

idea is presented by Stratfor Global Intelligence (Friedman, 2013) where author remarks that political instability is an attribute present in several Post China 16 countries.

OECD Factbook 2014 (OECD, 2014) defines the current account balance as difference between current receipts from abroad and current payments sent abroad. Transactions that constitute a current account are exports and imports of goods, services as well as income flows such as wages, dividends, and income from investments such as interest, remittances from abroad and other transfers. Ghosh and Ramakrishnan of the IMF add that interest, dividiends and transfers represent a small fragment of the total amount and express the current account deficit as:

*"the difference between the value of exports of goods and services and the value of imports of goods and services."* (Ghosh & Ramakrishnan, 2012)

The current account deficits reflects a difference between national savings and investment. A developing country with abundant investment opportunities and low domestic savings naturally seeks foreign capital from abroad. However, a current account deficit can be viewed from different perspectives. The timing of trade and resulting intertemporal trade may cause a country to import more in one period (running a current account deficit) while exporting more in the other (running a current account surplus). A current account can also smooth out country's consumption after a shock such as a natural disaster. Current account deficit can spread the impact of the shock over time until the country reaches its productive capacity again. However, persistent current account deficits mean that a country is accumulating liabilities to the rest of the world which it needs to repay in the future. If the funds borrowed from abroad are invested into projects or activities that do not increase the productivity in the future, solvency of the country is threatened. (Ghosh & Ramakrishnan, 2012). On the other hand, current account surplus needs to be carefully monitored as well. Its existence can point at underlying inefficiencies in the domestic economy. Woo (2011, pp. 28-30) analyzes the issue of current account imbalances between China and the United States. Author describes China's current account surplus as a failure of China's financial system. It fails to channel the sum of private sector savings into investment expenditures. Rise of the saving rate in China reflects the uncertainty about the future of privatized state owned enterprises and decline in state subsidies for services such as housing, medical care and pensions. Author concludes that dysfunctional financial system fails to pool risks and provide medical or

unemployment insurance and to channel the savings into housing or investment loans. Reduced saving rate would result in lower current account surplus.

Yin-Wong et al. (2012, pp. 6, 24) test the responsiveness of China's imports and exports to the foreign GDP and exchange rates. Authors claim that since large amount of China's imports are used as input for export, standard links (positive link between rising domestic GDP and imports) might not be present. What is more, their results show that while Chinese exports rise with RMB depreciation, interestingly, imports rise as well. Real GDP index of the world and the real effective exchange rate of the Chinese currency are considered to be explanatory variables of exports, among others. (Yin-Wong, et al., 2012, p. 14). Authors then disaggregate exports to manufactured products and primary products. Primary exports are negatively correlated with income unless the post-WTO trend is included. Then the correlation with income turns positive and correlation with real exchange rate negative, as predicted. Exports of manufactured products constitute the majority of total exports and they behave in a similar fashion. (Yin-Wong, et al., 2012, p. 17) Authors conclude that China's trade flows behave as theory might predict – higher world GDP increases exports and stronger currency decreases them. They propose more detailed disaggregation of trade flows for further research of China's exports. (Yin-Wong, et al., 2012, pp. 22, 23) Zhang (2011, pp. 69, 74) studies trade balances between Asia and the United States. He uses a multi-country model to explore 3 possible scenarios and to determine the effectiveness of currency appreciation on trade imbalances between the US and the East Asian countries. (Zhang, 2011, p. 75) The scenarios include unilateral RMB revaluation, fiscal stimulus in China and joint revaluation in emerging Asia. (Zhang, 2011, p. 77) The results show that unilateral revaluation has negative effects on China's growth and tends to reduce inflation. Fiscal stimulus scenario ends with opposite results. However, China's growth rate slows down in unilateral revaluation scenario. This translates to negative impact on developed economies as well as on export of Asian countries that supply China with raw materials. (Zhang, 2011, pp. 81-83). Result of the joint revaluation scenario brings recession to the countries undergoing it and would only slightly improve US current account deficit. Results of the fiscal stimulus scenario lead the author to the conclusion that overall this option is the most favorable. (Zhang, 2011, p. 83) Tran and Dinh (2014, pp. 150, 161) study the relationship between trade imbalances and FDI inflows. They analyze trade balance, FDI, export and import of 15 developing countries in Asia between 1991 and 2011. Their results show that exports do not respond

to the real depreciation and imports are positively related to real exchange rate. Authors attribute this unexpected result to the type of goods imported. Majority of imported goods are used in production and this affects the relationship between imports and the real exchange rate. (Tran & Dinh, 2014, pp. 164, 165) Authors conclude that FDI contributed to the growth of exports as well as strong growth of imports. Real depreciation initially worsens the trade balance not only because of the Marshall-Lerner condition, but also due to increased imports of production goods used for exports. FDI's appear to worsen the trade balance at first and improve it later. (Tran & Dinh, 2014, p. 167) Aizenman (1992, pp. 890, 893) studies the exchange rate flexibility and its implication for FDI flows. Author develops a model to describe the situation of two countries in two periods exchanging two categories of goods. Author's result show that fixed exchange rate regime is associated with higher volume of foreign and domestic FDI's. Reallocation of employment from low-productivity country to high-productivity country is greater under the fixed exchange rate regime. Country with flexible exchange rate regime undergoes real appreciation which will reduce employment growth. Results of the model imply that fixed exchange rate regime helps to promote flows of FDI's. However, there is a trade-off between the volatility of employment and volatility of expected income when comparing the fixed and flexible exchange rate regimes. (Aizenman, 1992, pp. 911, 913)

## 1.5 Studies on recent development of China's competitive position

Variables described in the previous part of the study influence the competitiveness of China's exports in the world. Modernization of China and FDI inflows that have increased since the 1980's have changed Chinese economy and Chinese society. Disproportionate volume of FDI's and research and development activities were concentrated in the coastal regions. (Jefferson, et al., 2006, p. 25) Jin (2009, pp. 313, 314) describes two conflicting theories about the effect of FDI's on a country – modernization theory and dependency theory. Modernization theory states that income inequality is reduced by FDI because it provides the host economy with capital and technology. (Jin, 2009, pp. 313, 314) Dependency theory claims that positive effects are only short term and that FDI flows are a long term burden on the host economy. China benefited greatly from the incoming foreign direct investment as it indeed provided the country with new capital and technology. Over time, it helped the Chinese economy to raise its productivity and to catch up with the global technological frontier. Positive

effects were followed by negative ones as well. Jin (2009, pp. 312, 315, 318) shows that since China opened up to foreign FDI flows in 1978, inequality in the country increased rapidly. Author studies the effect of foreign direct investment on income inequality in China. Provincial level data and the empirical results show that FDI, education, privatization, urbanization and economic growth are factors that contribute to inequality in urban China. However, FDI's do not contribute to the rural-urban income gap. The same is true for export which does not contribute to the urban or rural-urban income gap. To level the playing field author proposes to eliminate special treatment of FDI's by the policy makers and concludes that investment in public education would narrow the skill gap as well as income gap among citizens. (Jin, 2009, p. 332. 333) Proposed investment into education will also provide a beneficial increase in labor quality which will then translate into improved competitiveness.

Exchange rate policy played a major role in promoting competitiveness of China's export in the past. Authorities actively used foreign exchange rate to promote competitiveness of export by adjusting the exchange rate to the level at which an average Chinese exporter would incur no loss when exporting. This procedure was abandoned in 1994 with unification of exchange rates and a further devaluation (Institute of World Economics and Politics, Chinese Academy of Social Sciences, 2000) Rationale for such actions in the past are explored by Yin-Wong et al. (2012, p. 14) who show that exports are strongly dependent on real exchange rate as theory predicts (depreciation increases exports, provided the Marshall–Lerner condition holds). Secondly, China's exports are positively correlated with growth of world GDP. However, authors attribute part of this growth to the trend of China's increasing share of world exports and not just the GDP growth. Accusations that current exchange rate manipulation provides Chinese exporters with unjustifiable advantage remained. Zhang (2011, pp. 69, 74) studies trade balances between Asia and the United States. Author notes that appreciation of China's currency would not solve United States' trade deficits on the grounds that a collective revaluation of China and other East Asian countries would be necessary to achieve this. Foreign exchange rate policy continued to be a contested topic nonetheless. Whether and by how much renminbi is undervalued was a subject of numerous research papers. Chu (2005, pp. 7, 8, 12) creates an index to measure absolute PPP of China and United States to address this question. Inspired by The Economist's Big Mac index author creates an index based on the price of salt, haircuts, electricity and flour. Chu argues that these items better

represent developing country's context. His calculation suggests that RMB is undervalued by almost 79% against the dollar, which is even lower than Big Mac index suggests. Author attributes this result to well-known Balassa-Samuelson effect and adds that currency of countries such as India can be viewed as similarly undervalued. (Chu, 2005, p. 15) Harberger (2008) comments on China's fixed exchange rate regime period from 1995 to 2005. In his view China's exchange rate regime followed standard rules needed to maintain fixed exchange rate and accusation of currency manipulation in that period are baseless. (Harberger, 2008, p. 234) Frankel (2006, p. 268) adds that according to his calculations using real GDP per capita (absolute terms, PPP) RMB was undervalued by 35% in 2000 and again in 2005. Based on his analysis, such gaps are halfway closed in the subsequent decade by either inflation or nominal appreciation out of which Frankel prefers nominal appreciation. China maintained a fixed exchange rate regime between 1995 and 2005. Interestingly, Rodrigo and Magendzo (2011, pp. 26-27) show in their analysis that for some countries flexible exchange rate regimes seem to help eliminate the misalignments of real exchange rate.

Even though labor productivity of China's economy grows over time, it still lacks behind the world technological frontier. Jefferson et al. (2006, pp. 2-6, 8) identify a productivity gap between the world technological frontier and China's coastal regions as well as a productivity gap between coastal regions and other regions. Additional productivity gap exists between coastal industrial sector and lagging services and agricultural sector. Their measurement shows that labor productivity in coastal region industry was ¼ of the international frontier in 2002. Ratio of coastal productivity to regional productivity was 1.86 for central region and 2.52 for the western region in 2002. (Jefferson, et al., 2006, p. 18) Authors' other findings include that capital intensive industries (e.g. extractive industries) in China tend to have high labor productivity and low capital productivity. Estimation of productivity growth implies that north-eastern, western and central region will not catch up with coastal regions in the medium term. (Jefferson, et al., 2006, pp. 21, 25) Authors conclude that industrial coastal region is and will be the leader in productivity and that its productivity will approach the international frontier. China's overall productivity will grow as the gaps (international gap, regional gap and sector gap) continue to narrow. Moreover, when the coastal productivity reaches the international frontier, authors expect China's GDP growth to slow substantially. (Jefferson, et al., 2006, p. 46) Fiscal stimulus applied in the wake of the Great Recession

halted this slowdown. Nevertheless, annual growth of the real GDP decreased from 10.6% in 2010 to 7.3% in 2014. (The World Bank Group, 2015) Government annual growth rate target for 2016 is lower still - a range between 6.5% and 7% coupled with plans to raise fiscal deficit to 3% of GDP in 2016 up from 2.3% in 2015. (The Economist Newspaper Limited, 2016) This slowdown reflects the evolving structure of Chinese economy. As investment-led and export-led growth gives way to the rising consumption (Fan, et al., 2013, p. 23) Chinese economy turns its focus away from labor intensive factory employment. Different authors use different indicators to measure country's ability to compete in export. Mao and Zhang (2015, p. 143) use market penetration rate (MPR) due to its simplicity and robustness to measure China's competitiveness and imply that this measure can be accurately used to assess development in competitiveness of a particular economy. (Mao & Zhang, 2015, p. 147) Their findings suggest that China's relative strength among other exporters in the international market is decreasing. This negative development of the MPR is influenced mainly by production cost, trade cost, productivity and real exchange rate. Authors conclude that structural change in the economy coupled with policies stimulating domestic demand (increased income, improved social security) are needed to maintain economic growth. (Mao & Zhang, 2015, p. 166) Dinda (2014, p. 83) adds that China is reshaping its economy to focus on more sophisticated products instead of labor intensive industries which were its focus in the past. This summary is similar to the original Post China 16 report mentioned in the introductory part of this thesis. Emerging trends of this kind originally manifest themselves in most developed coastal regions such as Shanghai. Zhang (2004, pp. 1, 7) warns of increasing labor costs in the Chinese economy after admission of China into WTO and subsequent inflow of foreign capital. Author stresses that wage growth as well as welfare insurance growth already started to influence the structure of China's economy as Shanghai's focus turns away from the industrial sector to the tertiary service sector. (Zhang, 2004, p. 4) Rebalancing of this kind is necessary. China gradually continued to lose its competitive edge in manufacturing in the following years due to ever increasing labor costs while other sectors started to take its place. High labor costs in Shanghai could keep research and development in the city while mass production will develop in areas with lower labor costs. Zhang (2004, p. 9) adds that relation between labor costs and labor productivity needs to be managed carefully with a cost benefit analysis. Continuation of this trend is apparent from the work of Qu and Cai (2011, pp. 8-15) who specifically analyze China's workforce competitiveness. They too stress rising labor costs since the

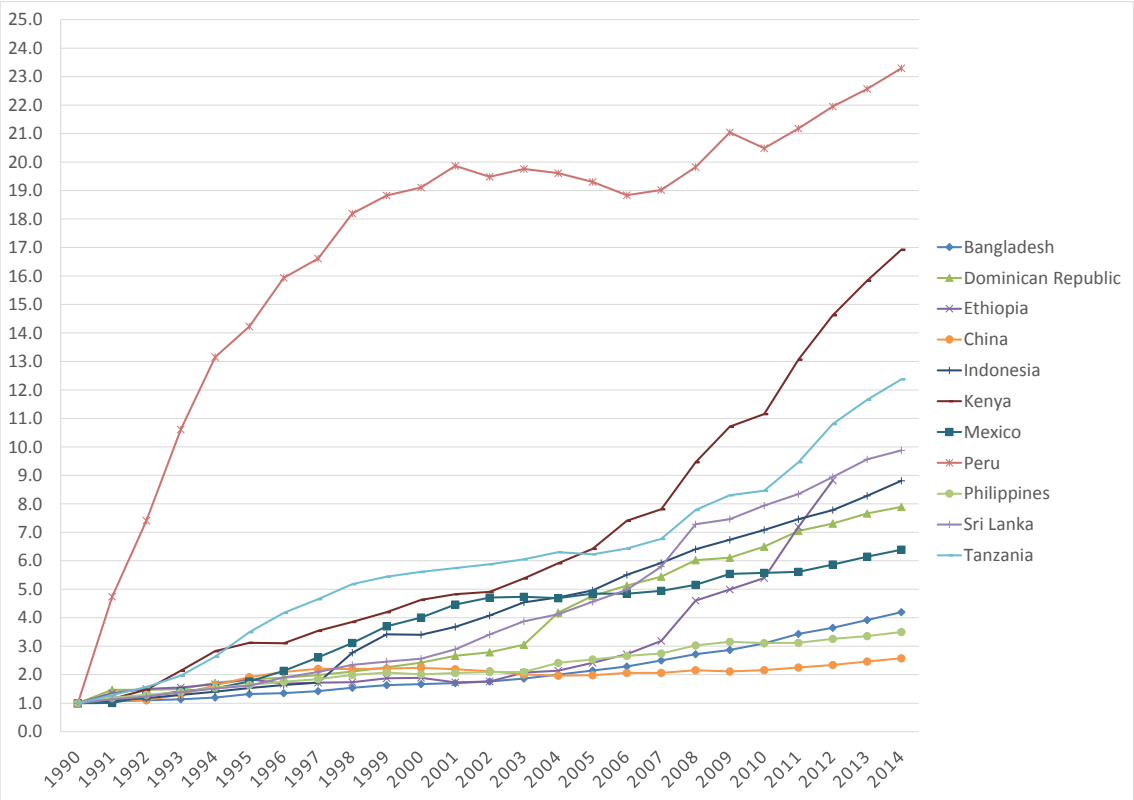
mid-1990s with nominal and real wage growth above 10% in the subsequent years. Authors suggest that this tendency may force enterprises to replace labor with capital in order to minimize costs. Labor costs influence various sectors of the economy unequally. Authors analyze workforce productivity in different industries in China in relation to education and identify textiles, dressing and dyeing of furs, crafts and rubber products as labor intensive industries. They conclude that return on education is higher in industries with less educated workforce and overall improvement of country's productivity is achieved by improved training and education of less educated workforce in labor intensive industries. (Qu & Cai, 2011, pp. 16,17) Labor costs kept growing in the following years as well. On average, wage costs represented close to 40% of China's manufacturing output. (Mao & Zhang, 2015, p. 155) Authors suggest that annual growth of the real wage stayed above 10% from 2002 to 2009 and that this factor was the main contributor to the decline of China's MPR. Decreasing trade costs are not able to offset negative effects of rising production costs. Labor costs are consequently an important factor influencing FDI's. Alam et al. (2013, pp. 523, 524) conclude that in the long run it is the quality of infrastructure and low labor costs that influence the decision of investors regarding the location of FDI's. Sauvant and Davies (2010, pp. 2-3) analyze inward and outward foreign direct investments in China. They notice that outward investment of China increase as yuan strengthens. This trend is magnified by rising labor costs in coastal provinces as well. Trajectory of these investments reveal how capital flows shift from China to new developing economies that can replace its position in low cost manufacturing. Interestingly, authors remark that in order to lower labor costs, China's firms do not only invest into inland regions in China but also to countries regarded as Post China 16 – for example Vietnam. This activity can be viewed as interesting yet logical development. Usual explanation that other countries are replacing China's cheap labor can be presented from a different point of view. It can be regarded as outsourcing by China itself.

# 2 Post China 16 Country analysis

This thesis uses various data to study relationship between merchandise exports of a specific country and different macroeconomic variables. Data on merchandise export were retrieved from the database of The World Trade Organization (World Trade Organization, 2016). Current account balance (% of GDP) was calculated using the Balance of Payments database provided by The International Monetary Fund (International Monetary Fund, 2016). Data on labor quality growth, number of persons employed and share of total labor compensation in gross domestic product and growth of labor productivity per person employed were retrieved from The Conference Board Total Economy Database (The Conference Board, 2015). Following chapter showcases the development of above mentioned variables and explores the underlying trends.

## 2.1 Development of selected variables

Nominal unit labor costs calculated according to the equation (4) are presented in Figure 1. The original value of the nominal unit labor cost in the year 1990 is represented by 100% (number 1) and subsequent increases and decreases are recorded as cumulative percentage changes over the original value. In order to have an adequately long time-series and due to unavailability of valid data for some periods in this time-frame, certain countries are excluded from the data analysis in Figures 1-7. Our sample therefore excludes economies that were home to almost 210 million people in 2014 according to The World Bank Group data. The remaining 10 countries (excluding China) had almost 894 million inhabitants combined in 2014 and they represent a relevant sample. The countries excluded due to unavailable or inadequate data are Cambodia, Laos, Myanmar, Nicaragua, Uganda and Vietnam.

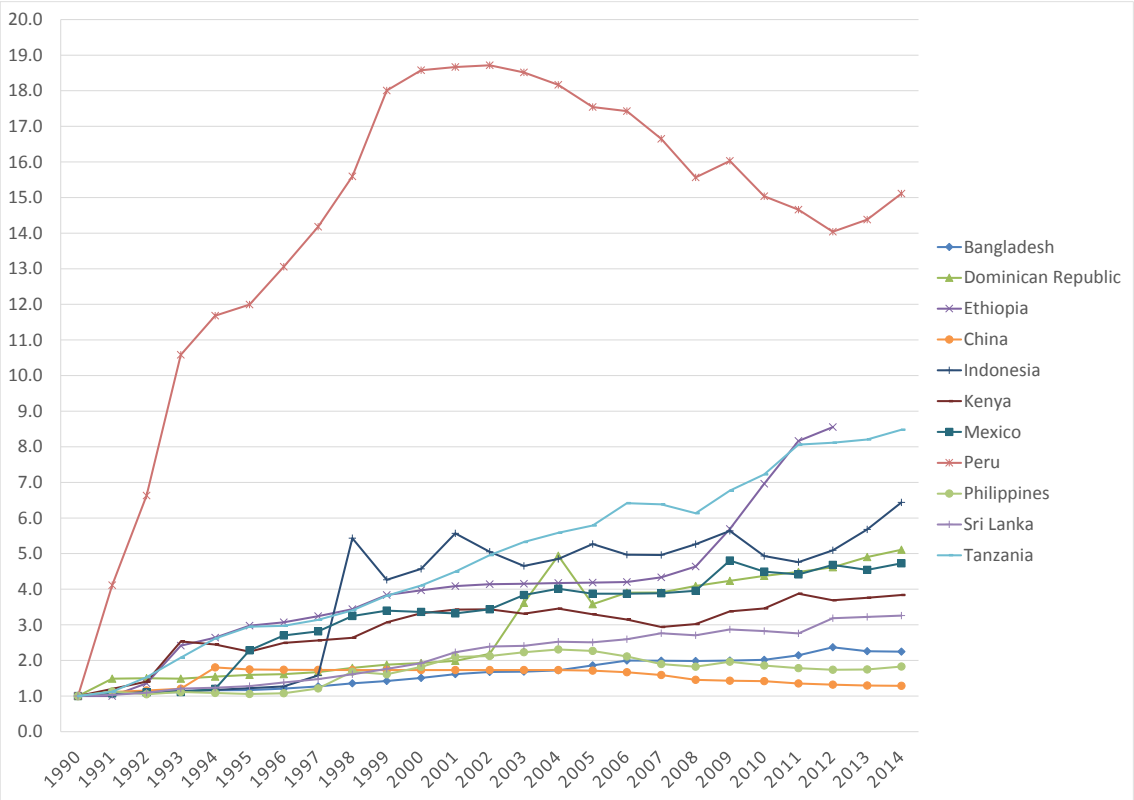



Source: Databases - The World Bank Group (2015), The Conference Board (2015), own calculations

*Figure 1- Nominal unit labor costs, local currency unit*

Figure 1 shows significantly diverging increases of nominal unit labor costs in different countries. This is due to the fact that labor costs are calculated with the use of the nominal GDP in units of local currency. Countries that experienced periods of high inflation in local currency units are perceived as those with strong increases in nominal unit labor costs. Peru, Kenya, Tanzania and recently Sri Lanka and Ethiopia represent this trend. On the contrary, we can see that China experienced the smallest increases in nominal unit labor costs denominated in local currency.

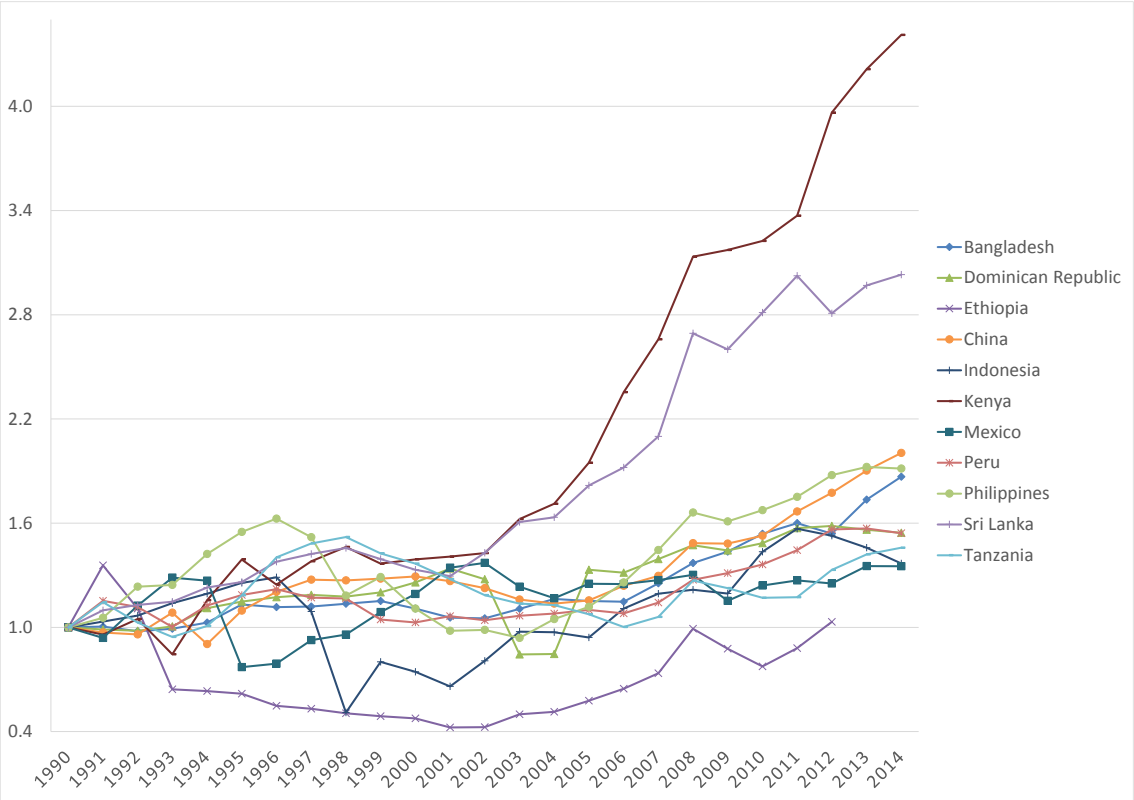
Naturally, ULCs denominated in local currency do not represent the true development of the labor costs. Countries which experience rapid rates of inflation usually undergo devaluation of their currency as well to offset the rising costs denominated in domestic currency.




Source: Databases - The World Bank Group (2015), own calculations

*Figure 2- Official exchange rate (LCU per US$, period average), index of percentage changes*

Figure 2 shows cumulative index of percentage changes of nominal exchange rate of local currency per US dollar. We can see that countries with rapid inflation undergo equivalent devaluation. This trend is clearly visible in Peru, Tanzania or Ethiopia. Nominal ULCs denominated in local currency need to be adjusted for the change in nominal exchange rate in order to be comparable. Figure 3 shows this adjustment. It clearly shows two exceptions – Sri Lanka and Kenya with highest increases in foreign exchange rate adjusted nominal ULCs. On the other hand, Ethiopian labor costs started to fall in 1993 and continued to decrease until 2002. They started to grow since then with a slight decrease in the wake of the Great Recession of 2008 and 2009. However, the long term overall increase is the smallest out of the countries in the sample. Foreign exchange adjusted ULCs in other countries follow a similar pattern to a certain extent. Firstly, ULCs increase until the years 1997 and 1998. This period is then followed by a modest decline that continues until 2003 and 2004. The trend then reverses and ULCs increase until 2014 where our dataset ends.



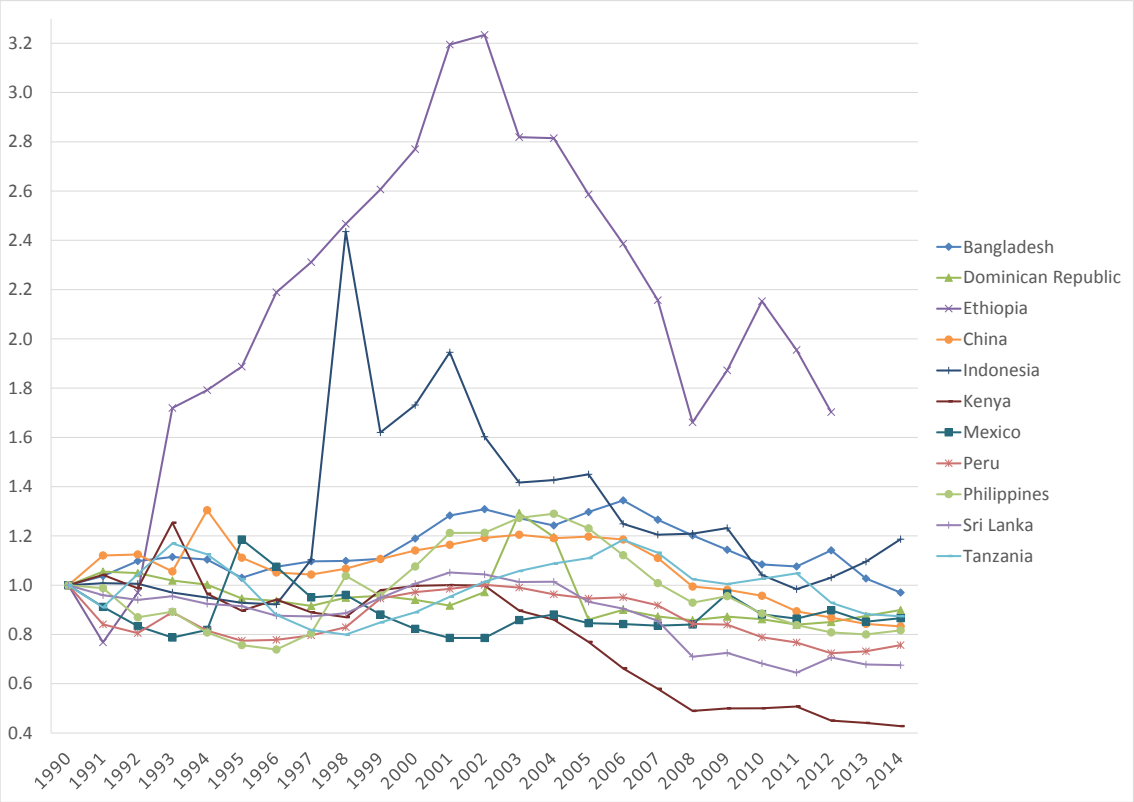

Source: Databases - The World Bank Group (2015), The Conference Board (2015), own calculations

*Figure 3- Nominal unit labor costs, foreign exchange rate adjusted*

China mostly follows this pattern with a few exceptions. We can see a fall in China's foreign exchange rate adjusted ULCs in 1994 when the exchange rates were unified and devalued. However, the decline after 1997 was not significant. Strengthening and stability of the yuan in the following years contributed to the rapid rise in foreign exchange rate adjusted ULCs after 2004. Figure 3 shows that with the exception of Kenya and Sri Lanka cumulative increase of this indicator over the period of 1990-2014 is the highest in China. The trend of rising ULCs after the year 2004 that continued for the following decade is mentioned several times by other studies referenced in the first part of this thesis. We can clearly see that it is visible in our dataset as well.

Figure 4 presents the development of the real exchange rate index of the countries in our sample. It is calculated using the equation (2). Values above 1 denote a real exchange rate depreciation and an increase of export competitiveness in the international markets. Values below 1 denote a real exchange rate appreciation and a loss of competitiveness in the international markets. Year on year changes of this variable oscillate around 1. Therefore we start with the value 1 and this number is then multiplied

by the value of the real exchange rate index for the following year and this process is repeated in each subsequent year. This method provides us with a clear perspective and we can observe a development of the real exchange rate index throughout the whole period.

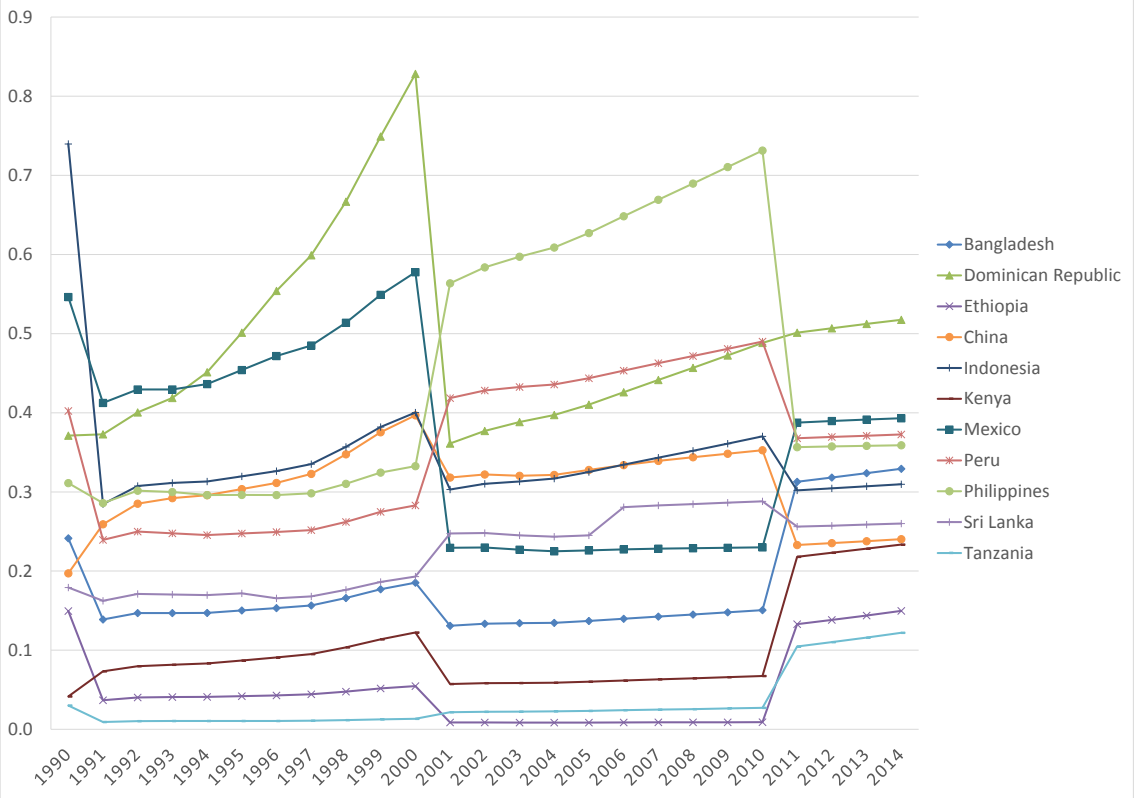



Source: Databases - (The World Bank Group, 2015), (The Conference Board, 2015), own calculations

*Figure 4- Real exchange rate index, cumulative change*

Figure 4 clearly shows that cumulative change of the real exchange rate index oscillates around 1 for most countries with the exception of 3 outliers. Ethiopia and Indonesia underwent a significant real exchange rate depreciation that was followed by a real exchange rate appreciation. The adjustment process for the Ethiopia is clearly not finished. However, data for this country end in 2012 and I was unable to obtain comparable and reliable data for the last 2 years. On the other hand, Kenya experienced an appreciation of the real exchange rate in the period of 1990 – 2014. Values for the remaining countries oscillate around 1. China experienced a gradual depreciation of the real exchange rate since the 1990 with a notable depreciation in 1994 due to the devaluation connected with the unification of the foreign exchange rates. However, in

2005 the trend reversed and China experienced a strong appreciation of the real exchange rate. This development denotes a gradual loss of competitiveness of the Chinese exports in the world markets. Development of this variable in China is comparable with other countries. However, only Peru, Sri Lanka and Kenya experienced a stronger real exchange rate appreciation. Therefore, development of the real exchange rate index could be added to the factors that indicate loss of competitiveness of China's exports.

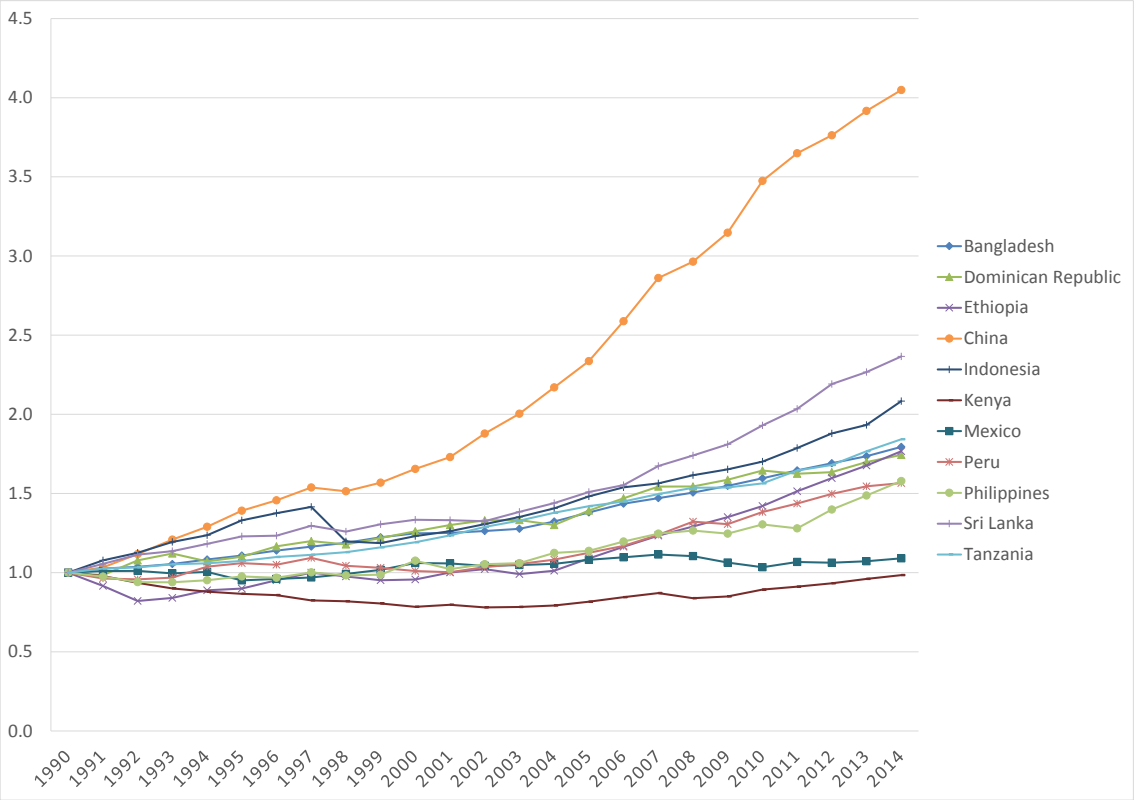



Source: Databases - (The World Bank Group, 2015), (The Conference Board, 2015), own calculations

*Figure 5- Growth rates of labor quality, log change*

Figure 5 describes the log change of the quality of labor calculated using the equations (8) and (9). Data show large increases in labor quality in Philippines, Dominican Republic, Peru and Mexico. On the other hand, labor quality did not grow at a rapid rate in Ethiopia, Tanzania and Kenya during the period of 1990 – 2014. Growth of labor quality in China is mostly average when compared with other countries in the sample throughout the whole period. China did not increase its relative advantage in this area nor did it markedly decrease.

Figure 6 shows the growth of labor productivity per person employed in 2014 USD (in order to capture real growth). Original value is represented by the value 1 and subsequent decreases and increases are presented as cumulative change over the original value.

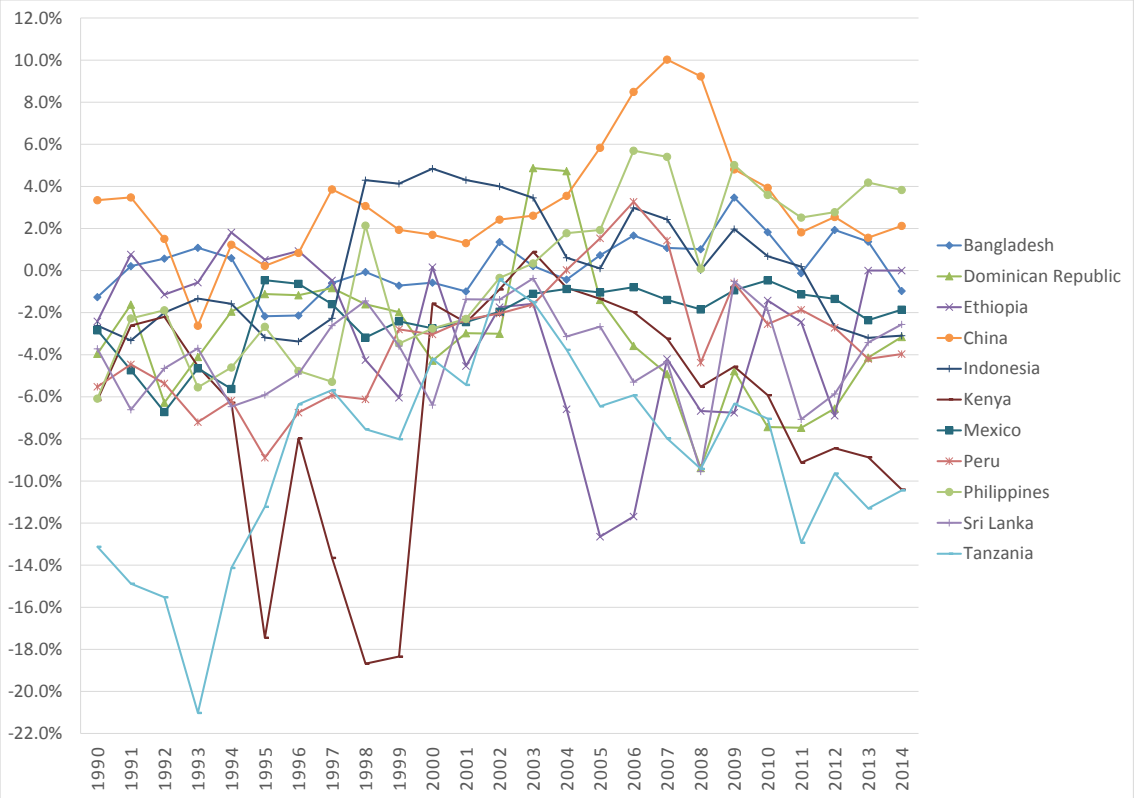



Source: Databases - (The World Bank Group, 2015), (The Conference Board, 2015), own calculations

*Figure 6- Growth of labor productivity per person employed in 2014 USD, cumulative increase*

Data presented in Figure 6 clearly show that China is an outlier in a positive sense of the word. Labor productivity in China has grown fourfold during the 25 years that are covered by available data. This development is substantially different from the other countries in the sample because labor productivity growth in China is by far the largest out of the countries included. Ethiopia and Indonesia recorded large increases in labor productivity as well. On the other hand, labor productivity in Mexico and Kenya did not change significantly during the period covered by available data. Remaining countries in the sample follow a trajectory of stable labor productivity increase in the period of 1990 – 2014.

Figure 7 showcases data for net current account balance as a percentage of GDP. China experiences positive current account balance for the entire period with the exception of 1993. Particularly worrying trend can be observed in Kenya and Tanzania since 2004 where current account balance steadily declines to more than 10% of GDP in 2014.




Source: Databases - (The World Bank Group, 2015), (The Conference Board, 2015), own calculations

*Figure 7- Current Account, Total, Net, % of GDP*

China experienced its largest current account surplus in 2007 and it started to decline since then. Years 2013 and 2014 are more balanced in comparison with the turbulent period between 1990 and 2014. All countries except Kenya and Tanzania recorded net current account balance between -4% of GDP and 4% of GDP in 2014.

## 2.2 Export data

Data on merchandise trade were downloaded from The Database of the World Trade Organization (WTO). Data are categorized into product groups which are defined according to the Revision 3 of the Standard International Trade Classification (SITC). (World Trade Organization, 2016) Fundamental classification includes primary products

and manufactures. Elementary categories are then split into detailed subcategories. WTO provides data for several subcategories but not for all of them. Data are available for products listed in Table 1. The classification suggests that the sum of agricultural products, fuels and mining products and manufactures should be equal to total merchandise exports. This equation does not hold and the actual numbers slightly differ due to unspecified products. (World Trade Organization, 2016)

*Table 1 - WTO Merchandise trade by commodity, classification*

**1. Primary products**
- **1.1 Agricultural products**
  - **1.1.1 Food**
- **2.1 Fuels and mining products**
  - **2.1.1 Fuels**

**2. Manufactures**
- **2.1. Iron and steel**
- **2.2. Chemicals**
  - 2.2.1. Pharmaceuticals
- **2.3. Machinery and transport equipment**
  - 2.3.1. Office and telecom equipment
    - *2.3.1.1. Electronic data processing and office equipment*
    - *2.3.1.2. Telecommunications equipment*
    - *2.3.1.3. Integrated circuits and electronic components*
  - 2.3.2. Transport equipment
    - *2.3.2.1. Automotive products*
- **2.4. Textiles**
- **2.5. Clothing**

Source: (World Trade Organization, 2016)

Development of different categories of exports from China is presented in Figure 8 (Primary products) and Figure 9 (Manufactures). Rapid growth of exports is evident in the period after the year 2001 when China became member of the WTO. Value of agricultural products and fuel and mining products exported from China in 2014 amounted to 74.47 billion US dollars and 63.70 US dollars, respectively. Exports of food declined only slightly after the Great recession in 2008. On the contrary, exports of fuel declined considerably in the same period and surpassed the pre-recession peak only in 2014. However, fuel and mining exports and agricultural exports do not constitute the majority of Chinese exports. The major category is represented by manufactures with exports worth 2.2 trillion US dollars in 2014. Subcategory of Machinery and transport equipment was the second most valuable with products worth 1.07 trillion US dollars exported in 2014. The most dominant type of this machinery is office and telecom

equipment, the third largest subcategory when measured by the value of exports in 2014. (World Trade Organization, 2016)

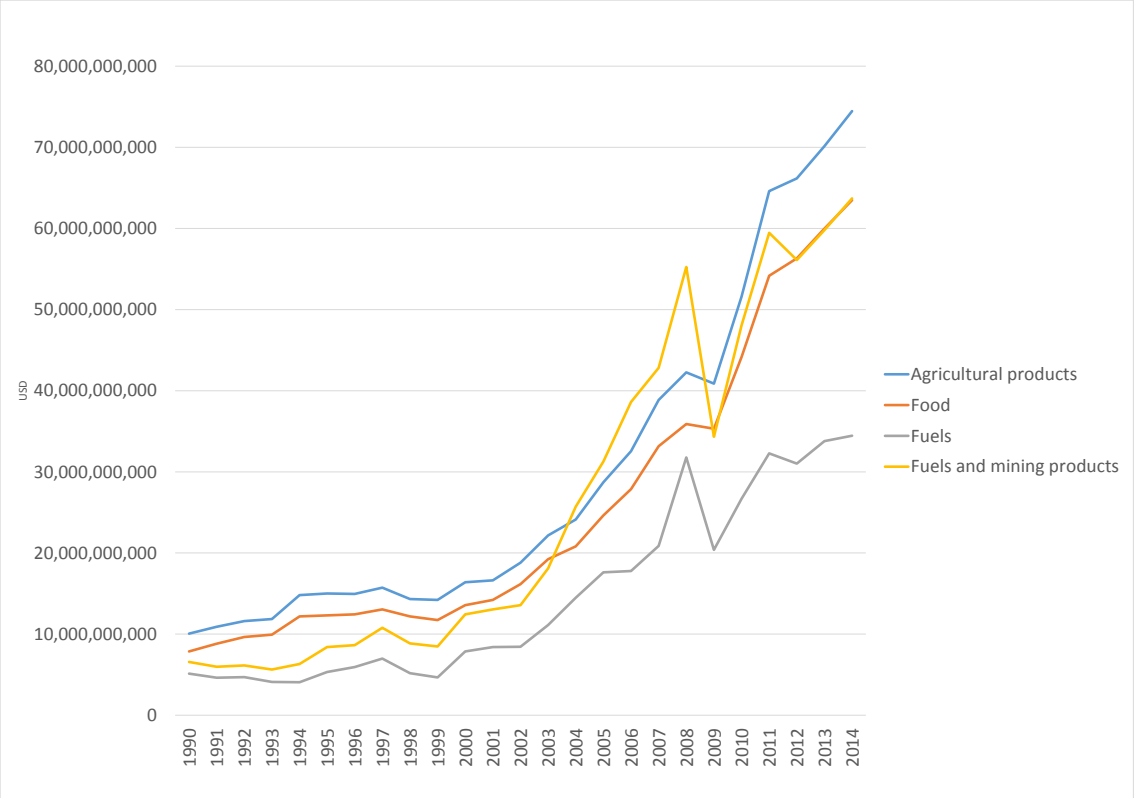



*Figure 8- Export of Primary products, China*

*Source: (World Trade Organization, 2016)*

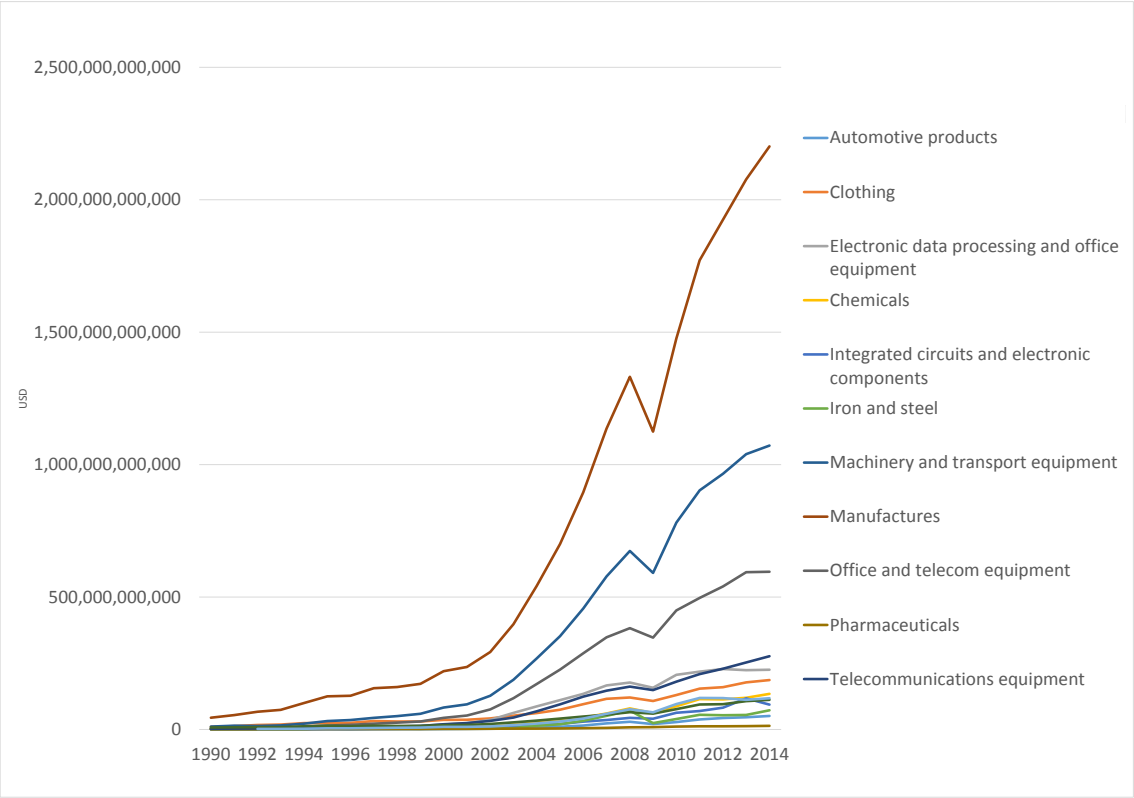



*Figure 9- Export of Manufactures, China*

*Source:* (World Trade Organization, 2016)

## 2.3 Implications for competitiveness

Review of data presented in the previous chapter suggests several key trends. Firstly, increases in labor productivity in China are noticeably higher than in other countries when adjusted for changes in the nominal exchange rate. Nominal ULCs adjusted for changes in the exchange rate increased in China especially between 2004 and 2014. Cumulative growth of ULCs adjusted for changes in the exchange rate in China was the 3rd largest among the countries in the sample. At the same time, China underwent gradual real exchange rate appreciation especially between 2006 and 2014. Other countries experienced more favorable development of these variables in terms of competitiveness. Ethiopia did not undergo an increase in ULCs adjusted for changes in the exchange rate. At the same it experienced a significant real exchange rate depreciation which favorably influences competitiveness as well. However, Ethiopia experienced only a modest increase in labor productivity. Indonesia too experienced a positive development of variables that influence competitiveness. Nominal ULCs adjusted for changes in the exchange rate started to decline after 2010. Similarly, real exchange rate started to depreciate since then. Labor productivity in Indonesia steadily increased over the period

between 1990 and 2014. Albeit not being as high as in China, the increases in labor productivity in Indonesia were the 3rd highest among the countries included in the sample. Thirdly, there is Tanzania. This country experienced relatively low cumulative increase of ULCs adjusted for changes in the nominal exchange rate. Real exchange rate did appreciate recently but growth of labor productivity kept on increasing between 1990 and 2004. Cumulative increase of labor productivity per person was the 4th largest among the countries in the sample. It is important to note that most variables are presented as cumulative percentage changes. Therefore, we mostly observe relative development of the specific variable. Initial level of the variable which significantly influences the competitiveness of a country in the long term is not accounted for.

## 2.4 Export sensitivity

This thesis uses an econometric model to test whether different categories of export in different countries are significantly influenced by changes in the variables described in the previous chapter. Original data are transformed in order to obtain stationary data. Data for each variable except real exchange rate index and growth rates of labor quality are transformed to yearly relative percentage changes as is presented in equation (10). Growth of labor quality represents one of the contributors that together form an aggregate GDP growth. (Vries & Erumban, 2015, p. 13) Therefore it represents a component of a time series that is already stationary. Data for real exchange rate index and growth rates of labor quality already present yearly changes and do not need to be transformed as is presented in equation 10.

$$\%\Delta X_{(t-1,t)} = \frac{X_{(t)} - X_{(t-1)}}{X_{(t-1)}} \qquad (10)$$

Where

$X_{(t)}$ = value of each variable in the year t

$X_{(t-1)}$ = value of each variable in the year t-1

$\%\Delta X_{(t-1,t)}$ = percentage change of each variable between the year t and t-1

Dependent variable of the model is yearly percentage change of each category of export in each country. Independent variables are percentage changes of nominal unit labor costs in domestic currency, nominal exchange rate and labor productivity. Changes in the real exchange rate index and growth of labor quality are included as well. Two

dummy variables are included in order to account for 2 sudden changes in labor quality growth rate data in 2001 and 2011 due to the methodology used in construction of this data set. (Vries & Erumban, 2015, p. 20). $LQdummy01\_14$ is set to 0 in the years 1991-2000 and 1 in the years 2001-2014. $LQdummy11\_14$ is set to 0 in the years 1991-2010 and 1 in the years 2011-2014.

$$\begin{aligned}\Delta EXP = \beta_0 &+ \beta_1 * \Delta ULClocal + \beta_2 * \Delta NominalFX + \beta_3 * \Delta RealFX \\ &+ \beta_4 * \Delta LaborQuality + \beta_5 * \Delta LaborProductivity \\ &+ \beta_6 * LQdummy01\_14 + \beta_7 * LQdummy11\_14\end{aligned} \quad (11)$$

Where

$\beta_0$ = constant

$\Delta EXP$ = yearly percentage change of each category of export

$\Delta ULClocal$ = yearly percentage change of nominal unit labor cost in local currency

$\Delta NominalFX$ = yearly percentage change of nominal exchange rate

$\Delta RealFX$ = yearly changes of real exchange rate index

$\Delta LaborQuality$ = growth rates of labor quality

$\Delta LaborProductivity$ = yearly percentage change of labor productivity

$LQdummy01\_14$ = dummy variable, 2001-2014

$LQdummy11\_14$ = dummy variable, 2011-2014

Method of ordinary least squares is applied in order to test whether individual parameters ($\beta_0$ to $\beta_7$) significantly differ from 0. We can therefore formulate the null hypothesis $H_0$ and the alternative hypothesis $H_1$ for each of the parameters from $\beta_0$ to $\beta_7$.

$$H_0: \beta_j = 0$$

$$H_1: \beta_j \neq 0$$

I have tested the regression for 7 categories of exports. They are direct subcategories of 2 main categories which are Primary products and Manufactures. Therefore, I have included Agricultural products, Fuels and mining products, Iron and steel, Chemicals, Machinery and transport equipment, Textiles and Clothing. Unfortunately, export data

are interrupted in some cases and cannot be used for the calculation. In case of Ethiopia and Tanzania, complete data are not available for all categories of export. These restrictions reduce the number of estimated equations to the total of 54. Data availability is summarized in the Table 2.

*Table 2- Export data availability*

| | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
|---|---|---|---|---|---|---|---|
| **Bangladesh** | data available | data available | n/a | data available | n/a | data available | data available |
| **Dominican Republic** | data available | data available | data available | data available | data available | n/a | data available |
| **Ethiopia** | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| **China** | data available | data available | data available | data available | data available | data available | data available |
| **Indonesia** | data available | data available | data available | data available | data available | data available | data available |
| **Kenya** | data available | data available | data available | data available | data available | n/a | data available |
| **Mexico** | data available | data available | data available | data available | data available | data available | data available |
| **Peru** | data available | data available | data available | data available | data available | data available | data available |
| **Philippines** | data available | data available | data available | data available | data available | data available | data available |
| **Sri Lanka** | data available | n/a | n/a | n/a | n/a | n/a | data available |
| **Tanzania** | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

Source: (World Trade Organization, 2016), own adaptation

## 2.4.1Bangladesh

*Table 3- Summary of the results - Bangladesh*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | -15.042 *** | -16.267 | | -35.352 ** | | -7.625 | -4.075 |
| | (5.120) | (14.219) | | (14.897) | | (8.380) | (2.723) |
| ULClocal | 15.645 *** | 19.249 | | 34.726 ** | | 7.364 | 6.613 ** |
| | (4.701) | (13.057) | | (13.679) | | (7.695) | (2.501) |
| NominalFX | -15.002 *** | -18.893 | | -40.480 ** | | -7.118 | -3.844 |
| | (5.088) | (14.132) | | (14.805) | | (8.329) | (2.707) |
| RealFX | 13.989 ** | 16.358 | | 35.652 ** | | 7.588 | 3.864 |
| | (4.790) | (13.303) | | (13.936) | | (7.840) | (2.548) |
| LaborQuality | 3.817 | -4.741 | | -4.303 | | -2.705 | 1.520 |
| | (4.148) | (11.522) | | (12.070) | | (6.791) | (2.207) |
| LaborProductivity | 2.332 | 8.146 | | -1.586 | | 11.210 | -2.289 |
| | (4.975) | (13.819) | | (14.477) | | (8.144) | (2.646) |
| LQdummy01_14 | 0.148 | 0.296 | | -0.306 | | 0.127 | -0.102 |
| | (0.120) | (0.334) | | (0.350) | | (0.197) | (0.064) |
| LQdummy11_14 | -0.675 | 0.613 | | 1.089 | | 0.464 | -0.276 |
| | (0.753) | (2.092) | | (2.192) | | (1.233) | (0.401) |
| Observations | 24 | 24 | | 24 | | 24 | 24 |
| R-squared | 0.49 | 0.32 | | 0.41 | | 0.28 | 0.54 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 3 presents parameter estimates for Bangladesh with standard errors in parentheses. Analysis of exports of Bangladesh spans 24 years between 1991 and 2014. All data are available for agricultural products, fuels and mining products, chemicals,

textiles and clothing. Neither of the parameters is statistically significant at any conventional significance level in case of the fuels and mining products and yearly changes in exports of this category do not seem to respond strongly to the yearly changes of independent variables. Growth of exports of agricultural products and chemicals is positively associated with growth of unit labor costs in local currency. Moreover, changes in exports of chemicals and agricultural products are positively associated with the appreciation of the local currency. Both of these results are the opposite of what is expected. However, positive increases of real exchange rate index are associated with increased exports of both agricultural products and chemicals and the parameters are statistically significant at the 5% level. Increased values of real exchange rate index defined in equation (2) represent increases in competitiveness of exports in the international markets. Resulting parameter estimates of the variable real exchange rate index are positive as expected by the theory. Parameters are statistically significant at the 5% level for 2 dependent variables – agricultural exports and chemicals. Interestingly, parameter estimates of real exchange rate index have positive values for all dependent variables, even though the parameters are not statistically significant even at the 10% level. Finally, it is worth noting that parameter estimates for variable labor productivity are positive for exports of textiles but the parameter is not statistically significant at the 10% level (p-value of 0.188). Coefficient of determination is 0.49 in case of agricultural products, 0.41 in case of chemicals and 0.54 in case of clothing.

## 2.4.2Dominican Republic

*Table 4- Summary of the results – Dominican Republic*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 0.210 | 67.997 | -1.012 | 11.022 | -0.999 | | 2.326 |
| | (2.280) | (53.187) | (10.883) | (7.934) | (2.619) | | (1.824) |
| ULClocal | -0.514 | -58.433 | 3.558 | -9.713 | 1.710 | | -1.903 |
| | (2.129) | (49.661) | (10.161) | (7.408) | (2.446) | | (1.703) |
| NominalFX | -0.184 | 38.077 | -0.226 | 6.925 | -0.489 | | 1.293 |
| | (1.307) | (30.479) | (6.236) | (4.547) | (1.501) | | (1.045) |
| RealFX | 0.065 | -64.886 | 0.889 | -10.888 | 0.974 | | -2.065 |
| | (2.251) | (52.511) | (10.744) | (7.833) | (2.586) | | (1.801) |
| LaborQuality | -0.249 | 2.949 | 0.089 | 1.050 | 0.117 | | -0.156 |
| | (0.506) | (11.794) | (2.413) | (1.759) | (0.581) | | (0.404) |
| LaborProductivity | -1.055 | -26.620 | -1.459 | -3.301 | 1.842 | | -1.131 |
| | (2.345) | (54.702) | (11.193) | (8.160) | (2.694) | | (1.876) |
| LQdummy01_14 | 0.042 | -1.244 | -0.120 | -0.055 | -0.195 | | -0.233 * |
| | (0.145) | (3.377) | (0.691) | (0.504) | (0.166) | | (0.116) |
| LQdummy11_14 | -0.001 | -0.718 | 0.628 | -0.069 | 0.220 | | 0.268 ** |
| | (0.143) | (3.336) | (0.683) | (0.498) | (0.164) | | (0.114) |
| Observations | 22 | 22 | 22 | 22 | 22 | | 22 |
| R-squared | 0.10 | 0.18 | 0.14 | 0.20 | 0.22 | | 0.52 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 4 presents parameter estimates for Dominican Republic with standard errors in parentheses. Analysis of exports of Dominican Republic spans 22 years between 1993 and 2014. Data are not available only for export of textiles. Parameters are statistically significant only for export of clothing. They are the 2 dummy variables included to capture the effect of sudden changes in labor quality growth data. The remaining parameters are not statistically significant even at the 10% level. Surprisingly, parameter estimates for variable labor productivity are mostly negative. Coefficient of determination is 0.52 in case of clothing but between 0.1 and 0.22 for all other categories. This shows that the model does not capture the dynamic of exports of Dominican Republic.

## 2.4.3China

*Table 5- Summary of the results - China*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | -0.529 | -0.146 | 2.993 | 1.270 | -0.672 | -0.397 | -0.689 |
| | (0.789) | (2.244) | (7.051) | (1.660) | (1.683) | (1.210) | (0.965) |
| ULClocal | -0.012 | 0.027 | 1.008 | -0.072 | 0.558 | -0.057 | -0.421 |
| | (0.612) | (1.740) | (5.468) | (1.287) | (1.305) | (0.938) | (0.748) |
| NominalFX | 0.254 | 0.333 | 2.002 | 1.175 | -0.012 | 0.506 | -0.319 |
| | (0.609) | (1.732) | (5.442) | (1.281) | (1.299) | (0.934) | (0.745) |
| RealFX | 0.270 | -0.611 | -3.782 | -1.492 | 0.500 | 0.116 | 1.076 |
| | (0.730) | (2.075) | (6.521) | (1.535) | (1.556) | (1.119) | (0.892) |
| LaborQuality | 0.576 | 2.102 | 1.732 | 0.657 | 0.869 | 0.724 | -1.214 |
| | (0.632) | (1.797) | (5.646) | (1.329) | (1.347) | (0.969) | (0.772) |
| LaborProductivity | 2.077 ** | 3.012 | 6.912 | 1.966 | 1.395 | 2.164 * | 3.597 *** |
| | (0.728) | (2.071) | (6.509) | (1.532) | (1.554) | (1.117) | (0.891) |
| LQdummy01_14 | 0.041 | -0.007 | 0.072 | 0.083 | 0.048 | 0.059 | -0.108 |
| | (0.054) | (0.152) | (0.479) | (0.113) | (0.114) | (0.082) | (0.066) |
| LQdummy11_14 | 0.116 | 0.213 | 0.089 | 0.007 | -0.061 | 0.086 | 0.012 |
| | (0.083) | (0.235) | (0.738) | (0.174) | (0.176) | (0.127) | (0.101) |
| Observations | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| R-squared | 0.57 | 0.25 | 0.24 | 0.39 | 0.30 | 0.44 | 0.62 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 5 presents parameter estimates for China with standard errors in parentheses. Analysis of exports of China spans 24 years between 1991 and 2014. Required data are available for all 7 categories of exports. Parameters for variable labor productivity are statistically significant at the 1% level for exports of clothing, at the 5% level for exports

of agricultural products and at the 10% level for exports of textiles. Sign of this parameter estimate is positive for all categories of export. Increases in labor productivity are associated with increases in exports. Other parameters are not statistically significant even at the 10% level. Parameter estimates for labor quality growth rate are positive in all but one case and faster growth of labor quality is associated with increased exports. Parameter estimates for changes in nominal foreign exchange rate are positive for all categories of exports except machinery and transport equipment and clothing. In such cases, nominal depreciation positively influences exports. Parameter estimates for changes in unit labor costs are positive in case of fuels and mining products, iron and steel and machinery and transport. This is contrary to the assumption that decreasing nominal unit labor costs should positively influence exports. In the remaining categories of exports parameter estimates are negative. However, none of them are statistically significant even at the 10% level. Coefficient of determination is 0.57 in case of agricultural products, 0.44 in case of textiles and 0.62 in case of clothing.

## 2.4.4Indonesia

*Table 6- Summary of the results - Indonesia*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 2.907 | 3.178 | 3.582 | 3.034 | 7.259 * | 2.920 | 0.701 |
| | (2.610) | (2.232) | (3.936) | (2.706) | (3.972) | (2.912) | (2.351) |
| ULClocal | -1.963 | -3.455 * | -1.913 | -2.346 | -6.969 * | -1.714 | 0.256 |
| | (2.309) | (1.975) | (3.483) | (2.395) | (3.514) | (2.577) | (2.081) |
| NominalFX | 1.818 | 2.522 * | 3.707 | 2.419 | 4.672 * | 1.818 | 0.571 |
| | (1.587) | (1.357) | (2.393) | (1.645) | (2.415) | (1.770) | (1.429) |
| RealFX | -2.663 | -3.687 * | -4.490 | -3.358 | -6.307 * | -2.754 | -1.164 |
| | (2.205) | (1.886) | (3.326) | (2.287) | (3.356) | (2.461) | (1.987) |
| LaborQuality | -0.473 | 2.145 | 1.606 | 1.344 | -0.601 | -0.102 | 1.433 |
| | (1.859) | (1.589) | (2.803) | (1.927) | (2.829) | (2.074) | (1.675) |
| LaborProductivity | 1.480 | 0.930 | 8.363 ** | 3.186 | 2.064 | 1.124 | 1.931 |
| | (2.578) | (2.205) | (3.888) | (2.673) | (3.924) | (2.877) | (2.323) |
| LQdummy01_14 | 0.057 | -0.030 | 0.181 | -0.121 | -0.561 *** | -0.161 | -0.115 |
| | (0.098) | (0.084) | (0.148) | (0.102) | (0.150) | (0.110) | (0.089) |
| LQdummy11_14 | -0.096 | -0.015 | -0.150 | 0.016 | -0.009 | 0.066 | 0.058 |
| | (0.115) | (0.098) | (0.173) | (0.119) | (0.174) | (0.128) | (0.103) |
| Observations | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| R-squared | 0.29 | 0.55 | 0.51 | 0.29 | 0.59 | 0.23 | 0.40 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 6 presents parameter estimates for Indonesia with standard errors in parentheses. Analysis of exports of Indonesia spans 24 years between 1991 and 2014.

Required data are available for all categories of exports. Parameter estimates for variable unit labor costs are negative (expected by the theory) for all export categories except for clothing. However, parameters are statistically significant only at the 10% level for exports of fuels and mining products and machinery and transport equipment. Parameter estimates for nominal exchange rate are positive in all cases as is expected by the theory. Depreciation of the nominal exchange rate increases competitiveness of exports. Parameters are statistically significant at the 10% level for exports of fuels and mining products and Machinery and transport equipment. On the other hand, parameter estimates for real exchange rate index are negative for all categories of export and parameters are statistically significant at the 5% level for fuels and mining products and machinery and transport equipment. Parameter estimates for labor productivity are positive for all categories of exports. Labor productivity growth is positively associated with the growth of export. Parameters are statistically significant at the 5% level for iron and steel exports. Coefficient of determination is 0.55 in case of fuels and mining products, 0.51 in case of iron and steel and 0.59 in case of machinery and transport equipment.

## 2.4.5Kenya

*Table 7- Summary of the results - Kenya*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 1.819 ** | 0.768 | 1.644 | 6.898 | -8.672 | | 12.652 |
| | (0.669) | (3.567) | (2.885) | (5.579) | (8.416) | | (27.371) |
| ULClocal | -0.438 | -2.923 | 1.022 | -1.680 | 4.554 | | -3.400 |
| | (0.496) | (2.645) | (2.139) | (4.137) | (6.240) | | (20.296) |
| NominalFX | 0.924 * | 0.306 | 0.792 | 3.575 | -7.726 | | 6.950 |
| | (0.493) | (2.629) | (2.126) | (4.111) | (6.202) | | (20.171) |
| RealFX | -1.497 ** | 0.497 | -0.474 | -6.729 | 10.487 | | -12.026 |
| | (0.678) | (3.613) | (2.922) | (5.649) | (8.523) | | (27.718) |
| LaborQuality | -2.926 * | -10.568 | -13.724 * | -1.839 | -19.198 | | -1.086 |
| | (1.649) | (8.792) | (7.110) | (13.748) | (20.741) | | (67.456) |
| LaborProductivity | 1.096 | -8.887 * | 1.641 | 3.445 | -12.893 | | 34.103 |
| | (0.873) | (4.652) | (3.762) | (7.274) | (10.974) | | (35.690) |
| LQdummy01_14 | -0.109 | -0.077 | -0.265 | -0.027 | 0.456 | | -0.127 |
| | (0.071) | (0.380) | (0.307) | (0.594) | (0.897) | | (2.917) |
| LQdummy11_14 | 0.409 | 2.161 | 2.024 | 0.083 | 2.489 | | -1.211 |
| | (0.272) | (1.450) | (1.172) | (2.267) | (3.420) | | (11.122) |
| Observations | 24 | 24 | 24 | 24 | 24 | | 24 |
| R-squared | 0.65 | 0.42 | 0.53 | 0.28 | 0.27 | | 0.13 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 7 presents parameter estimates for Kenya with standard errors in parentheses. Analysis of exports of Kenya spans 24 years between 1991 and 2014. Required data are

available for all categories of exports except for textiles. Parameter estimates for variable unit labor costs are negative (expected by the theory) for all export categories except for machinery and transport equipment and iron and steel. However, parameters are not statistically significant even at the 10% level. Parameter estimates for nominal exchange rate are positive (expected by the theory) for all export categories except for machinery and transport equipment. However, parameters are statistically significant at the 10% level only for export of agricultural products. Parameter estimates for real exchange rate index are negative in all but one case (contrary to the theory). Parameter is significant at the 5% level only for export of agricultural products. Parameter estimates for growth of labor quality are negative in all cases and parameters are statistically significant at the 10% level for exports of agricultural products and iron and steel. Parameter estimates for labor productivity are negative for fuels and mining products and machinery and transport equipment and positive for the remaining categories of export. Parameter is statistically significant at the 10% level only for fuels and mining products. Coefficient of determination is 0.65 in case of agricultural products, 0.42 in case of fuels and mining products and 0.53 in case of iron and steel.

## 2.4.6Mexico

*Table 8- Summary of the results - Mexico*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 0.303 | 0.604 | 1.485 | 0.356 | 0.968 | 1.390 ** | 1.652 ** |
| | (0.488) | (1.466) | (2.025) | (0.582) | (0.611) | (0.542) | (0.628) |
| ULClocal | -0.893 ** | -1.777 | -2.251 | -1.069 ** | -1.013 ** | -0.856 ** | -0.308 |
| | (0.358) | (1.075) | (1.486) | (0.427) | (0.449) | (0.398) | (0.461) |
| NominalFX | 0.348 | 1.299 | 1.672 | 0.537 | 0.512 | 1.167 *** | 0.839 * |
| | (0.315) | (0.946) | (1.307) | (0.376) | (0.395) | (0.350) | (0.405) |
| RealFX | -0.015 | -1.714 | -0.989 | -0.295 | -0.936 | -1.622 *** | -0.955 |
| | (0.482) | (1.448) | (2.000) | (0.575) | (0.604) | (0.536) | (0.620) |
| LaborQuality | -0.211 | 2.581 | -0.532 | 0.255 | 0.510 | 0.665 | -0.976 |
| | (0.569) | (1.709) | (2.361) | (0.678) | (0.713) | (0.632) | (0.732) |
| LaborProductivity | 0.378 | 2.557 | -2.013 | 0.655 | -1.216 | -0.718 | -0.523 |
| | (1.209) | (3.631) | (5.017) | (1.441) | (1.514) | (1.344) | (1.556) |
| LQdummy01_14 | -0.142 | 0.696 | -0.193 | -0.010 | -0.062 | 0.063 | -0.546 *** |
| | (0.138) | (0.415) | (0.574) | (0.165) | (0.173) | (0.154) | (0.178) |
| LQdummy11_14 | 0.050 | -0.555 * | 0.034 | -0.055 | -0.040 | 0.000 | 0.248 * |
| | (0.095) | (0.287) | (0.396) | (0.114) | (0.120) | (0.106) | (0.123) |
| Observations | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| R-squared | 0.57 | 0.36 | 0.45 | 0.49 | 0.51 | 0.67 | 0.85 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 8 presents parameter estimates for Mexico with standard errors in parentheses. Analysis of exports of Mexico spans 24 years between 1991 and 2014. Required data are available for all categories of export. Parameter estimates for variable unit labor costs are negative (expected by the theory) for all export categories. Parameter is statistically significant at the 5% level for exports of agricultural products, chemicals, machinery and transport equipment and textiles. Parameter estimates for nominal exchange rate are positive (expected by the theory) for all categories of export. Parameter is statistically significant at the 1% level in case of exports of textiles and at the 10% level in case of exports of clothing. Parameter estimates for real exchange rate index are negative in all cases (contrary to the theory) and parameter is statistically significant at the 1% level in case of exports of textiles. Parameter estimates for labor quality are positive for fuels and mining products, chemicals, machinery and transport equipment and textiles and negative for the remaining categories of exports. Parameters are not statistically significant at any conventional significance level. Coefficient of determination is 0.85 in case of clothing, 0.67 in case of textiles, 0.57 in case of agricultural products, 0.51 in case of machinery and transport equipment and 0.49 in case of chemicals.

## 2.4.7Peru

*Table 9- Summary of the results - Peru*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | -1.396 | 2.196 | -6.747 ** | 0.902 | 1.485 | 1.883 | -3.068 |
| | (1.271) | (1.927) | (3.029) | (1.295) | (2.634) | (1.134) | (1.795) |
| ULClocal | 0.634 | -0.746 | 2.074 | 0.425 | 0.897 | 0.420 | 0.925 |
| | (0.677) | (1.026) | (1.613) | (0.690) | (1.403) | (0.604) | (0.956) |
| NominalFX | -0.583 | 0.741 | -2.063 | -0.550 | -1.274 | -0.613 | -0.866 |
| | (0.759) | (1.151) | (1.808) | (0.773) | (1.573) | (0.677) | (1.072) |
| RealFX | 1.392 | -1.757 | 7.016 ** | -0.466 | -1.246 | -1.723 | 3.856 ** |
| | (1.173) | (1.778) | (2.795) | (1.195) | (2.431) | (1.046) | (1.656) |
| LaborQuality | 0.234 | -1.393 | -0.179 | -1.177 | 0.188 | -0.444 | -2.669 |
| | (1.853) | (2.810) | (4.417) | (1.888) | (3.841) | (1.653) | (2.618) |
| LaborProductivity | 5.423 *** | 2.618 | 7.684 ** | 3.325 ** | -5.905 * | 1.629 | 5.651 ** |
| | (1.399) | (2.121) | (3.334) | (1.425) | (2.900) | (1.248) | (1.976) |
| LQdummy01_14 | -0.138 | 0.336 | -0.203 | 0.185 | 0.007 | 0.033 | 0.393 |
| | (0.366) | (0.555) | (0.872) | (0.373) | (0.758) | (0.326) | (0.517) |
| LQdummy11_14 | -0.026 | -0.298 | -0.168 | -0.252 | -0.046 | 0.044 | -0.345 |
| | (0.175) | (0.266) | (0.418) | (0.179) | (0.363) | (0.156) | (0.248) |
| Observations | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| R-squared | 0.52 | 0.42 | 0.41 | 0.57 | 0.29 | 0.68 | 0.46 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 9 presents parameter estimates for Peru with standard errors in parentheses. Analysis of exports of Peru spans 24 years between 1991 and 2014. Required data are available for all categories of export. Parameter estimates for variable unit labor costs are positive (contrary to the theory) for all export categories except for fuels and mining products. However, neither of the parameters is statistically significant at any conventional significance level. Parameter estimates for nominal exchange rate are negative (contrary to the theory) for all export categories except fuels and mining products. However, neither of the parameters is statistically significant at any conventional significance level. Parameter estimates for real exchange rate index are positive in case of agricultural products, iron and steel and clothing and negative for the remaining categories of exports. Parameters are statistically significant at the 5% level for exports of iron and steel and clothing. Parameter estimates for labor quality growth rate are positive in case of agricultural products, machinery and transport equipment and negative for all other categories of exports. None of the parameters is statistically significant at any conventional significance level. Parameter estimates for labor productivity growth are positive for all categories of exports (as expected by the theory) except for exports of machinery and transport equipment. Parameters are statistically significant at the 1% level for agricultural products, at the 5% level for iron and steel, chemicals and clothing and at the 10% level for machinery and transport equipment. In most cases, growth of labor productivity is positively associated with growth of exports. Coefficient of determination is 0.52 in case of agricultural products, 0.57 in case of chemicals, 0.46 in case of clothing and 0.41 in case of iron and steel.

## 2.4.8Philippines

*Table 10- Summary of the results - Philippines*

| | Dependent variables | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 0.926 | 5.631 | -14.025 | 5.717 * | 0.886 | 3.966 | 4.099 ** |
| | (2.725) | (4.257) | (10.735) | (2.858) | (2.688) | (3.243) | (1.713) |
| ULClocal | -0.548 | -2.848 | 9.302 * | -2.232 * | -0.087 | -1.438 | -1.469 * |
| | (1.197) | (1.869) | (4.714) | (1.255) | (1.181) | (1.424) | (0.752) |
| NominalFX | 0.539 | 2.928 | -13.986 | 4.572 * | 0.131 | 2.438 | 3.294 ** |
| | (2.354) | (3.677) | (9.273) | (2.469) | (2.322) | (2.801) | (1.480) |
| RealFX | -0.881 | -4.864 | 14.332 | -5.585 * | -0.548 | -3.413 | -3.745 ** |
| | (2.596) | (4.056) | (10.229) | (2.723) | (2.562) | (3.090) | (1.632) |
| LaborQuality | -0.030 | -2.207 | -0.874 | -0.635 | -0.138 | -1.583 | -1.315 * |
| | (1.060) | (1.656) | (4.176) | (1.112) | (1.046) | (1.261) | (0.666) |
| LaborProductivity | 0.559 | 4.445 ** | 4.005 | 2.863 ** | 1.242 | 1.711 | 2.601 *** |
| | (1.133) | (1.770) | (4.463) | (1.188) | (1.118) | (1.348) | (0.712) |
| LQdummy01_14 | 0.054 | 0.762 | 0.449 | 0.386 | -0.248 | 0.379 | 0.399 |
| | (0.377) | (0.590) | (1.487) | (0.396) | (0.372) | (0.449) | (0.237) |
| LQdummy11_14 | 0.035 | -0.781 | -0.714 | -0.357 | -0.106 | -0.343 | -0.406 * |
| | (0.334) | (0.522) | (1.315) | (0.350) | (0.329) | (0.397) | (0.210) |
| Observations | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| R-squared | 0.18 | 0.55 | 0.44 | 0.49 | 0.60 | 0.37 | 0.52 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 10 presents parameter estimates for Philippines with standard errors in parentheses. Analysis of exports of Philippines spans 24 years between 1991 and 2014. Required data are available for all categories of export. Parameter estimates for unit labor costs are negative (as expected by the theory) for all categories of exports except iron and steel. Parameters are statistically significant at the 10% level in case of iron and steel, chemicals and clothing. Parameter estimates for nominal exchange rate are positive (as expected by the theory) for all categories of export except iron and steel. Parameters are statistically significant at the 10% level for exports of chemicals and at the 5% level for clothing. Parameter estimates for real exchange rate index are negative (contrary to the theory) for all categories of exports. Parameters are statistically significant at the 10% level for exports of chemicals and at the 5% level for clothing. Parameter estimates for growth of labor quality are negative for all categories of exports (contrary to the theory). However, parameter is only significant at the 10% level for one category of export (clothing). Parameter estimates for growth of labor productivity are positive for all categories of exports. Parameter estimates are statistically significant at the 5% level for fuels and mining products and chemicals and at the 1% level for exports of clothing. Growing labor productivity is positively associated with growing exports. Coefficient of

determination is 0.55 in case of fuels and mining products, 0.52 in case of clothing, 0,49 in case of chemicals and 0.44 in case of iron and steel.

### 2.4.9Sri Lanka

*Table 11 - Summary of the results - Sri Lanka*

| | **Dependent variables** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Independent variables** | Agricultural products | Fuels and mining products | Iron and steel | Chemicals | Machinery and transport equipment | Textiles | Clothing |
| const | 2.379 | | | | | | 1.866 |
| | (1.499) | | | | | | (1.580) |
| ULClocal | -0.912 | | | | | | -0.929 |
| | (0.884) | | | | | | (0.932) |
| NominalFX | 0.661 | | | | | | 0.207 |
| | (1.253) | | | | | | (1.320) |
| RealFX | -2.216 | | | | | | -1.445 |
| | (1.409) | | | | | | (1.485) |
| LaborQuality | -0.345 | | | | | | -1.215 |
| | (1.511) | | | | | | (1.592) |
| LaborProductivity | -0.364 | | | | | | 1.237 |
| | (0.911) | | | | | | (0.960) |
| LQdummy01_14 | 0.041 | | | | | | -0.070 |
| | (0.145) | | | | | | (0.153) |
| LQdummy11_14 | -0.009 | | | | | | 0.033 |
| | (0.065) | | | | | | (0.069) |
| Observations | 24 | | | | | | 24 |
| R-squared | 0.44 | | | | | | 0.56 |

* - parameter is statistically significant at the 10% level, ** - parameter is statistically significant at the 5% level, *** - parameter is statistically significant at the 1% level

Source: Own calculations

Table 11 presents parameter estimates for Sri Lanka with standard errors in parentheses. Analysis of exports of Sri Lanka spans 24 years between 1991 and 2014. Unfortunately, complete data are available only for 2 categories of exports (agricultural products and clothing). No parameters are statistically significant at any conventional significance level.

## 2.5 Summary of the results

Although majority of parameters are not statistically significant at any conventional significance level, several patterns do emerge from the model. Parameter estimates for changes of unit labor costs are mostly negative (34 negative and 20 positive). Out of statistically significant parameters (at least at 10% level) 8 are negative and 4 positive. It shows that in majority of cases decreasing unit labor costs are associated with increasing competitiveness and growing exports. Majority of parameter estimates for changes in nominal exchange rate are positive (36 positive and 18 negative). Out of statistically significant parameters (at least at 10% level) 7 are positive and 2 negative. The results

show that nominal depreciation is associated mostly with increased exports. Aforementioned results conform to the theory. Majority of parameter estimates of real exchange rate index are negative (36 negative and 18 positive). This is contrary to the theory. Quantitative increase in the value of real exchange rate index increases the competitiveness of a country's exports in the international market and parameter estimate is expected to be positive. Out of parameters statistically significant at least at 10% level 4 are positive and 6 negative. Parameter estimates of labor quality growth are mostly negative (32 negative and 22 positive) and only 3 of them are statistically significant at least at the 10% level. Increases and decreases of labor quality do not seem to be clearly associated with relative changes in exports. Lastly, parameter estimates for labor productivity growth are positive in majority of cases (39 positive and 15 negative). There are 13 parameters that are significant at least at the 10% level. 11 parameter estimates are positive and 2 are negative. Growth of labor productivity is positively associated with growth of exports.

Disintegration of above mentioned relations shows that influence of relative percentage changes of selected macroeconomic variables on export does exist. However, due to short timeframe, insufficient accuracy of the data and simplicity of the model the influence does not manifest itself more clearly. Moreover, parameters are estimated for broad aggregated categories of exports and numerous other influences distort the effect of particular variables. Additionally, approximations in the construction of the unit labor costs variable might be influencing the model and making the results less precise. Growth of labor productivity is strongly associated with growth of textiles export in China, Peru and Philippines. However, according to Figure 6 labor productivity growth in China significantly surpassed labor productivity growth in other countries from the sample. Nominal unit labor costs are positively associated with growth of exports in Bangladesh. This result contradicts the theory and according to the Figure 1, unit labor costs in Bangladesh did not rise significantly in the selected timeframe (1991-2014). On the other hand, decreases in unit labor costs are positively associated with the growth of exports in Mexico, Indonesia and mostly in Philippines. Interestingly relative growth of nominal unit labor costs in China is the lowest out of all countries in the sample. Increases in nominal exchange rate stand for depreciation. Depreciation is negatively associated with the exports of Bangladesh. This contradicts the theory that depreciation increases competitiveness of exports. This unexpected result may be connected with the fact that

currency of Bangladesh experienced only mild depreciation in comparison with other countries in the selected timeframe (1991-2014). This situation is highlighted in Figure 2. Opposite is true for Indonesia, Kenya, Mexico and Philippines where the result is what was originally expected and nominal depreciation is positively associated with the growth of export. This finding corresponds with the fact that Chinese currency did not depreciate significantly in the selected timeframe (1991-2014) in comparison with the other countries. In contrast, it started to appreciate between 2004 and 2014 (Figure 2) and the increase in nominal unit labor costs adjusted for changes in nominal exchange rate (Figure 3) were the third highest in China (after Kenya and Sri Lanka). Thus data confirms that a combination of increasing unit labor costs and appreciating currency negatively influenced exports during the studied timeframe. Results for real exchange rate are inconclusive. Statistically significant parameters with positive parameter estimates occurred in Bangladesh and Peru. This is the result expected by the theory. Increased value of the real exchange rate index improves competitiveness of exports in the international market. However, statistically significant parameters with negative parameter estimates are present in Indonesia, Kenya, Mexico and Philippines. China did undergo a significant real exchange rate appreciation between 2006 and 2014. However, other countries from the sample underwent a broadly similar real exchange rate appreciation. Results of the model suggest that relative yearly changes of the real exchange rate index do not seem to significantly influence yearly changes of exports. Parameters of labor quality growth are statistically significant in only 3 instances in case of 2 countries, Kenya and Philippines. Parameter estimates are negative in all 3 cases. Labor quality growth does not seem to be significantly influencing yearly changes in exports.

# Conclusion

This thesis examines the evolution of China's economy and the competitive position of its exports in the international market. Export-led growth was a significant factor behind China's economic success since the start of the liberalization efforts in the 1978. GDP growth was coupled with the rise of exports and China's presence in the international markets increased even more after its accession to The World Trade Organization in 2001. Growth of exports was facilitated by a favorable exchange rate policy. Fall of exports during the Great Recession of 2008 and 2009 followed by the fiscal and monetary stimulus unfolded at a time when China's transition from this export-led growth to consumption-led growth was already under way.

The extensive review of the literature in the first part of this thesis summarizes recent studies that focus on the influence of various macroeconomic variables on exports of a given country. Firstly, real exchange rate, nominal exchange rate and exchange rate dynamics and their effects on exports are studied. Increased exchange rate dynamic does not seem to negatively influence trade while the real exchange rate has the effects which are expected by the theory. Several cases of nominal and real depreciations and their effects on restored competitiveness are shown. Secondly, the thesis details increasing labor costs in China and how this phenomenon shapes Chinese economy. Rising production costs force industries to move from coastal regions deeper into the mainland. Wage development is also a factor that significantly influences FDI flows. Moreover, labor productivity, labor quality and their implications for exports are analyzed along with the data issues connected with these variables. Studies highlight how transfer pricing distorts data on productivity and vertical specialization distorts data on labor sophistication in different industries. Finally, foreign direct investments are identified as a common source of the increased export capacity of a developing country. Factors such as market size, labor costs and quality of infrastructure significantly influence the attractiveness of a given country for potential foreign investors.

Based on the literature review this study identifies variables that significantly influence export competitiveness of a given country. They are nominal unit labor costs, nominal and real exchange rate, growth of labor quality and growth of labor productivity. Data clearly show that nominal unit labor costs adjusted for the exchange rate have been

rising significantly in China especially between 2004 and 2014. This poses a clear threat to competitiveness of China when compared to other developing countries in the sample. Real exchange rate have appreciated significantly in China between 2006 and 2014. However, this development does not significantly differ from other countries in the sample. Similarly, growth rate of labor quality has been average in China and it does not create an advantage nor a disadvantage for the economy. Lastly, data suggest that China has experienced a significant growth of labor productivity since 1990. No other developing country from the sample has experienced a similar development.

Finally, the thesis uses an econometric model to test the relationships between the development of exports and selected macroeconomic variables across various industries of the Post China 16 countries. Limitations of the model are mainly unavailability of data for certain countries and certain categories of export which restrict the original scope of the model. Moreover, precision of the results is also influenced by the fact that the model uses yearly data which are less detailed. Additionally, in order to use more reliable and recent data the timeframe had to be reduced to the period of 1991-2014. Nevertheless, 54 regressions have been tested for 7 categories of exports.

The results show that selected macroeconomic variables indeed influence exports. Majority of parameter estimates conform to the theory in case of unit labor costs, nominal exchange rate and labor productivity. Increased labor costs have a negative effect on exports, depreciation of nominal exchange rate has a positive effect on exports and growing labor productivity has a positive effect on exports. Parameter estimates for changes of real exchange rate index are ambiguous and mostly negative. This result contradicts the theory. Quantitative increase of the real exchange rate index describes a depreciation of the real exchange rate and is expected to have positive effect on exports. Parameters for labor quality growth are mostly not statistically significant and we cannot draw any conclusion from them. Presented results confirm that a combination of rising labor costs and an appreciating currency which has been the case in China has negative effects on exports. However, labor productivity growth has a strong positive effect on exports. China has experienced an unprecedented labor productivity growth higher than any other country in the sample. Results across different sectors of the economy reveal that exports of clothing, agricultural products and chemicals are more dependent on the changes of the selected macroeconomic variables. This partly confirms the original idea presented by Stratfor Global Intelligence. They suggest that increased competition to

Chinese exports from other developing countries will initially manifest itself in exports of clothing and mobile phone assembly.

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