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The growth in China: a macro-economic analysis

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Domestic-demand-led-growth approach based on a BVAR analysis

Abstract

This paper studies the effect of the determinants of China's gross domestic product (GDP) and their contribution to the economic growth. The relationship between export and economic growth has attracted already some interest in macroeconomic research but tests on the domestic-demand-growth effect are very limited for China. Therefore, more specifically an in-depth analysis on China's domestic demand shocks with its short and long run effect will be provided in this study. The Bayesian Vector Auto Regression (BVAR) analysis with real quarterly time-series data within the period from 2000Q1 till 2016Q4 reveals that the fluctuations or changes in GDP are most effective when a positive shock of one standard deviation (S.D.) occurs in Government Spending and Consumption. The results of this paper show that all the elements of national income accounting contribute to the economic growth except for import which has a negative relationship with economic growth. In addition, a shock of one S.D. to export shows fluctuations of variation in GDP and a large contribution to GDP in the long run. Furthermore, domestic demand contributes the most to the output growth in China, especially in the short run. Unlike Tsen's (2010) study which declares that economic growth contributes to domestic demand and export, known as the Growth-Led-Export (GLE) and Growth-Led-Domestic-Demand (GLDD), little or no effect has been observed in this analysis. To conclude, household consumption as one of the main contributors to GDP is also an important factor for global economic stability and sustainable economic growth for China and where income is distributed more equally and there is less repression on wages.

1 Introduction

For almost four decades the Chinese economy has been experiencing a remarkable process of economic growth and social development. What once was a centrally controlled country is now a more market-oriented nation. China expanded its international trade thanks to their open-door strategy in 1978 as well as by entering the World Trade Organization (WTO) in 2001, which removed most barriers of trade with the West. This expansion caused tremendous changes for both China and the Global Economy. The importance of China on a global scale, in terms of GDP at market exchange rate is with 11. 8 trillion dollar the second largest economy of the world with the United States being the largest economy. Because it doesn't take the relative prices into account, it can be said that this result represents a misleading picture. Therefore, to give a more accurate view, the adjustment of Purchasing Power Parity (PPP) is required. Once applied, it looks like China takes over the United States and secures her leading position (Worldbank, 2016). At the same time, China becomes the largest exporter and the second largest importer (OEC, 2016).

As China's export became more important, quite some literature explored whether China's economic growth is due to its increase in exports. This effect is known as the export-led growth (ELG) hypothesis. The ELG Hypothesis proposes that an export growth leads to an increase in the output growth. Studies, such as Balassa (1978); Chao, Chou, & Yu (2001), examined the impact of the level of export share or export growth on the real output growth. These studies show that there is indeed a causal relationship between export and economic growth. But not all studies agree with this discovery. Shan & Sun (1998) researched the bi-directional causality between export and real industrial output. Different from the studies that are mentioned above, there is indeed a significant evidence of the impact of economic growth on export growth, but not the other way around. Liu, Song & Romilly (1997) and Giles & Williams (2000) obtained the same results. Depending on which methodology used in the research, the results vary enormously.

Although many contradictions have been found in this regard, depending on the research method used, there is limited research on how large the impact is of domestic demand on the Chinese growth. Wong Tsen (2010) Granger causality method have used time-series data on a yearly basis to investigate whether the Chinese economic growth is more dependent on an ELG or Domestic Demand Led Growth (DDLG) strategy. In this case there is no clear determination whether it is either export or domestic demand that is more important for long-term economic growth. But both export and domestic demand have a link with the Chinese output growth.
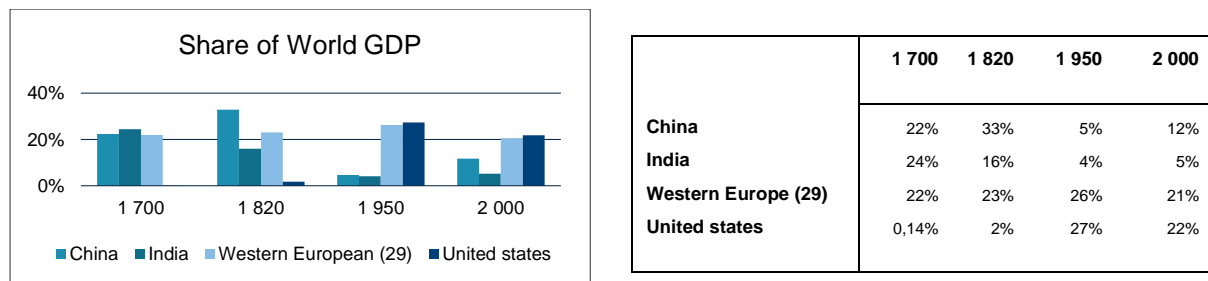
This paper will first clarify how China is moving their investment and export led-strategy to a more consumption driven strategy and why they do so. Also why household consumption is still low compared to other developed economies (DE) and less developed economies (LDE). In addition, the paper will research and focus in more depth on domestic demand and economic growth and whether it is an important contributor for the Chinese economic growth, based on a BVAR model using quarterly time-series for the period covering 2000Q1 to 2016Q4. The BVAR analysis is based on a deeper investigation on particular shock events. Furthermore, which part of the domestic demand is the one that boosts the Chinese growth and the one that will represent a stable economic growth? Finally, a BVAR method makes it possible to predict future growth patterns which will be researched for the economic growth and their contributors. These questions will be answered by inquire into the disposable data, available literature and agreements signed by the Chinese government and the Public Bank of China (PBC). The paper is structured into six sections. The next section provides an overview of the economic growth and the mean contributors of output growth over the past 16 years. This is followed by the Chinese authority's initiatives linked to theory from literature. In the fourth section the theory of DDLG will be discussed. In the fifth section the methodology used with the collected data will be discussed further. The analysis and its results will be reported in the sixth section and finally an overall conclusion of the results based on previous literature.

2   The economic growth model of China

Hundreds of year ago, China was, together with India, one of the biggest economies. In 1820 both countries together represented 50 percent of world's GDP (Figure 1. & table 1.). But then as we enter in the 19th century the industrial revolution took place. The most important technology was the steam engine which was used in the power factories. Because China got into wars (opium-wars) they didn't get into the industrial revolution as quickly as other countries and their GDP growth underwent a huge decline. Economists talk about the moment "the great divergence" took place. That was the moment when the western countries were gaining productivity and became superpowers and the eastern countries missed their opportunity (Parthasarathi, 2002).

In 1990 a mix of high-tech and low-wage shifted manufacturing from the developed (G7[1]) to developing nations. This shift caused a rebalancing act (great convergence[2]) which created opportunities for some developing countries to become wealthier (Thomas, 2018). From that point on China started increasing tremendously.

Figure 1. & table 1.   Historical statistics of world economy, 1-2003 AD, Source: Maddison.

	1 700	**1 820**	**1 950**	**2 000**
China	22%	33%	5%	12%
India	24%	16%	4%	5%
Western Europe (29)	22%	23%	26%	21%
United states	0,14%	2%	27%	22%

The last 16 years China had an annual average growth of 9.42 percent (GDP annual %) (Figure 3. & table 3.), the fastest growth of a nation in history (Worldbank, 2018). According to Reuters (2013) a 7.2 percent of GDP growth rate is necessary to create the 10 to 15 million new jobs China needs every year and to keep their unemployment rate low. But the growth rate started declining and in 2014 it reached its minimum growth rate objective for job creation.

For a very long period the GDP (Gross Domestic Product) was pushed by export and investments (Prasad, 2009; Pencea & Oehler-Sincai, 2015). Since China became a member of the WTO in 2001, her export expanded enormously for several years, till it reached its peak in 2006 by 37 percent (of GDP) (Table 3). From that moment export only decreased due to the economic crisis that caused a decline in output especially in developed (Western) countries. These countries were China's most important trading partners and since the recession their GDP underwent a declining trend which induces the share of their imports to narrow down (Wang, 2017). However after a long period of high output growth, in 2007 the Chinese economic growth underwent a huge slowdown which resulted in an annual decline of around 5 percent (Table 3).

After a closer look at the determinants of domestic demand, investment has grown rapidly in China with their main focus on infrastructure. However, unlike most countries, after the Asian financial crisis, China's investment to GDP ratio was still rising strongly. Shown in Table 3 and Figure 7, the share of gross capital formation in 2006 was around 40 percent of GDP compared to 2011 where this share reached historically high levels of almost 50 percent. While on the one hand the share of investment to

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[1] G7: The Group of Seven (G7) consists of Canada, France, Germany, Italy, Japan, UK and US. It is an informal bloc of industrialized democracies that meets annually to discuss issues such as global economic governance, international security, and energy policy. (Laub & McBride, 2017)

[2] Great convergence: the combination of rapid industrialization in the developing nations, due to a congregation of low wages and technological development, and simultaneous deindustrialization in the developed nations is the outcome of today's Great convergence (Baldwin, 2016).

GDP declined from 2014 to 2016 with 4 percent, on the other hand consumption increased with 5 percent in the same period. Over the last 16 years the share of household consumption in GDP has fallen from 46 percent in 2000 to 35 percent in 2007 but started increasing slightly the last several years (Table 3). Compared to the United States (US) where its final consumption in 2003 was around 86 percent of GDP, United Kingdom (UK) with 86.5 percent, Japan with 74.4 percent and even India with 75 percent of GDP, China's consumption share of GDP only consisted of 57.2 percent of GDP (Jiming, 2006). It is noted that from the moment the household share to GDP increased the last several years, at the same time investments and exports underwent a declining trend during that same period (Table 3). In addition, China's Net Export to GDP growth was -0,46 percent in 2016 that is, compared to -0,09 percent in 2015, a decline (CEIC data, 2017) (Figure 2. & Table 2.). Even if China had a large export volume, her imports are large as well and this results in a decrease of Net Exports the last couple of years. Therefore the impact of export on the economic growth isn't that remarkable. This decreasing trading surplus can be contributed to the growth in domestic demand over the last several years. When a country's net export consist of large trade surpluses, the higher the contribution of export will be on the economic growth and the smaller the contribution will be of domestic demand (C,I and G) (Mayer, 2016).

Shown in table 3 the total Chinese consumption is mainly driven by household consumption. Before starting on the actual analysis, figures (4, 6 and 8) already represent a short glimpse of the expected output growth trend. Moreover household consumption, government consumption, investments and export move in the same direction with output growth in China. When taking a closer look at the household consumption annual growth rate (Figure 6), the government consumption growth rate (Figure 4) and investments growth rate (Figure 8), it is noted that not all of these move in the same close direction as economic growth. Although all of these indicators move more or less in the same direction towards economic growth, household consumption shows the closest estimation and moves more or less in the same direction as economic growth. After household consumption, investments also represents a close estimation.

Because economic growth affects welfare and the quality of life of the people, it is a very important subject within economics. Furthermore, social development does create a positive impact on economic growth but not the other way around (Newman & Thomson, 1989). Therefore policy makers must distinguish the elements that could decide long-term economic growth and the short-term changes in the economic cycle. A country with sustained economic growth is recognized by a strengthened national force and is often a country where the population enjoys growing prosperity. Countries where long-term economic stagnation takes place or even negative economic growth is often fighting against poverty. Where Keynes theory focuses mainly on short-term economic growth, the long-term growth theory will mainly explain that economic growth leads to higher employment rates and income building (Li & Ning, 2013). This gives us a first indication why we want to investigate the growth habits of China as a country. This growth pattern is therefore not statistically significant and a broader angle should be applied in order to approach this hypothesis.

Figure 2. & table 2.   CA balance of trade as a percentage of GDP, Source: Knoema World Data

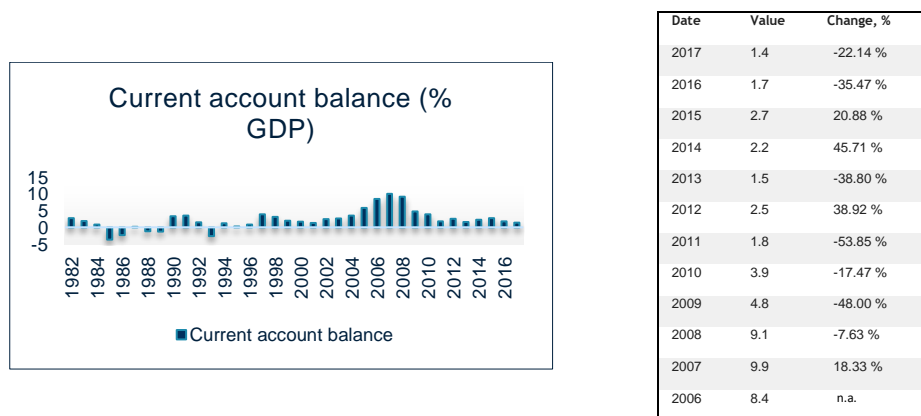| Date	Value	Change, %
2017	1.4	-22.14 %
2016	1.7	-35.47 %
2015	2.7	20.88 %
2014	2.2	45.71 %
2013	1.5	-38.80 %
2012	2.5	38.92 %
2011	1.8	-53.85 %
2010	3.9	-17.47 %
2009	4.8	-48.00 %
2008	9.1	-7.63 %
2007	9.9	18.33 %
2006	8.4	n.a.

Table 3. Economic growth, Household Consumption, Government Consumption, Investments, Export and Import to GDP in China

(Hist. Data (2000-2016) : % to GDP)

Year	Economic growth	Household consumption (C)	Government Consumption (G)	Investments (I)	Export (X)	Import (IM)
2000	8,4915	46,2185	16,6333	34,42966	21,2357	18,5171
2001	8,3399	44,8644	16,0900	36,42222	20,8386	18,2152
2002	9,1306	44,4316	15,6032	37,07753	22,9903	20,1027
2003	10,0356	41,7405	14,6769	40,63156	27,7742	24,8232
2004	10,1112	39,8710	13,9020	42,89447	31,7766	28,4442
2005	11,3958	38,4794	13,9951	41,39123	34,5124	28,3780
2006	12,7195	36,3865	13,9490	40,93325	37,1751	28,4439
2007	14,2314	35,8217	13,4833	41,46314	35,9483	26,7164
2008	9,6543	36,4578	13,1850	43,26638	32,0242	24,9333
2009	9,3998	36,1525	13,1968	46,44129	24,3582	20,1488
2010	10,6361	35,9246	12,8176	47,61227	26,2674	22,6219
2011	9,5364	36,7453	13,1801	47,68586	26,4943	24,1055
2012	7,8563	36,6261	13,4309	47,23453	25,4082	22,6997
2013	7,7576	36,6310	13,5365	47,38775	24,5050	22,0603
2014	7,2977	37,1649	13,3193	47,00772	24,0800	21,5719
2015	6,9002	37,1413	13,9737	45,40088	21,9732	18,4891
2016	6,7000	39,2000	14,4000	44,1800	19,6441	17,4153

Source: World bank

Table 3: Source: Data Worldbank
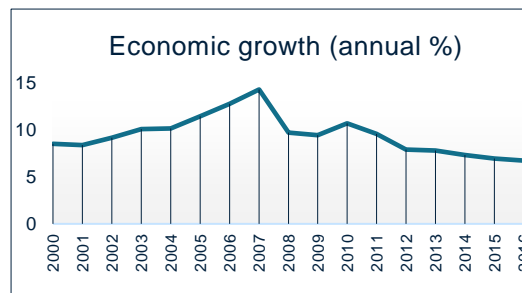
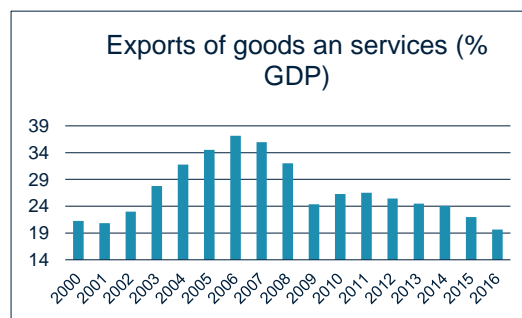Figure 3. GDP growth (annual %)
Source: Data Worldbank

Figure 4. Government expenditure (annual %)
Source: Data Worldbank
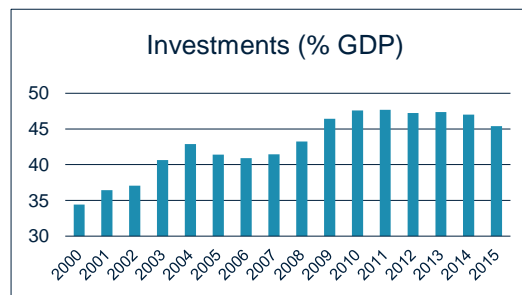

Figure 5. Share of export of GDP
Source: Data Worldbank

Figure 6. Household expenditure (annual %)
Source: Data Worldbank

Figure 7. Share of gross capital formation of GDP
Source: Data Worldbank

Figure 8. Gross capital formation (annual %)
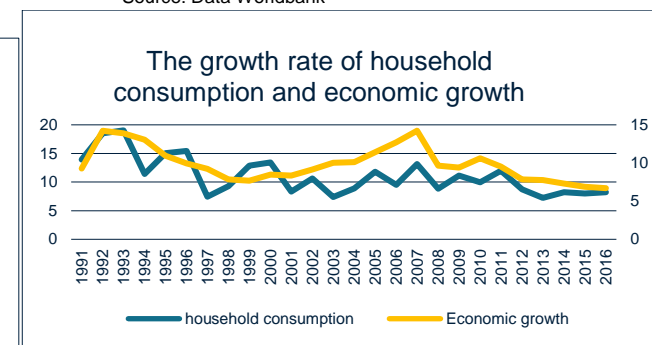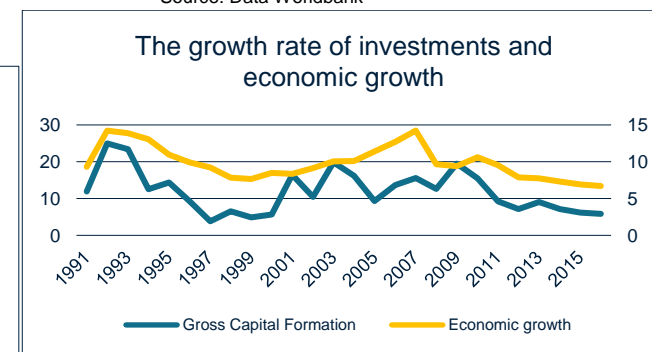Source: Data Worldbank

3 Rebalancing Growth-Model: From export towards domestic demand

China as one of the largest emerging economies of the world is also known as one of the BRIC (Brazil, Russia, India and China) countries. These four and later five (BRICs incl. South Africa) countries became commonly used in papers as they are among the largest in population and largest in GDP. In addition they all underwent reforms and each country has an abundance of unrealized potential (O'Neill, 2001).

China's oriented growth strategy, whether it is more toward export or domestic demand, is basically focused on some elements which makes differences in the growth contribution. These elements of national income accounting based on the Keynesian macroeconomic equation of aggregate demand, which is based on the short term economic growth perspective can be written as followed (Li & Ning, 2013):

$$Y = C + I + G + (X - IM) \tag{1.1.}$$

The economic output or GDP of a country (Y) is the sum of private or household Consumption (C), investments (I), Government expenditure (G) and Net Export (NX) - the difference between exports (X) and imports (IM). A strategy that is based on export will especially focus on the relationship between exports and imports, while on the other hand the other three elements (C,I,G) will pay particular attention to a more domestic-demand-growth oriented strategy. An increase in any of these elements will increase employment opportunities and income; In addition, through changes in fiscal policies and/or monetary policies the level of gross demand in a country can change (Li & Ning, 2013).

The Chinese export-oriented strategy[3] and the high investment rate, that was mainly aimed to maintain their internal balance (Blanchard & Melesi-Ferretti, 2012), is partly the reason for the global imbalances of the last decade and partly responsible for causing the global economic crisis (Prasad, 2009; Li & Ning, 2013; Pencea & Oehler-Sincai, 2015). Although greedy bankers did cause the US banking crisis, they were not the main reason of the economic crisis that followed when the housing bubble burst.

For over 30 years China's economy under control of its government was mainly driven by their export. Such an ELG strategy can be explained by the use of a simple model created by Hiroyuki Uni (2007) which is based on the Kaldorian export-led growth model (Kaldor, 1977). This study shows that under the conditions of export-biased productivity increase (2), repressed wages (3) and a fixed exchange rate policy (1) this will lead to an undervalued currency (Figure 9). Eventually, a country will gain in competitiveness when its currency is undervalued. As a result the prices of the exported goods will decrease. Consumers in other countries will purchase these goods and their purchasing power will increase which gives part of the benefit of productivity growth to consumers in other countries. In addition, some other governmental policies support the export growth as well. The Chinese government maintained taxes and duties at a low level in order to create even more export growth. Compared to western countries such as the US and Europe, China's compliance was less regulated because their main focus went to export growth and economic development.

Such an export strategy, which is a policy methodology powered by a constrained low domestic demand (due to high savings) and a depreciation of the real exchange rate, is seen towards other (WTO member state) countries as unfair trade (Rodrik, 2013). Large trading partners like the US, the European Union (EU) as well as the Emerging Market Economies have accused China of currency manipulation and tried to devise strategies to let the Chinese exchange rate increase again. (Illionois business law, 2010). According to the Big Mac index, which is an indicator used to measure the purchasing power parity

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[3] ELG-Strategy: Is an economic growth strategy driven by their net export, or basically their exports (trade surpluses).

(PPP) of a currency between countries all over the world, the Chinese currency was undervalued by 42 percent (compared to United States Dollar (USD)) in January 2012 (Table 4).

Furthermore, China is not the only country that has ever used such a strategy. In fact, most of the developing countries implement such a strategy as a tool for economic development. Mainly because export creates earnings of foreign currency and leads to acquiring fundamental imports - products that they do not possess or cannot produce themselves. This in turn makes it easier for these countries to meet their domestic production and creates output growth (Chenery & Strout, 1966). However when one country starts exporting more, at least one other country has to increase their import as well. Striving at the same time for an export-led growth by all developing countries, especially when concentrated in a comparable product range, can only work when the demand from developed countries meets this target. So the universal pursuit of export-led growth is likely to result in yield decreasing returns. Strictly speaking, this export strategy requires that developed countries run trade deficit which can become unsustainable at some point. After the recent global financial crisis developed countries grew at a slower pace and were less willing to run trade deficits. (Jimenez & Razmi, 2013). This resulted in a decrease of the external demand which was one of the factors why the Chinese authorities started to switch from the export strategy towards domestic market and in particular by boosting domestic consumption through carrying out more domestic reforms.

Figure 9.   Simple model of export-led growth, Uni (2007).
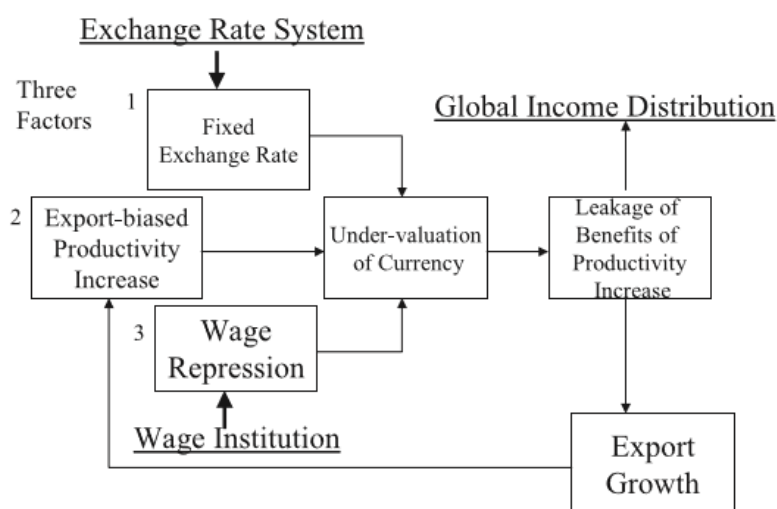
According to Krugman (2013) the so-called 'Lewis Turning Point[4]' is reached for China, where their comparative advantage in labour intensive goods in combination with unelaborated technologies is starting to disappear. In that perspective it was clear that China needed a new approach to ensure its position in the future global economy. Rebalancing the growth strategy would not only be positive to restore the international imbalances but it would also benefit the Chinese citizens from income inequality it is suffering from and would create a more sustainable growth.

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[4] Lewis Turning Point: Is a shift, named after Arthur Lewis a Nobel-Prize winner, which is visible after a phase of fast-growing industrialization through the import of foreign technology and cheap, unskilled workers from agriculture. After a while there is pressure on the wages so that they begin to rise. This results in less profitability within the companies, which means that the companies themselves must implement technological changes in order to continue to guarantee growth. A.C.S. (2013), China approaching the turning point, retrieved on may 1th, 2018 from https://www.economist.com/blogs/freeexchange/2013/01/growth-and-china.

Despites all these positive arguments, rebalancing China's growth pattern from an export-perspective towards a domestic demand-perspective also includes some pitfalls and risks. Especially East Asian economies are undergoing the largest impact. These regions benefit a comparative advantage in labour-intensive products. A slowdown in Chinese investments results in lower exports of Asian countries to China and reduces the growth of industrial development (Akkamik, 2015). In addition, the size of the domestic market has to be large enough to compensate for a declining export. Which means that C, I and G need to bear for the losses in X if we want to keep the economic growth in balance. Another point of interest is that all the elements of domestic demand (C, I and G) are endogenous variables, which means that they are influenced by the level of income (Y). For example, the more income a country generates, the more investments and consumption is being implemented in a country (Mayer, 2016). These drawbacks are only small compared to the benefits consumption growth generates. China's domestic market is large enough to compensate the export loss the country is suffering from and the wages started increasing as well which stimulates consumption expenditures.

Table 4.   Source: Big Mac Index, Historical Data retrieved from the Economist's Big Mac Index. Big Mac price in US in 2012 cost 4.2 USD.

Country	Local price	$ exchange rate	Dollar price	Dollar PPP	Dollar Valuation
China	15.40	6.32	2.44	3.67	-41.90

3.1   Cause of low domestic consumption

China has chosen a different development path compared to that of the US and most DE. These economies' focus was mainly on their domestic consumption. Even though China's domestic market consist of 1.3 billion people, little or no use was made of this market (Worldbank, 2018). After China opened the country to the forces of the market, suddenly lots of workers were added to the world labour market. With their tremendous low salary payments China became in no time "the factory" of almost the entire world. Very quickly, a lot of western companies saw the opportunity to move their manufacturing businesses to China and increased its wealth through huge economic growth. But most of this wealth was not equally divided as it went especially to the government and the owners of the companies. As labour costs have been kept low, the purchasing power of the Chinese people remained low as well. Increasing their household income would create more opportunity for education (in more particular school attendance), health-related quality of life (HRQL) and (food) consumption which create a more sustainable economy (Zhang, Ou et al. 2015; Gong, Xu, & Han, 2015).

But for many decades already, the Chinese current account represents surpluses (graph 7, table 2) which is partly the reason for the global imbalances. The main causes are high national savings that surpass the overall investments (1) and a positive Net Export induced by an undervalued exchange rate (2). (Yang, Zhang & Zhou, 2011). Three major sources of savings went up. First, the corporate profit increased in China as well as in the rest of the world. But not all profits were reinvested which created higher corporate savings. Secondly, due to a lack in the social safety net (the lack on pensions & health insurance and the worry about the amount of money they need to spend on their children's education) the household savings increased as well. Finally due to higher corporate profits that created higher corporate income tax, the government savings went up and created excess savings. Which they invested later in US treasuries (government bonds), leading housing interest rates to fall and housing prices to rise. This caused the housing bubble to burst in 2008.

Figure 10.   Gross savings as a percentage of GDP for China and the World, source: Worldbank.
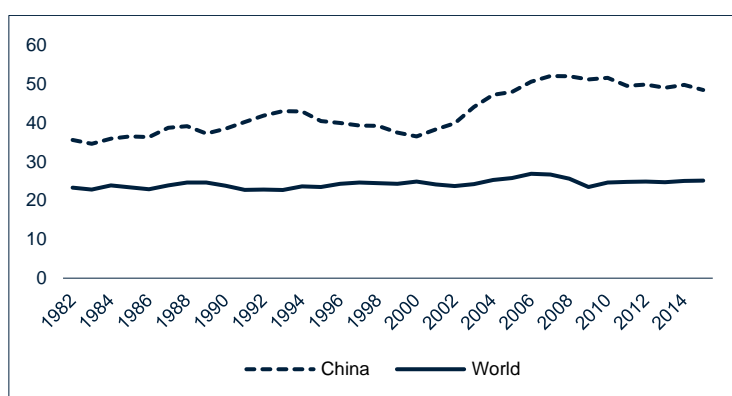
This saving behaviour was provoked by China's export-strategy, by maintaining an undervalued exchange rate vis-à-vis the USD, which in turn has induced trade surpluses. Compared to World national saving rates, China has one of the worlds' largest (graph 8). This high figure of national savings was mainly driven to assist investment-strategies and an export-led growth model. Eventually, the high national saving rate and the export-led strategy enforced a weak Domestic Demand – in particular a low private consumption. (IMF—ILO, 2010; Blanchard & Milesi-Ferretti, 2011).

3.2   Initiatives for rebalancing the sources of economic growth

Because this rapid economic growth brought many challenges for China like, environmental issues, rapid urbanization, growing inequality, aging population and lots of global imbalances, china needed a change of direction (Worldbank, 2018). Therefore, to address these challenges, since the launch of the 12th Five-year plan[5] (2011-2015), and now the 13th five-year plan (2016-2020), China has been shifting from an export and investment-led expansion into a growth driven by consumer spending. Not only high economic growth is important for a country's welfare but also other aspects are equally important. That is why we talk about "sustainable" or "durable" economic growth. To realize this consumption growth strategy, employment rates have to grow and household incomes as well (Britton, 2010).

But the Chinese economy only driven by consumption growth would not be the most adequate solution. Therefore an investment-strategy in combination with a consumption growth strategy would lead to a sustainable economic growth (Li & Ning, 2013). First, the investment-led strategy that is mainly dominated by the government and state-owned enterprises (SOE) is still necessary to develop their technology and innovation and to invest in Central and Western region of China to boost their productivity (before investments were mainly done in Eastern region of China). Instead of declining these investments it is more likely to raise the efficiency of investment (Li & Ning, 2013; Pencea & Oehler-Sincai, 2015).

In addition, before a consumption growth model is set, four different Chinese generations have to be distinguished (Jin-Seok, 2013). The first generation "Balinghou", born under the one-child policy before the 1980's and making them the main drivers of consumption in China. The second generation "Jiulinghou" are in their mid-twenties and they are the present and future drivers of consumption. In addition they are the group of people that tries out new products introduced on the market (early

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[5] 12th five-year plan and 13th five-year plan: These vigorous governmental actions address these challenges by higher the development in services, tackling environmental problems, increasing energy efficiency, improve access to healthcare and education and increase the social protection. Growth targets for the 12th five-year plan was around 7 percent, when the growth targets for the 13th five-year plan is 6.5 percent where they focus on the quality of the growth. By 2020 China want to be a "moderately prosperous society". (Worldbank (2018), The Worldbank in China: overview, retrieved on may 1th, 2018 from http://www.worldbank.org/en/country/china/overview.

adopters) and the generation that is concerned with social media. Finally the third generation consists of two different kind of group. "The Fuerdai" grew up in wealthy families and uses rich brands to express themselves. On the other hand "The New Generation Nongmingong" grew up in rural areas but hope to become part of the urban population and spent most of their incomes. This generation is becoming more important as regards consumption since the Chinese government is raising the minimum wages. All of the four generations are moving or willing to move to a middle-class income generation which leads to more domestic consumption. This means that consumption is an important driver for durable economic growth. This new strategy approach which is called "the new normal" can be accomplished by several changes in the Chinese economy which contributes towards a more sustainable output growth model. The two most important elements to reach this sustained principle will be discussed:

3.2.1   Source for new markets due to increasing productive capacity

To start, China is dealing with an increasing productive capacity which leads to overcapacity. Overcapacity or excess capacity exists when supply overpasses demand. An overcapacity is caused by increased technology, overinvestment, a kept down demand and outer shocks such as the financial crisis (Yang, Zhang et al. 2011). China's overcapacity is especially driven by overinvestment mainly because of governmental incentives such as subsidies, access to raw materials, financial aid and so on. Hence, companies are more prepared to take investment incentives even though this creates excess capacity. In addition in order to stabilize the Chinese economy after the financial crisis, the government implemented a powerful stimulus package consisting of infrastructure investments and public spending. To summarize, the economic growth was heavily dependent on investments which resulted in overcapacity.

Therefore the government had to change their strategy out of concern that export was declining due to global recession. Mainly because one of China's biggest import-partners was and still is the US. The western countries were the most affected and their growth suffered a huge drop. But China's productive capacity was and still is growing and therefore it needs new sources of demand for its products. Eventually China need to find a market that can absorb $5 to $7 trillion worth of Chinese-produced goods and services every year. Because the world economy is not able to soak up such a huge amount of capacity, China has to rely on its own domestic market and must boost its private consumption. If China is not able to boost domestic income and demand to ensure this extra production is absorbed, possibly the world would have to deal with excess capacity and an economy driven by debt, which creates huge risks (Britton, 2010).

3.2.2   Reduce income inequality

According to Kujis & Wang (2005) the growth rate that was fuelled by foreign trade and government investment over the last decades caused the income inequality where the Chinese population is dealing with today. In that perspective income inequality can be attributed to formal institutions (government development policies) as well as informal institutions (believes) which changes the Chinese spending and saving behaviour. Especially from 1980 till 2010 the Chinese income inequality has grown fast. Before the reform of Xiaoping (Former Chinese communist leader) the national safety net was so secure that the Chinese households saved a smaller percentage as they do now (Yang, 2012). His focus was mainly creating incentives for fast and high economic growth which neglected at the same time its social safety regime and its income distribution. Because of that Chinese people started feeling insecure in the system and started saving more.

Given the structural importance in generating China's high income inequality, it seems plausible that the inequality can be ameliorate by reducing the rural-urban and regional disparities (Yu & Zhoua, 2014). The last several years we saw small indications of improvement in the Gini coefficient of China. At the same time consumption started increasing. Chan, Dang, Li, & So (2016) study proofs that there is a negative relationship between the evolution of consumption and the share of income inequality. As

soon as the income distribution changes in favour of the rich people, the Chinese GDP share of consumption will decrease. Shown in the graph below, as consumption share of GDP decreases over time, the income inequality increased over the same period. Therefore a domestic-consumption driven strategy would probably be more attractive and would cure China from the income inequality it suffers from (Prasad, 2009; Kujis &Wang, 2005).

Figure 11.   Cross province means of Gini coefficient and GDP share of consumption, Chan et al.
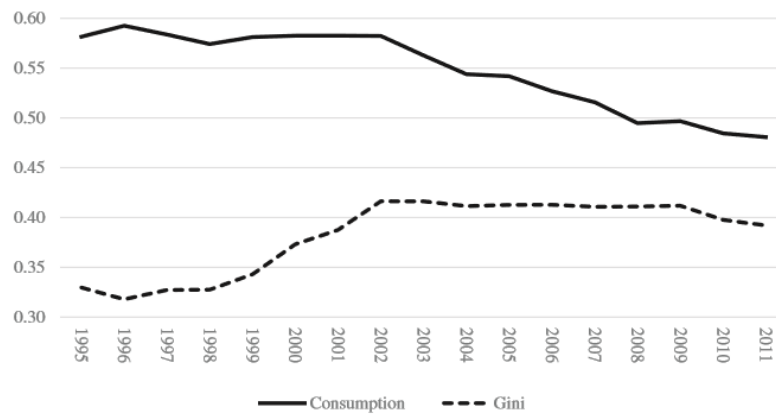
4 DDLG-theory

In chapter 3 the export-led growth expansion based on the Kaldorian ELG strategy is already been discussed extensively as it produces negative consequences by preventing the domestic market to develop and/or grow (Palley, 2002). This chapter elaborates on theoretical analysis which reflects the effect of domestic demand on economic growth.

In this paper a DDLG will basically contain the growth from consumption and investments and their contribution to the process of output growth. Consumption Growth (C-G) and Investment-Led-Growth (ILG) find their basis in the Old Growth Theory (OGT) or Solow economic growth (neo-classical growth model) named after Robert Solow, Nobel-Prize winner (Solow, 1956). The OLG is based on an economic model where key variables contributes to growing GDP. The production function shows how resources and inputs; human capital (eL, e: education, L: labour), physical capital (K) and knowledge (A) are used to produce valuable output.

$$Y = f(A, eL, K)' \hfill (1.2.)$$

The New Growth Theory (NGT) or Endogenous Growth omitted the fact that growth is caused by external forces but put its focus on endogenous factors (Harrod, 1948). NGT's theory finds its basis in Arrow (1962) work where he researched the effect of knowledge, innovation and investments in human capital on the analysis of growth. According to the NGT, the complementarily investments, investments in human capital, infrastructure and research and development (R&D), result in private and public investment. Which demonstrates, because of public and private investments in human capital, that economic growth is taking place in these knowledge-based industries.

Tsen's (2010) Granger causality test on export, domestic demand and economic growth in China represents that there is some evidence of bidirectional Granger causality among export and economic growth, domestic demand and economic growth and between export and domestic demand. Either way there is no proof whether domestic demand is a more important contributor than export to create economic growth. Therefore both drivers are important for the Chinese output growth model. Furthermore, there is proof of a GLE and GLDD where the economic growth itself is a contributor for export and the domestic demand. According to Lai (2004), which investigated the Granger causality among private consumption and economic growth and export and economic growth of Malaysia, there is a short run bidirectional Granger causality between export, private consumption and economic growth. But is insignificant in the long run with regards to the ELG hypothesis. Furthermore this study declares that the ELG strategy was not a cause of the crisis.

4.1 Consumption-Growth (C-G) theory

The effect between consumption and economic growth is different from that of the export-led growth theory. For consumption-growth hypothesis the cumulative causation will start with productivity growth which will increase wages and will lead to higher consumer demand. The growing consumer demand leads to an increase in output. The GDP in turn will increase in productivity again (Uni, 2007). To be able to enter such a C-G strategy it must be preceded by an export strategy. Because export actually ensures that productivity growth occurs by generating economies of scales (Park, Yang, Shi, & Jiang, 2010; Masso & Vahter, 2014; Helpman & Krugman, 1985). Only 30 percent of household consumption contributes income in the manufacturing sector and 70 percent of export will generate income in this same industry (Kaldor, 1971). Therefore, when depending on the investment share of output the productivity will be lower in case of the C-G theory. In this way, a link can also be made between export and consumption (Kaldor, 1971). However, opinions are divided whether export positively affect total factor productivity (TFP) growth and if there would be a positive relationship between these two elements, this will mostly befall in the long run (Rath & Akram, 2017; Chandan & Ritesh, 2011; Liao & Liu, 2009). In addition, in the latter studies, a sector distinction was not assumed as it was in Kaldor's

study. Furthermore, government healthcare spending also can have a positive relationship with consumption growth. A one Chinese Yuan increase in government healthcare spending results in a two Yuan increase in consumption growth (Barnett & Brooks, 2010).

Subsequently, the early Keynesian growth theory has already focused on the dynamics of effective demand in the long run but did not enlighten the transformation effect of consumption and growth. Gualerzi (2012b) acquired some knowledge on the C-G relationship which is a further analysis based on Pasinetti's (1981a, 1993b) model. He states that consumption cannot impact growth without structural changes in consumption patterns. These patterns are basically driven by investment. Furthermore, two different kind of investment can be distinguished; induced investment and autonomous (innovative) investment (Zhang, Ou et al., 2015). The first component of investment is according to Keynes associated with the interest rate. In periods of high interest rate the investments will be rather low because they react conservatively on the interest rate changes. On the other hand, the autonomous level of private investment growth is not influenced by the interest rate fluctuations. In other words, the variability in these investments is not fully explained by the level of current interest rates but focuses on product innovations.

These autonomous investment strategy implementations causes changes in consumption patterns (Gualerzi, 2001a). That adds an essential point to the C-G analysis where in a market economy innovative investment is key for creating new products and clarifies the firms' engagement in the competitive forces which create bigger markets. That is the moment when consumption patterns and economic growth become interconnected. (Gualerzi, 2012b). Furthermore, innovation in combination with technological progress and human capital development will ensure the household consumption and will play an active role in Chinese economic growth through an ameliorating employment structure and increased income. (Li & Ning, 2013; Arrow, 1962).

4.2 Investment-led-growth (ILG) theory

Whereas investment is a key element for changes in the consumption pattern it is also a way of enforcing economic growth. Contrary to the previous observation, because China's ILG is mainly driven by the government and SOE and particularly in infrastructure constructions - which is different from most other countries where the biggest part of investment is led by private owners - a decline is created in the final consumption rate of GDP in the long run (Li & Ning, 2013). Furthermore, in the case of China, a large part of these infrastructure investments do not belong in investment in the national accounting equation but are actually government expenditures. According to Wang & Wen's study, which is based on a Granger causality method, concerning government spending, two major trade-off effects are investigated on Chinese data. First it confirms that in LDE the multiplier of government spending is greater than one, both on national and regional level. This means when there is a positive change in government spending of one the effect on the total output will be greater than one. Which is comparable with the Increasing Returns to Scale (IRS) of a production function in a company and signifies that government spending contributes to the economic growth. The second argument consists of the negative consequences government spending brings. Although government spending is responsible for high economic growth it also creates high inflation. In turn high inflation ultimately leads to the government having to limit its spending, which means that growth will end in a recession period. Subsequently, another spending pattern will take place, so that the Chinese economy ends up in a vicious circle.

Furthermore, most papers agree that export strategy had has his days. However concerning investment, the opinions are divided (there are polarized groups) (Lee, Syed & Xueyan, 2013). On the one hand, infrastructure investments are still needed in less developed non-coastal Chinese areas. On the other hand, the question arises as to whether China can maintain this high investment spending in terms of increasing capacity pressure and also because the investment are often used inefficiently. According to Lee et al, excessive investments create little to no future growth, on the contrary it creates

deadweight losses[6]. Reducing investments also does not seem to be a solution as it creates a negative impact on growth. That is why economic growth remains intact when increasing capital efficiency. And that is where the focus should be.

In the past, Investment has already been used as a recovery mechanism for recessions and periods of long economic stagnation. Therefore it can be accepted as an important contributor for the economy (Griffith-Jones & Cozzi, 2015). Investment contributes to economic growth in two ways. The first way is the short run approach where investment performance is a way to increase national income because it improves the resources of employment and the economy as a whole. Secondly, in the long run, when the capital stock grows faster than the population increase and when there is an increase in fixed capital investment that creates an increase in the capital stock, the labour productivity of a country will increase and this will then lead to economic growth. This capital increase will not only have the intention to realize capital expansion but also to realize the deepening of capital (Li & Ning, 2013).

Especially China's long term investment-led growth path is considered by many economist by non-sustainable for the Chinese economic development. There are some major problems why there is such a belief (Li & Ning, 2013). The first problem concerns the environmental issues. High quantities of resource consumption deteriorated the living environment of the Chinese people. Second, high investments creates more production than available export markets which creates excess capacity. In addition, the production of consumer goods has been remained low due to high investment rates into real estate and manufacturing production tools. Investment creates a lower rate of national income growth compared to the economic growth rate whereas income-level have been kept low and thus reducing the people's consumption capacity. The second argument, which is discussed in previous chapter, can be achieved by the Chinese domestic market with the necessary policy reforms.

Furthermore, lowering the Chinese investment can create some spill-over effects in other countries which can emerge into negative economic growth for these particular countries (Ahuja & Nabar, 2012). Ahuja & Nabar's study reveals the effects of a slowdown in investment in China. First, a decline of investments in China will deteriorate GDP growth of the Asian regional supply chain (Taiwan Province of China, Korea and Malaysia). Next, an investment slowdown will create a reduced growth of commodity exporters especially in Chile. In contrast to investment-led growth, the consumption led growth in China ensures that these spill-over effects do not have a significant impact on his trading partners which are the aforementioned regions.

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[6] Deadweight loss: This is an inefficient allocation of resources in the economy which prevents markets from moving toward the equilibrium. This inefficiency can be caused by monopolies, subsidies, excessive taxes or other externalities where too little or too much of a particular good or asset has been produced. In this case excessive investments will result in too much of a production (overcapacity). The equilibrium or Pareto efficiency, named after Vilfredo Pareto (1848–1923), is the state of an economy that determines when an allocation is optimal and when both producers and consumers can no longer improve their position (Lyons, 1986).

5 Methodology

As most papers discuss the export-led growth strategy where the Chinese economic growth is driven by exports only a few papers investigate whether their output growth is caused by their domestic demand. As already mentioned in studies above, investment in China is also a main policy driver which is part of the domestic demand. In addition, because of several reasons mentioned above China is rearranging their economic growth strategy by changing it more towards a household-consumption led growth strategy.

Data

The data used for this study, for the variables investment, consumption and government expenditure, export and import, a monthly time-series sample (2000M1 – 2016M12) retrieved from the National Bureau of Statistics of China database (NBS). For GDP a quarterly sample (2000Q1 – 2016Q4) is collected from the NBS economic database. Unlike the import and export variables, which were already displayed in real data, the other variables were converted into real data on the basis of a number of calculations before they were imported into Eviews. Real[7] data represents the actual quantities which makes the analysis more accurate. Furthermore, GDP, Consumption, Investment, Government expenditure, Export and Import are expressed in 100 million Chinese Yuan Renminbi (CNY) or Renminbi (RMB). All the above variables are elements of the Keynesian national accounting equation which is discussed previously in chapter 2. Real GDP is the total income a country generates, household consumption or private consumption is the money spent by the consumers within a country, gross fixed capital formation are the investments made in a country, government expenditure is all the money the government spent within a country, export is all the home produced goods and services that are sold abroad and import is the foreign production of goods and services bought by the country (Blanchard & Johnson, 2013).

From NBS the nominal GDP in current quarter as well as the quarterly price index has been retrieved and by means of the following calculation *(2.1.)* expressed in real data (Bureau of Economic Analysis, 2010).

$$Real\ GDP = \frac{Nominal\ GDP}{Price\ Index} \qquad (2.1.)$$

Then, in order to avoid misunderstandings, price indices are expressed in integer numbers. Therefore, in order to obtain the correct result, the published price index has to be divided by 100 (1.2).

$$Real\ GDP = \frac{Nominal\ GDP}{\frac{Price\ index}{100}} \qquad (2.2.)$$

In addition, the variables investment, consumption and government expenditure are also subject to a calculation. Again the nominal figure needs to be divided by a price index. For this calculation the nominal investment, consumption and government expenditure figure will be divided by the monthly consumer price index.

Because the Chinese government is very protective about their country's economy, it is still very difficult to find all their data online. Therefore, for the variables Household Consumption, Investment and Government expenditure monthly data is collected and is been converted into quarterly with a Hodrick-Prescott (HP) filter[8] (Ravn & Uhlig, 2002). GDP, Export and Import where available in quarterly figures. Furthermore with weekly, monthly or quarterly data there may fluctuations such as crisis, climate

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[7] Real value: Is when this entity has been adjusted for inflation which makes is easier to compare quantities as if prices had not change. A nominal value is when it has not been adjusted for inflation.

[8] Hodrick-Prescott (HP) filter: a filter which is often used to remove trend movements in the business cycle (Ravn & Uhlig, 2002).

changes, etc. that repeatedly occur. To counteract seasonality datasets mostly logarithmic transformations are carried out on the variables (Granger, 1979). The data for the variable Import is been transferred into negative figures since it is also deducted to obtain the Aggregate Demand (AD) function

The analysis is done through statistical software named Eviews, which is a tool designed to work with time series analysis such as Vector Auto Regression (VAR) and in the case of this paper a Bayesian VAR analysis.

Bayesian Vector Auto Regression

The objective of this paper is to diagnose the determinants of the economic growth, the economic growth itself and the relationship between these variables in China based on a BVAR model. Vector Auto Regressive models or a VAR analysis is one of the key empirical tools in the modern applied macroeconomics and is created to capture the joint dynamics of multiple time series. Chris Sims' work, a famous American economist, is closely linked to the beginning of VAR modelling. In his paper "macroeconomics and reality" he criticised macroeconomic models as they impose very strong restrictions (Sims, 1980). These most itemized models make strong assumption about the dynamic relation between the macroeconomic variables. Which leads us to one of the most important advantages of VAR modelling. Here it is no longer needed to worry about the consistency of the equation. In previous time series models there was often the concern whether the variables were endogenous in nature. For these models an understanding was needed if the variable had to be assigned on the left side of the equation or the right side. All the variables included in the analysis are endogenous variables. Also government expenditure which is assigned in the macro economy as an exogenous element will be included in the analysis as an endogenous variable.

VAR analysis can be used in two different ways. VAR modelling is broadly used for macroeconomic forecasting and to analyse the effect of structural shocks. Compared to Bloomberg macroeconomic forecasting, BVAR forecasting has multiple benefits (Silvia & Iqbal, 2012). A major finding is that a BVAR model is on average double as accurate as the Bloomberg forecast because many macroeconomic variables are subject to revision. Furthermore in case of forecasting data there have to be an awareness that there is no model that can carry out a correct prognosis that includes more than a few years. And this even got worse after the financial crisis in 2007-2008 and other factors as the oil price spike, the housing market crash and different types of stimulus packages (Silvia, J. and Iqbal, A., 2012)

The Multivariate analysis with $Y_t = [y_{1,t}\ y_{2,t}\ y_{3,t}\ y_{4,t}\ y_{5,t}]$ is a n x 1 vector with the value of n variables at time t. The ε_t is a n x 1 vector of white noise (errors) and we assume that ε_t is N(0, $\sum \varepsilon$) and α is the constant term in the equation. The basic VAR equation can be written down as the following model (VARρ):

$$y_t \ = \ \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \cdots + \beta_p y_{t-p} \ + \varepsilon_t \qquad\qquad (3.1.)$$

Furthermore, for clarification an example is provided of a matrix equation with two endogenous variables and p lags as followed:

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix} + \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \cdots & \beta_{1p}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \cdots & \beta_{2p}^1 \end{bmatrix} \begin{pmatrix} y_{1t-1} \\ y_{2t-1} \end{pmatrix} + \cdots + \begin{bmatrix} \beta_{11}^p & \beta_{12}^p & \cdots & \beta_{1p}^p \\ \beta_{21}^p & \beta_{22}^p & \cdots & \beta_{2p}^p \end{bmatrix} \begin{pmatrix} y_{1t-P} \\ y_{2t-P} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix} \qquad (3.2.)$$

An important criteria for a VAR model is the determination of the lag length. As the VAR tries to estimate many coefficients with a small dataset, the coefficients themselves are poorly estimated. However the model appears to fit the in-sample data very well but out-of-sample forecasts are bad (Fernando Francisco & Ramos Ribeiro, 2003). Overfitting (applying a higher lag length than necessary) creates higher mean squares forecasting errors (Lütkepohl, 1993a). In other words a VAR model with the wrong

lag length will be paradoxical and could result into omitting variable biased which leaves out important variables or dynamics. One approach to address this poor quality estimation and bad forecasting achievement is by the use of Bayesian analysis (other approaches will not be further discussed). The BVAR method is basically a VAR where a restriction on the parameters is applied to narrow down the set of parameters. Since VAR models require a multitude of parameters, a problem of over-parameterization can occur when too little observations are provided to estimate the available parameters of the model. Bayes' theory of a reduced set of parameters is called "shrinkage". (Doan, Litterman & Sims, 1983; Sims & Zha, 1998). Under the condition that we work with a bi-variate model (working with two variables) and implementation of two lags the simplified equation will be written down as followed:

$$Y_t = A + B_1 Y_{t-1} + B_2 Y_{t-1} + \cdots + B_p Y_{t-p} + E_t \qquad (3.3.)$$

$And\ where\ Y_t = \begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix}, A = \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix}, B_1 = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \dots & \beta_{1p}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \dots & \beta_{2p}^1 \end{bmatrix}, Y_{t-p} = \begin{pmatrix} y_{1t-P} \\ y_{2t-P} \end{pmatrix} and\ E_t = \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$

Here Y_t is a n x 1 vector matrix. For this study the variables will be Y_t = GDP, C_t = Household Consumption, I_t = Investment, G_t = Government expenditure, X_t = Export and IM_t = Import. And basically the analysis is focused on the impact of the retaining variables on GDP or output. The equations can be written down as a BVAR (1) where two lags are included in the model. Every equation is estimated by ordinary least squares (OLS). In this case a basic BVAR equation with 6 variables and 4 lags will lead us to 25 coefficients and white noise or error (ε_t) also called the innovation, impulses or shock when estimating the response impulses in the analyses. Working with six variables gives an equation output of six different equations because every variables included in the analysis is both dependent as independent. The first equations estimates shocks in all the variables which causes fluctuations in the output growth *(4.1.)*. Second equation estimates the shocks which occurs in the variables and react on household consumption *(4.2.)*. For the other four equations the same shocks are calculated for changes in Investments *(4.3.)*, Government expenditure *(4.4.)*, Export *(4.5.)* and Import *(4.6.)*. All the variables included in the analysis will be dependent as well as independent. Therefore the next equations are part of the model, but is simplified with two lags to make the equations less long and complex.

$Y_t = \alpha_1 + a11Y_{t-1} + a12C_{t-1} + a13I_{t-1} + a14G_{t-1} + a15X_{t-1} + a16IM_{t-1} + b11Y_{t-2} + b12C_{t-2} + b13I_{t-2}$
$+ b14G_{t-2} + b15X_{t-2} + b16IM_{t-2} + \varepsilon_{t\ 1}$ *(4.1.)*

$C_t = \alpha_2 + a21Y_{t-1} + a22C_{t-1} + a23I_{t-1} + a24G_{t-1} + a25X_{t-1} + a26IM_{t-1} + b21Y_{t-2} + b22C_{t-2} + b23I_{t-2}$
$+ b24G_{t-2} + b25X_{t-2} + b26IM_{t-2} + \varepsilon_{t\ 2}$ *(4.2.)*

$I_t = \alpha_3 + a31Y_{t-1} + a32C_{t-1} + a33I_{t-1} + a34G_{t-1} + a35X_{t-1} + a36IM_{t-1} + b31Y_{t-2} + b32C_{t-2} + b33I_{t-2}$
$+ b34G_{t-2} + b35X_{t-2} + b36IM_{t-2} + \varepsilon_{t\ 3}$ *(4.3.)*

$G_t = \alpha_4 + a41Y_{t-1} + a42C_{t-1} + a43I_{t-1} + a44G_{t-1} + a45X_{t-1} + a46IM_{t-1} + b41Y_{t-2} + b42C_{t-2} + b43I_{t-2}$
$+ b44G_{t-2} + b45X_{t-2} + b46IM_{t-2} + \varepsilon_{t\ 4}$ *(4.4.)*

$X_t = \alpha_5 + a51Y_{t-1} + a52C_{t-1} + a53I_{t-1} + a54G_{t-1} + a55X_{t-1} + a56IM_{t-1} + b51Y_{t-2} + b52C_{t-2} + b53I_{t-2}$
$+ b54G_{t-2} + b55X_{t-2} + b56IM_{t-2} + \varepsilon_{t\ 5}$ *(4.5.)*

$IM_t = \alpha_6 + a61Y_{t-1} + a62C_{t-1} + a63I_{t-1} + a64G_{t-1} + a65X_{t-1} + a66IM_{t-1} + b61Y_{t-2} + b62C_{t-2} + b63I_{t-2}$
$+ b64G_{t-2} + b65X_{t-2} + b66IM_{t-2} + \varepsilon_{t\ 6}$ *(4.6.)*

BVAR is more accurate than a simple VAR and is most recommended to forecast for macro-economic changes and compare the actual trend with the forecasting trend. The distribution of BVAR consists of 3 main characteristics which counteracts the problem of overfitting: *prior, likelihood and posterior*. Different types of priors are discussed in literature. The prior distribution used in this paper is the Litterman/Minnesota prior (Doan et al, 1983). The Minnesota prior is composed by Litterman and got some adjustments later on. (Litterman, 1980). This prior assumes that most macro-economic variables are stochastic variables which means that all coefficients, except for the first of which the average is

one, have an average of zero. Furthermore, the variance of the coefficients is determined on the basis of a function that links the standard deviation with a number of hyper parameters. This is an important process for the BVAR model, because it determines how far the coefficients may deviate from their mean and to what extent the model is allowed to approach a non-Bayesian VAR (Spencer, 1993; Lütkepohl, 2005b). For the analysis executed in Eviews the proposed hyper parameters is used where the overall tightness is set on 0.1 and the relative cross-variable weight for value 0.99.

Furthermore, two types of analysis, impulse response and variance decomposition, will be conducted in Eviews. The impulse response function (IRF) shows the reactions of the response variables to a shock of another endogenous variable or impulse variable. It increases the error term ε_t of the impulse variable by one unit and calculates the future reactions of the error terms of the response variables. The IRF assumes that error terms of the response variables start at zero and that the error term of the impulse variables falls back to zero. For ordering the variables the given settings of Eviews is chosen which is the "Cholesky Adjusted model". When a Cholesky decomposition is used in order to realize an IRF then there must be paid particular attention to the ordering of the variables in the model. Cholesky has a lower triangular matrix or an upper triangular matrix which depends on the software computing. In case of working with Eviews this will be the lower triangular matrix which means that the most exogenous variables will be put first in order, than the second most exogenous variables and so on, and will end with the least exogenous or most endogenous variable. This is the variable where all the other variables has effect on (Ludvigson, Steindel, & Lettau, 2002).

6 Results

To reproduce the model first some additional tests have been carried out to eventually arrive at a qualitative and representable model as such. The model is constructed with the provided dataset in appendix (Appendix 1). The model contains the variables GDP, household consumption, government spending, investments, exports and imports in Chinese Yuan.

MODEL: Equations as presented in the methodology – 6 variables / 4 lag / 25 coefficients

Hypothesis 1:   "The GDP growth is mainly caused by the domestic demand. Can be by investment, private consumption and/or government consumption. Believe in an investment growth strategy in combination of private consumption strategy."

This model provides a deeper understanding whether the economic growth fluctuations are due to export or domestic demand in the short and long run. In addition, with regard to domestic demand, the different elements will also be analysed more extensive.

Before analysing the model, an important execution of VAR estimation is the identification of the lag length (ρ). The lag length are the terms that must be investigated for serial correlation. The VAR lag order selection criteria test, to compute the lag length, is based on five different criteria tests (sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ)) with the maximum lag length set to four because the provided data is quarterly. The results of the VAR order selection criteria test are reported in table 5. LR, FPE, AIC, SC and HQ (table 5) all suggest a lag order length of four lags (*). Because there is no discussion for the assignment of the lag criteria, four lags are used to compute the analysis. All the test are with a 5 percent significance. For further estimations of the impulse response function and variance decomposition two lags will be used for this model.

Table 5.   VAR Lag order selection criteria test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	219.7223	NA	5.07e-11	-6.678823	-6.476427	-6.599089
1	559.4182	605.0833	3.85e-15	-16.16932	-14.75255	-15.61118
2	683.8030	198.2382	2.50e-16	-18.93134	-16.30020	-17.89480
3	758.3200	104.7895	8.10e-17	-20.13500	-16.28949	-18.62006
4	862.0523	126.4237*	1.14e-17*	-22.25163*	-17.19175*	-20.25829*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Additionally, the residual plot provides a control whether residuals seem to be white noises. In general they do in certain periods but the reasons are probably related to crisis episodes as they occur around 2008 and 2009 which is the period the financial crisis happened. Both a decline in household consumption and investments happened in the first quarter of 2008. Not only influenced by the event itself but also indirect factors (psychological) were the reason of a sudden drop in the consumption. Consumptions were postponed due to a lack in the Chinese social safety net (Voon, 2012). Afterwards,

during the first quarter of 2009, export were hit hard. Because they could contain interesting information the data is kept in the model (Appendix 3).

First a BVAR estimation with the proposed settings given in Eviews is provided in Appendix 2. The columns represent the equations with their coefficients. In each equation there are six coefficients - the four period lags and the constant coefficients. The standard errors (S.E.) are between brackets and the t-statistics are between square brackets (appendix 2). The latter is to check whether the coefficients are significant for the analysis. Despite not all coefficients are as efficient, according to the requirement that a t-stat needs to be higher than two, the output estimation is not very important for the further BVAR analysis because each variable is growing over time (Eviews user guide). Furthermore the r-square statistic measures, by predicting the values of the dependent variable within the sample, the success of the regression (Eviews user guide). This model shows an R² in all of the equations between 0.97 and 0.99, which is close to one (almost a perfect fit).

In further analysis, a logarithmic transformation has been applied to all variables, yet these variables will be written without Log or Ln in the next two estimation methods.

Impulse response of GDP

Thereafter, the IRF is estimated under the Bayesian VAR environment to investigate for how long these variables can affect each other and in what manner they will under the condition of a shock. Here the impulse response function estimates how domestic demand, export and economic growth react to each other over a forecasting period of 20 quarters or 5 years. The whole VAR system will be affected by shocks or changes in one of the ε_t (impulses or innovations). Therefore, as GDP is the variable where all the other factors have their effect on this will be assigned as last variable in the impulse definition function. Government spending is the most exogenous variable as it is based on policy instruments and other variables in the model do not influence this. Export is based on the GDP of their trading partners, which is no variable in our model. The impulse definition will be implemented as followed: Government – Export – Consumption – Import - Investment - GDP. Furthermore, the horizontal axe represents the forecasting quarter period horizon where the shock appears over 20 quarter. The vertical axe is the absolute value of change of the response variable when a shock or innovation occurs to the impulse variables and is shown in a 20 quarter forecasting period. Above the zero-line we talk about a positive reaction caused by a positive shock and below this line a negative reaction arises due to the same shock. When the graph increases and is above zero we talk about a positive change in the response variable. When it decreases but remains above the zero line the change in response variable still increases but less than the previous changes. When it decreases and reaches below the zero line there is a negative change in the response variable. Figure 12 and Appendix 4a show the responses of GDP to various macroeconomic shocks over a twenty-quarter forecast horizon.

Given a positive shock of one S.D. to GDP, GDP encounters an immediate positive reaction. In the short run will decrease and in the long run will become slightly negative but remains stable. This reaction is known as GDP's own shock. The shocks that attracts most interest in this study are the ones were the output is pushed by either export or domestic demand. Shown in figure 12, for domestic demand three different contributors are important for further conclusions. First, a positive shock of one S.D. in investment will represent an immediate positive reaction to GDP and decreases over the future period of four quarters but the changes in GDP will remain positive. Which means that the GDP will grow but at a slower phase. Investment shocks will create some fluctuations in GDP. The highest will be between the fourth and the sixth quarter. After these changing episodes the shock reaction will become stable in the long run horizon. Second, an impulse response of GDP to a one S.D. shock in Consumption will create the same changing patterns as investment did. Except that these fluctuations will be slightly bigger and again it will stabilize in the long run (Q20). There is an immediate positive reaction on GDP when a shock of one S.D. occurs in consumption. When entering the second quarter there will be a negative change in output due to this shock-event. After the 2nd forecasted quarter the absolute change

in GDP becomes positive and increases again and from quarter 10 onwards becomes stable. Furthermore, how will government expenditure react to GDP under the condition of a positive shock? The response of GDP to Government spending innovations is positive for the first period; after that, the response decreases but remains above zero. In addition it will follow more or less the same pattern as investment and consumption and creates over the whole period a positive change in GDP. Unlike the domestic demand factors, a positive shock of one S.D. in export will create a total different changing effect on GDP. The immediate effect of a shock to export will be negative and after the second quarter will become positive and start increasing gradually. It is not really clear whether it stabilize over time, but from these results in quarter 20 it seems reasonably stable. Finally, a one S.D. shock to import decreases the output over the whole period.

From these results it can be concluded that economic growth will start on a long run bases due to a shock to export and on the other hand domestic demand elements will represent an immediate shock reaction on the growth. These results give already some indication that domestic demand represents, after a shock event, a lot of fluctuation in the short run which let GDP increase. For the long run, export gives a higher expectance for economic growth. These results ask for a more extensive analysis by calculating the variance decomposition of each variable in the model.

Figure 12. .   Impulse response of GDP to a one S.D. (d.f. adjusted) shock in GDP, consumption, investment, government expenditure, export and import.
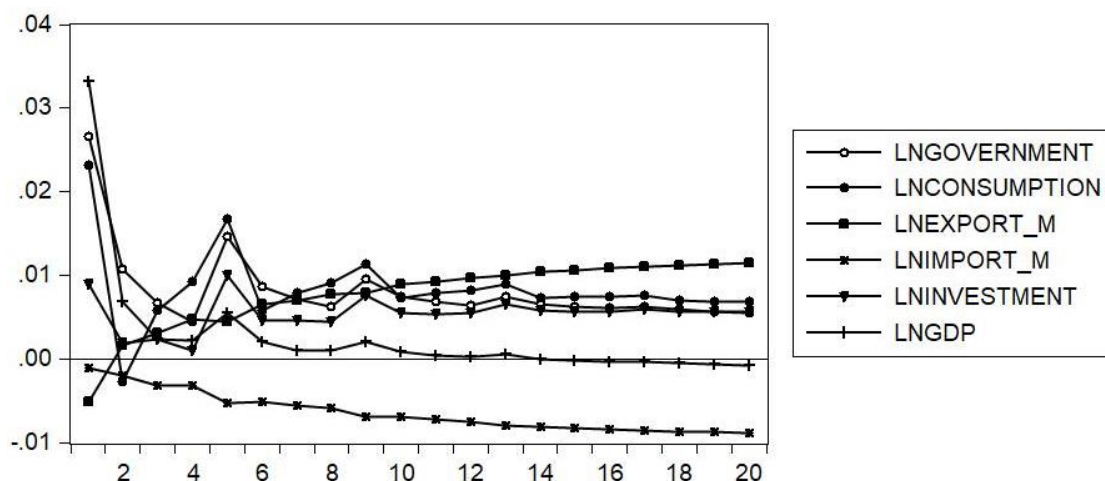
Variance Decomposition of GDP

Finally, the variance decomposition offers a slightly different method of examining the VAR dynamics. Variance decomposition gives the proportion of the movements in the dependent variables that are due to their own shocks or shocks in other variables and tells us something about the relative importance in percentages of each shock to the variables. The variance decomposition results are summarized in Table 6 over a 20 quarter future period. Again these percentages can be explained for the short run (SR) as well as for the long run (LR). This paper talks about SR around the third quarter and LR in the 20th quarter. According to Sims (1980) a variable is only a real exogenous variable, if their own shock explains all of the variable's forecasting error variance. From the analysis we see that government spendings' own shock contributes for 100 percent in the SR. This is the only variable that explains 100 percent. Furthermore, in the SR, consumption and export own shock is responsible for 93 percent which is a close estimation (Appendix 4). This also due to the ordering of Cholesky.

In the SR, which is quarter 3, a shock to GDP accounts for 42 percent variation of fluctuation in GDP (own shock). But in the long run the contribution to GDP has gone down to 15 percent. First the

contribution of the domestic demand elements will be discussed and afterwards the trade elements. An innovation to Consumption in the SR represents for 22 percent of fluctuations in GDP. In the LR, compared to SR contribution, a shock in Consumption gives a stable percentage of 23 percent fluctuations in GDP. Furthermore, Government spending is also a large contributor to changes in GDP. In the SR a shock to Government spending accounts for 31.55 percent of the economic growth and declines in the LR but still represents 22.67 percent of the variation in fluctuation. In Addition a shock to investment, last element of domestic demand, only contributes for a small percentages of changes in the GDP. In the short run this will be 3.22 percent and in the long run 8.39 percent. Also the elements of trade are analysed. Both a shock in export and import do not contribute for a lot of changes in the output in the short run. As far as export is concerned, a shock can cause 0.69 percent of movement in GDP and for import 0.55 of negative contribution in output growth. These percentages together represents for 100 percent which is the total fluctuation in GDP.

From these results, in combination of the IRF, we can conclude which element contributes the most to GDP growth. In fact, they all make a positive contribution to growth (except from Import which creates negative growth), but some clearly contribute more than others. Looking at both methods it is clear that government spending, export and consumption are all valuable contributors for movements in the economic output. But the short run effect of a shock to government spending contributes the most to fluctuations in GDP. Also consumption is an important driver for short run economic growth. Furthermore, they both represent large percentages of variance decomposition in the long run. But a shock in Export will generate higher contribution in the long run. Whereby a shock of one S.D. to export do not create economic growth immediately but after 10 quarters forecasting generates a slight higher contribution than both government spending and consumption. Eventually, the elements of domestic demand together account for about 55 percent in the SR and around 50 percent in the LR which is more than half of the economic growth explanation.

Table 6.   Variance decomposition using Cholesky (d.f. adjusted) factors

| Period	LNGOVERNMENT	LNEXPORT_M	LNCONSUMPTION	LNIMPORT_M	LNINVESTMENT	LNGDP
Variance Decomposition of LNGDP						
1	**28.80282**	**0.035341**	**22.91782**	**0.042677**	**3.235709**	**44.96563**
2	31.16146	0.078241	21.71058	0.188183	3.151615	43.70993
3	**31.55045**	**0.690837**	**21.79892**	**0.549086**	**3.228388**	**42.18232**
4	30.66751	2.048470	23.06727	0.867634	3.107074	40.24204
5	30.87274	3.191100	25.62485	1.471121	5.312511	33.52767
6	31.19135	4.496637	24.77261	2.099364	5.605266	31.83477
7	30.76936	6.009721	24.49158	2.781929	5.820951	30.12646
8	29.97293	7.690331	24.45612	3.455817	5.973041	28.45176
9	29.41669	9.113516	24.44747	4.186336	6.726987	26.10900
10	28.93923	10.68287	23.75321	4.952867	6.985914	24.68591
11	28.27962	12.26728	23.20538	5.711065	7.177451	23.35921
12	27.53837	13.84266	22.71851	6.443649	7.339744	22.11706
13	26.88923	15.25724	22.22721	7.160733	7.640854	20.82473
14	26.26205	16.68651	21.59193	7.875324	7.799431	19.78476
15	25.60806	18.06477	21.01090	8.560621	7.923615	18.83204
16	24.95623	19.38330	20.46395	9.211997	8.030929	17.95360
17	24.35417	20.59682	19.93368	9.832173	8.166418	17.11674
18	23.77534	21.77032	19.38711	10.43024	8.254181	16.38281
19	23.21090	22.88193	18.87426	10.99661	8.324914	15.71138
20	**22.66857**	**23.93082**	**18.38973**	**11.53099**	**8.385671**	**15.09422**

Hypothesis 2:   "Shocks in the autonomous investments are required for the growth of Consumption in China. The belief that investments will be the main contributor for consumption growth."

Another important fact that should be analysed is how consumption growth occurs. According to Gualerzi (2001a) due to a shock to autonomous investment, changes in consumption will occur which let consumption increase. And according to the figures retrieved from the Eviews output can be confirmed that investment shocks represents most of consumption growth. However, in this study, no distinction has been made whether the largest share of these investments are autonomous investments or induced investments

Impulse Response of Consumption

Figure 13 and Appendix 4b. give clearer evidence to find out which variables, when a positive shock of one S.D. occurs, respond to the change in consumption. Except for Import, in the case of positive shock of one S.D., all variables show positive growth in consumption. A shock of one S.D. in investment will create the highest IRF in the short run until it reaches quarter 11. After this point investment remains stable over the long run horizon and export becomes higher than investment, where the latter remains stable over the long run horizon. The short run shock responses represent lots of fluctuations in the change of consumption in the short run. For export a shock of one S.D. creates an immediate positive reaction to consumption. In quarter two this reaction declines but remains positive and after this point will increase gradually. Also in the long run it represents the highest shock reaction. A one S.D. shock to Government spending will create more or less the same response to consumption as investment did. Only the curve is slightly lower. Consumption's own shock shows a high immediate reaction but declines over the forecasting period of 20 quarters. Yet this shock remains positive over this period and stable after the 10th quarter. Also a one S.D. shock to GDP creates a positive reaction to consumption. Less fluctuations and a lower curve is represented in the Figure below (Figure 13). Therefore the conclusion based on the IRF is that investment creates lots of fluctuations in consumption in the short run and high immediate reaction. On the other hand, export, which increases gradually, represents a higher response to consumption in the long run. Till the 10th quarter a one S.D. shock to Investment and government spending creates higher changes for the consumption, after the 11th quarter this pattern changes and a one S.D. shock to export will create higher fluctuations in consumption.

Figure 13. .   Impulse response of consumption to a one S.D. (d.f. adjusted) shock in GDP, consumption, investment, government expenditure, export and import.
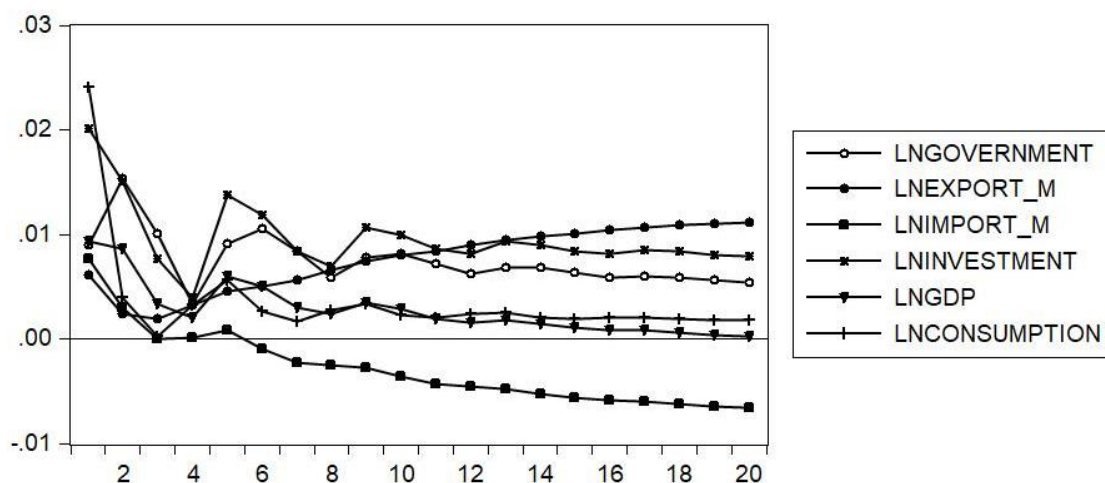
Variance Decomposition of Consumption

The other method, the variance decomposition, is based on the proportion of movements in the consumption due to a shock to investment, government, export, import, GDP and consumption. All the figures are shown below in table 7. Based on the IRF for all the variables this proportion will give positive movements in consumption except for import. Consumption's own shock explains most of the changes into consumption as an immediate effect (46.34 percent) and also in the SR (29.85 percent). This pattern changes in future reactions to this shock and will only represent 11.71 percent. Investment represents a 34.77 percent movement of consumption in the SR forecasting horizon and in the long run 34.34 percent. Also Government spending is a large contributor for movements in consumption growth. The immediate shock here is smaller than investment, it only represents 6.438 percent of movements in consumption which is a less important contributor. But in the SR (Q3) it increases exponential to 21.05 percent and in the LR (Q20) the percentage change of consumption will represent 20.59 percent due to a shock to government spending. Here the question arises whether these government spending consist government investments. In addition, a one S.D. impulse to export will create an immediate positive reaction on consumption but this reaction is rather small where 3 percent of the movements in consumption can be explained by a shock to export. This shock does not represent a lot of fluctuations but increases each period and over the 20-quarter forecasting horizon export will contribute for 21.84 percent of consumption movements (in this case growth).

Table 7.   Variance decomposition using Cholesky (d.f. adjusted) factors

Period	LNGOVERNMENT	LNEXPORT_M	LNIMPORT_M	LNINVESTMENT	LNGDP	LNCONSUMPTION
Variance Decomposition of LNCONSUMPTION:						
1	**6.438220**	**3.005124**	**4.637791**	**32.60760**	**6.975613**	**46.33565**
2	17.46543	2.380541	3.680322	34.87061	8.883546	32.71956
3	**21.05365**	**2.353809**	**3.357710**	**34.72248**	**8.660221**	**29.85213**
4	21.06703	2.790567	3.273975	34.62224	8.637922	29.60826
5	21.33160	3.220663	2.808811	37.36866	8.810908	26.45936
6	22.98121	3.799228	2.520971	38.28414	8.731744	23.68271
7	23.91602	4.657606	2.529337	38.17797	8.482747	22.23632
8	23.90735	5.858268	2.623915	37.94118	8.263253	21.40604
9	23.87755	7.084933	2.641138	38.36703	7.971477	20.05787
10	24.02255	8.361009	2.814162	38.40164	7.627558	18.77308
11	23.97952	9.750016	3.125955	38.08945	7.280596	17.77447
12	23.66824	11.24609	3.477484	37.69186	6.955734	16.96059
13	23.33368	12.68247	3.808111	37.47006	6.616424	16.08924
14	23.02080	14.09293	4.202771	37.12767	6.287042	15.26878
15	22.65368	15.50112	4.645406	36.67190	5.980101	14.54779
16	22.21871	16.89537	5.094775	36.18848	5.696022	13.90664
17	21.78616	18.21226	5.527470	35.76140	5.422869	13.28984
18	21.36587	19.47176	5.972484	35.30514	5.169026	12.71572
19	20.94056	20.68406	6.422634	34.82275	4.936570	12.19343
20	**20.50918**	**21.84530**	**6.862745**	**34.34273**	**4.723194**	**11.71685**

7 Discussion

Through all the incentives taken by the Chinese government, which are broadly explained and discussed above (chapter 2), a deeper investigation is done either these incentives create an impact on the GDP-growth or not. Where this paper differs from most others is the method of analysis, a deeper focus on the domestic demand growth approach, more recent figures and an analysis based on quarterly data. In addition it is only very recent that the Chinese economy is changing towards another growth-path. Therefore by using of recent data this could proof a different behaviour. Most paper put their focus on the ELG hypothesis, here this will be the DDLG hypothesis. The DDLG hypothesis can consist of either a growth engendered by consumption (household and/or government) and/or investments (private and/or public).

Unlike Tsen's (2010) research, where no conclusion can be drawn whether domestic demand or export contributed more to economic growth, a clear distinction can be made in this paper. Here it is identifiable that the short term Chinese growth is driven by domestic demand rather than exports, and mainly by government spending (G) (public investment and consumption) and private consumption (C). Both represent, according to IRF and Variance Decomposition, the highest short term value on the IRF graph and the highest percentages proportion of movements in GDP (Figure 12 and Appendix 4a). Also domestic demand is responsible for more fluctuations in the short term output growth. Furthermore investments consist of private investment (I) and public investment, the latter is part of government spending (G). Private investment, with around 3 percent in the SR and 8 percent in the long run, does not contribute a lot to the economic growth. Therefore the investment-led-growth belief for China is basically focused on the amount of public investments. There are other studies which also confirm that public investments mainly in infrastructure, make a major contribution to the Chinese growth (Li & Ning, 2013). In addition public investment contributes both in the short as in the long run. Also Wang & Wen (2017) has proven that government spending is a driver for the Chinese output growth. However, this analysis did not take into account the negative effect that the multiplier produces. Mainly, government spending is a source of increases in the inflation rate which in turn reduces the output. These high government investments in public goods can create "crowding in[9]" effects on private investment. And on the other hand government investments in private goods, mostly in SOEs, causes a "crowding out[10]" effect on private investment (Xu & Yan, 2014). The first effect indicates that the government of china should increase their public investments in public goods (healthcare, education...). Also Barnett & Brooks (2010) confirm that healthcare spending has a positive effect on consumption and investment. The latter effect indicates that the government shouldn't invest in sectors of SOEs who directly compete with the private sector. However, the opinions are divided. On the one hand, investments in infrastructure especially in less developed non-coastal areas are still necessary. On the other hand there is some scepticism about the excess capacity, inefficient use and tightening financial conditions these investment triggers (Lee et al., 2013).

Although export is also a really important contributor to a growing economy, its immediate and short run shock reaction to export on GDP shows that export do not contribute a lot and even creates a negative growth effect. However, over the long forecasting horizon (5 years) this effect will gradually increase and will become an important element for economic growth. Therefore for the long term growth case this study confirms the many other ELG investigations (Balassa, 1978; Chao et al. 2001; Tsen, 2013; Uni, 2007; Kaldor, 1977). Although export creates high economic growth in the LR, it also causes other local and global imbalances and is seen as unsustainable for the future economy (Hofman & Kuijs, 2008; Prasad, 2009; Lardy, 2012). First extension will be about the national imbalances provoked by the ELG. Because this export strategy was focused on low repressed wages and high savings rate

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[9] Crowding in effect: Is the effect caused by government deficits that stimulate investment. Public spending increases the demand for goods and as a result, spending in the private sector will increase.

[10] Crowding out effect: This is an effect where the interest rate increases due to a rise in government expenditure and financing with shortcomings. In turn, private consumption and investments will decrease.

which increased the nation's poverty and inequality and reduces the amount of consumption (Chan et al., 2016). That is why the government of China created policy reform mechanisms to change the Chinese economic market dependence from export more towards domestic demand factors and mainly consumption driven growth. So it is not an or-story but rather an and-story where exports fall and consumption rises simultaneously. Such that consumption ensures that the overcapacity created by declining exports (also by investment) gets transferred to the market. What consumption can do differently is mainly because consumption growth do not reflect in negative spill-over effects to surrounding countries. Furthermore by increasing the domestic consumption capacity wages will have to rise. Ultimately higher wages result in more consumption, better HRQL, more educated people and will finally result in less income inequality (Zhang, Ou et al., 2015; Gong et al., 2015; Chan et al., 2016). The global imbalances that China is trying to avoid the risk of retaliation between them and the developed countries because the ELG strategy emerge into currency devaluations (exchange rate manipulations) (Rodrik, 2013; Kaldor, 1977).

Furthermore, in order to generate this consumption growth, several elements play a role, such as consumer confidence, savings behaviour, etc. (Ludvigson, 2004). In addition, there are also endogenous elements which are decisive for creating consumption growth. According to Gualerzi (2001a), shocks in autonomous investment cause a growth in consumption. In this study, no distinction was made between autonomous or inductive investments because these data are not available for china. We can, however partly confirm this finding, since investments contribute the 34 percent of changes in consumption, both in the short term and in the long term we speak of Investment-led-Consumption (ILC) growth. Subsequently, unlike Tsen (2010), the GLE and GLDD effect cannot be confirmed for China according to this analysis. A one S.D. shock to GDP gives a positive response to consumption, export, investment, government spending but the contribution is rather low (Appendix 6).

In addition, a few points of criticism on this paper. The methodology based on a BVAR with the Cholesky ordering is produced according to findings in the literature. However there was only little evidence how this ordering should be prepared. A small change in the ordering of the impulse response definition will change the output of the impulse response and the variance decomposition. These results are based on ordering of the most exogenous variable to the least exogenous. It should be mentioned that this ordering is chosen based on the highest percentage own shock in the variance decomposition which is assigned as the most exogenous variable. As second finding, before the results in the analyses other data from the Federal Reserve Economic Data (FRED) of St. Louis was collected. This data was annually and transformed to quarterly with a HP-filter. There was no evidence found of other papers using this filter to decompose their data with the HP-filter from high frequencies (annual) to low frequencies (quarter). However, most literature that have used the HP-filter did the opposite (quarterly data converted to annual data). And from the results of the analysis it was clear that another dataset had to be used. Therefore monthly data for several variables has been collected in nominal terms and calculated by dividing with the price index into real data and thereafter converted in quarterly data with the HP filter. Still this analysis should have been more accurate if real quarterly data was available for China as there is some criticism and doubt about the accuracy of the HP filter. When it comes to the reliability and correctness of this filter, opinions are divided. According to Leon (2012) this filter is the most used and most accurate filter in business cycle estimations. While Hamilton (2016) doubt this method because the HP filter produces a false dynamic relationship in the series.

Finally, some suggestions are written down below that may be of interest for further research. What could be useful as an extension on this study is by dividing the data of government spending into different categories. Through splitting up these groups into government consumption and government investment and calculate each of them as an impact on growth and consumption. In addition, for investment, both public and private, it would be beneficial to know in what kind of sectors these investments are mainly done. In most papers we find a huge amount in infrastructure and housing investment (Li & Ning, 2013). First these papers are outdated as reform happened recently and this was not represented in the dataset. Also this paper did not make any distinction between the rural and urban consumption patterns. Mainly because this data is not available for China online.

8   Conclusion

Overall, this research has given a clearer picture of the elements of China's economic growth based on recent data. This study has clearly shown that domestic demand makes a very important contribution to economic growth. Especially short-term government spending (public consumption and investment) and private consumption are the sources of the domestic demand that makes this contribution for China. In the long term, too, this contribution is not unimportant, but mainly export is the main driver on a long term basis - after 3 years. Furthermore, as the government wants to improve domestic consumption some exogenous and endogenous elements could help accomplish this. First consumer confidence will have to increase and policy instruments can assist with this. Second, Increasing wages will automatically weaken the export strategy as this is an important element which ensures that their currency remains undervalued. When these wages increase, this effect will narrow down or no longer exist, making exports less attractive for their trading partners. Subsequently, because of these rise in income, domestic consumption will increase thanks to households that are going to consume more. The last element is an endogenous element, where shocks in autonomous investments create higher consumption growth. This means that investing into knowledge and innovation will trigger consumers to buy more goods and services provided. The distinction in the consistency of investment is not clear in this study because there is no separate data available for autonomous and induced investments. Hence it cannot be confirmed whether or not a shock in autonomous investments makes a positive contribution to consumption. However, we see that the total investment makes the highest contribution to consumption in the analysis. Another thing that may be interesting to calculate for further research is by applying domestic consumption at a regional level. Since China has large regional differences concerning rural and urban regions.

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10 List of abbreviations and symbols

$	United States Dollar symbol
¥	Chinese Yuan Renminbi symbol
A	Knowledge
AD	Aggregate Demand
AIC	Akaike Information Criterion
BRIC(s)	Brazil, Russia, India, China and South Africa
BVAR	Bayesian Vector Auto Regression
C	Consumption
CA	Current Account
C-G	Consumption-Growth
CNY	China Yuan Renminbi
d.f.	Degrees of freedom
DDLG	Domestic-Demand-Led-Growth
DE	Developed Economies
eL.	Human capital – e: education, L: labour
ELG	Export-Led-Growth
EU	European Union
FPE	Final Prediction Error
FRED	Federal Reserve Economic Data
G	Government spending (public investment, consumption)
GDP	Gross Domestic Product
GLDD	Growth-Led-Domestic-Demand
GLE	Growth-Led-Export
HP	Hodrick-Prescott
HQ	Hannan-Quinn information criterion
HRQL	Health-related quality of life
I	Investment
ILC	Investment-Led-Consumption
ILG	Investment-Led-Growth
IM	Import
IMF	International Monetary Fund
IRF	Impulse Response Function
IRS	Increasing Return to Scale
K	Capital

LDE	Les Developed Economies
LOG	Logarithm
LR	Long Run
NBS	National Bureau of Statistics (China)
NGT	New Growth Theory, Endogenous Growth theory
NX	Net Export
OEC	Observatory of Economic Complexity
OGT	Old Growth Theory, Neo-classical growth theory
OLS	Ordinary Least Squares
PBC	Public Bank of China
PPP	Purchasing Power Parity
Q20	Quarter twenty
Q3	Quarter three
R&D	Research & Development
RMB	Renminbi
S.D.	Standard Deviation
S.E.	Standard Error
SC	Schwarz information criterion
SOE	State-owned enterprise(s)
TFP	Total Factor Productivity
UK	United Kingdom
US	United States
USD	United States Dollar
VAR	Vector Auto Regression
WTO	World Trade Organisation
X	Export
Y	Gross Domestic Product, economic output, income
α	Constant term coefficient
β	Coefficient