



Universidad de  
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Foreign Exchange Interventions and Current Account  
Global Imbalances

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“Nothing truly valuable can be achieved except by  
the unselfish cooperation of many individuals”.  
(Albert Einstein)

“The greatest victory is that which requires no battle.”  
(Sun Tzu)

## Abstract

*The aim of this thesis is to analyze two macroeconomic topics that have become relevant in the last years. The first one is the Foreign Exchange Intervention (FEI), which has been widely used as a tool of monetary policy in the world in the last century by most of the central banks. Basically, it consists in influencing the nominal and real exchange rates by buying and selling currencies in the foreign exchange market. Overall, it seems that this mechanism has been efficient at boosting the local economies and has helped to achieve the policy objectives set by central banks. However, political tension may arise between nations, as currency wars and retaliations may emerge if coordination between countries is not reached. The second topic that we will discuss are current account global imbalances, which consists in those situations in which a group of countries have significant and increasing current account surplus and other few nations run the corresponding current account deficits. We will argue that global imbalances cannot last forever and that international cooperation seems to be one of the best ways to reduce them without generating harmful consequences in the global economy.*

**Keywords** Real Exchange Rate FX market Cooperation Undervaluation Global Imbalances  
Short-run Long-run Competitiveness Growth Retaliation

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# 1. Introduction

In the last few years, political tension between China and the United States escalated to unprecedented levels. Under the Trump administration, in 2016 the USA decided to retaliate against its most important trading partner. The reason that the American government gave to undertake these measures was the unfair Chinese trade policy applied in the last decades that were increasing the US current account deficit. More specifically, the two most questioned policies by the American authorities were the unilateral foreign exchange intervention to keep the Yuan undervalued and the massive purchase of American bonds that helped the Asian country to keep a current account surplus for several years. In response to the commercial barriers applied by the United States, the Chinese government decided to respond with tariffs against US imports, and a tariff war was established between both nations that culminated with a commercial agreement signed by Presidents Xi Jinping and Donald Trump in 2020.

The conflict between China and the United States constitutes the main motivation for the development of this thesis. Our aim will be to analyze the benefits and limitations of unilateral interventions in the foreign exchange market and the current account global imbalances dynamics. Despite that these two aspects run through different paths, both may lead to conflicts among countries. We will argue that international cooperation seems to be one of the best ways to reduce the rising tension between nations.

The first topic that we will discuss is the Foreign Exchange Intervention (FEI). Basically, FEI is a monetary tool used by Central Banks all around the world that consists in influencing the nominal and real exchange rates by buying and selling currencies in the foreign exchange market. In other words, governmental authorities decide to appreciate or depreciate the value of the national currency to meet their policy objectives. In this thesis, we will focus on studying some of the benefits and limitations of this tool.

As we will discuss later, FEI seems to have several benefits for those countries who decide to apply it. First, it may help to improve the exchange rate management and increase the monetary independence of a nation. Second, keeping an undervalued currency through FEI may lead to an increase in the competitiveness of tradable products and thus boost exports. Third, FEI can stimulate the reserves accumulation of a

country, which can provide a good shelter against unpredictable sudden stops in the financial market. Fourth, this monetary tool can be useful to stabilize exchange rates fluctuations and smooth the financial sector by reducing the volatility of debts and credits. Fifth, we will argue that FEI may support institutions and alleviate market failures, as Rodrik (2008) suggests.

Despite having several benefits, unilateral foreign exchange interventions may also have some limitations. The depreciation of the currency might lead to an increase in prices of those products whose inputs are fixed to a foreign currency. As a consequence, FEI can cause a reduction in real wages. At the same time, the inflationary process generated by FEI might have an impact in the real value of assets and liabilities, and thus lead to a redistribution of wealth from lenders to borrowers as suggested by Doepke and Schneider (2006). Besides, we will argue that intentional currency devaluations may lead to retaliation from other countries and currency wars, as it did in the post-World War I global economy. In the end, international cooperation seems to be one of the best solutions to avoid these conflicts.

The second topic that we will discuss is the current account global imbalances, which consists in those situations in which a group of countries have a current account surplus and other countries have a current account deficit. Understanding both the importance and the composition of the current account is fundamental to achieve a better understanding of global imbalances. For this reason, we will address these matters based on the framework suggested by Schmitt-Grohé et al (2019). At the same time, we will study the evolution of current accounts for several countries for the period 1980 to 2020. For simplicity, we follow the example of Edwards (2004) and we classified several nations in six groups: Industrial Countries, Latin America and Caribbean, Asia, Africa, Middle East and Eastern Europe.

There are different opinions concerning the dangers of sustained current account deficits through long periods of time. While some authors suggest that there is no risk, others believe that these deficits should be reduced to avoid an international financial crisis. In this thesis, we will study the arguments in favor of both points of view. Besides, we will develop a brief narrative to understand the dynamics behind global imbalances and study the case of the Plaza Accord signed in 1985 to understand the importance of international cooperation.

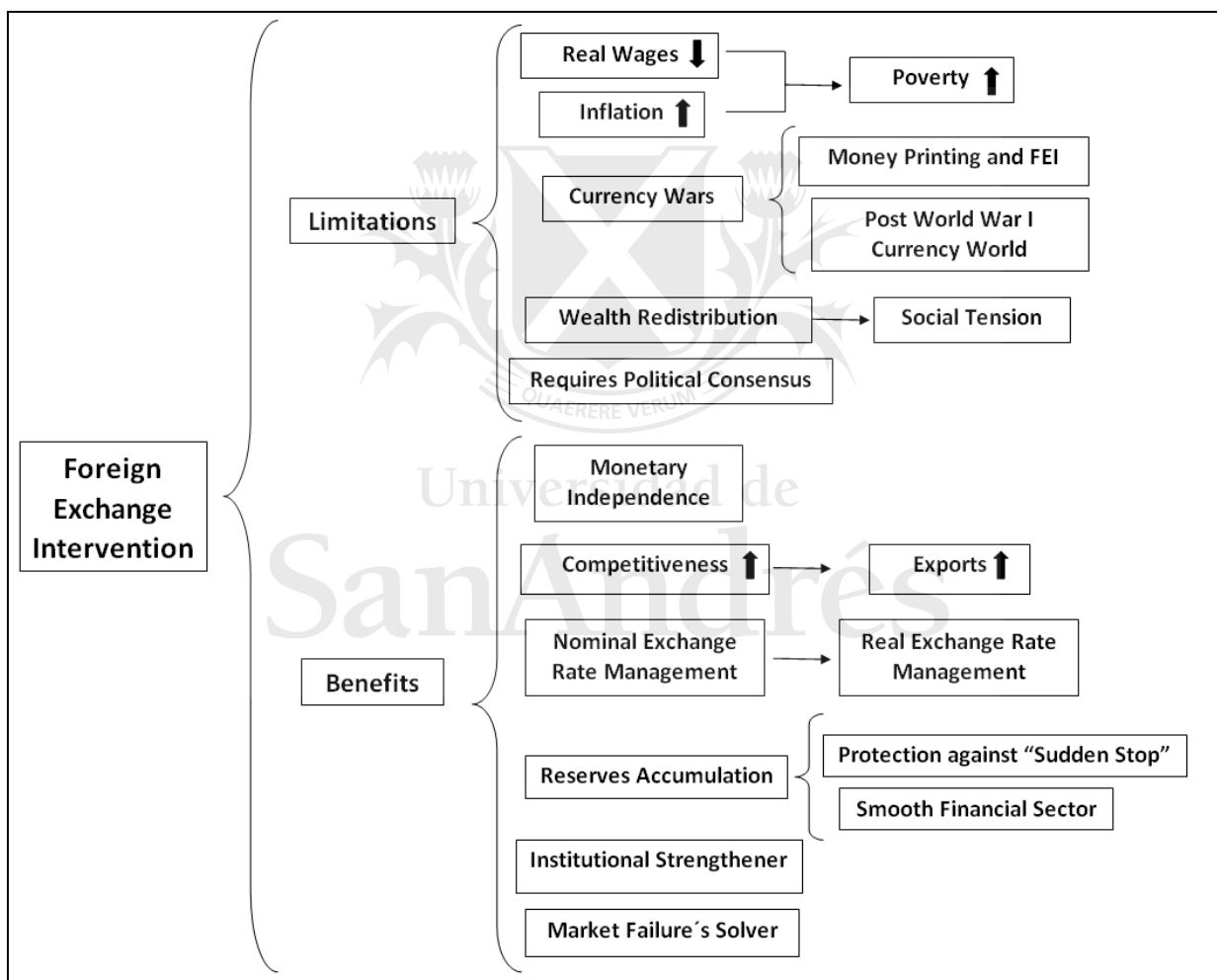
The organization of this thesis goes as follow. First, in section 2 we will talk about the advantages and disadvantages of unilateral foreign exchange interventions in a small and open economy. We will start by analyzing the limitations of FEI, which include an increase in poverty, social conflicts originated by unintended wealth redistribution, the necessity of achieving political consensus and the dangers of potential currency wars. After this, we will discuss the several benefits of devaluating the local currency, which include a proper management of the nominal and real exchange rates, an increase in competitiveness, acquiring more monetary independence, reserves accumulation, institutional strengthening and reduction of market failures. Second, in section 3 we will discuss the current account global imbalances. We will start by explaining the composition of the current account. Then, we will describe the evolution of global imbalances in different regions of the world for the last four decades. Later, we will analyze the present discussion about the dangers of large current account deficits by making a brief review of different economists' opinions. To finish this section, we will describe through a simple narrative the dynamics behind global imbalances and a possible international cooperation scenario by looking at the example of the Plaza Accord. Third, in section 4 we provide a summary of the main ideas discuss in this presentation. Finally, we conclude with sections 5 and 6 by presenting the bibliography and the appendix.

## **2. Foreign Exchange Intervention**

As we mentioned in section 1, the Foreign Exchange Intervention is a monetary tool used by most of the nations, which consists in influencing the nominal and real exchange rates by buying and selling currencies in the foreign exchange market. As Fanelli and Straub (2017) underline, FEI was implemented by both Advanced Economies and Developing Countries during the Gold Standard and the Breton Woods System to help countries in gaining a certain degree of monetary independence. After this period, most countries continue to intervene in the foreign exchange market to achieve their policies goals.

Our analysis of FEI will consists in discussing the main limitations and benefits that this monetary tool can bring to the economy. We present a brief summary in Figure 1 of the topics that we will discuss in this section. In the following lines, we will

provide more details on each one of these matters in order to have a better understanding of FEI. Before keep going, we should remind that the impact that FEI may have at home depends considerably in the level of involvement and management of the government. The degree of intervention, public policies and political consensus will be fundamental to determine the success of FEI. At the same time, as Fratzcher et al (2019) suggest, since 1990 most of the interventions have been oriented to the purchase of foreign currency, which means that most central banks have tried to depreciate the local currency<sup>1</sup>. For this reason, we are going to focus only on the case of a real depreciation of the exchange rate.



**Figure 1.** Benefits and Limitations of Unilateral Foreign Exchange Interventions.

<sup>1</sup> Fratzcher et al, 2019, p. 140



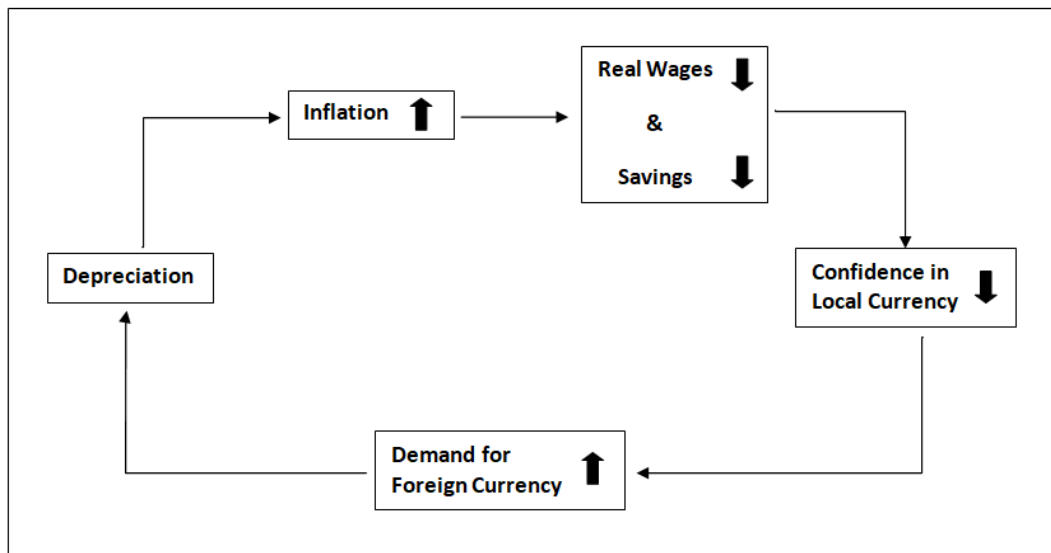
## *2.1 Limitations of FEI*

In this section, we will discuss three of the main limitations of unilateral foreign exchange intervention. We will start by analyzing the reduction in real wages and the unintended wealth redistribution that can be generated as a consequence of the application of FEI. Besides, we must recall that this monetary policy has consequences not only at home, but also abroad. This fact is considerably important because we should not only see what happens when a country participates in the foreign exchange market, but also understand how the rest of the nations will adjust to these fluctuations. For this reason, we will discuss the effects of currency wars by studying the example of the post-World War I international scenario.

### 2.1.1 Reduction in Real Wages

Let us start our analysis by thinking of a society in which all the citizens have their wages and savings in the local currency. Initially, a depreciation of the local currency may lead to an increase in prices of those products whose inputs are fixed to a foreign currency. In other words, a depreciation of the local currency will increase the inflation rate of the country. As a consequence, the purchasing power of the society will be reduced. Furthermore, the rising inflation may affect the confidence of citizens in the local currency by reducing their real wages and their real savings. To protect themselves against other devaluations of the domestic currency, most of the citizens may decide to buy foreign currencies. In the end, this will translate into more demand for foreign currencies, producing then a boomerang effect that may depreciate even more the nominal exchange rate, as we can see represented in Figure 2.

The example that we have discussed in the last paragraph sends an important message: The negative impact produced by FEI in the real wages depends mostly on how the confidence of people gets affected. If authorities manage to keep people's trust in the local institutions, then the adverse consequences of FEI will be limited. Otherwise, the depreciation of the local currency can be more than the expected one.



*Figure 2. What happens when depreciation harms the confidence of the society?*

### 2.1.2 Wealth Redistribution and The Need for Political Consensus

So far, we have discussed some of the economic implications of FEI, but let's analyze now the social and political consequences of currency depreciations. As we discussed in section 2.1.1, a reduction in real wages will diminish the purchasing power of the people. As a consequence, the amount of people below the poverty line will increase. On the good side, this unfortunate new poor people may not be under this situation for a long time, as an undervalued exchange rate will boost the economy if it is well managed in a relatively short period of time.

Another problem that may arise as a consequence of unilateral interventions in the foreign exchange market is the redistribution of wealth in the society. As Doepke and Schneider (2006) suggest, inflation lowers the real value of assets and liabilities, and thus contributes to the redistribution of wealth from lenders to borrowers<sup>2</sup>. For this reason, the new equilibrium of the economy will benefit some groups and will prejudice others. Besides, this new equilibrium can lead to an increase in inequality in the society, which may translate into more social tension. Institutions and political consensus among political parties will be crucial to keep peace and order at home. If they succeed in this enterprise, authorities will probably manage to achieve their policy goals.

<sup>2</sup> Doepke and Schneider, 2006, p. 1070.

### 2.1.3 International Tension: Currency Wars

So far we have ignored an important fact in our discussion about FEI: If a currency is undervalued, it means that another currency should be overvalued, and as Rodrik (2008) said: “Just as overvaluation hurts growth, so undervaluation facilitates it”<sup>3</sup>. A currency war occurs when countries start to intentionally devalue their own currency against others, and in response other nations decide to retaliate against these countries for unfair competitiveness.

As Rickard (2012) suggests, currency wars emerge in those countries with insufficient internal growth<sup>4</sup>. The stagnation of consumption and investment, a high unemployment rate, an undeveloped financial and banking sector and the unwillingness of authorities to reduce the fiscal deficit are typical circumstances in these nations. Thus, the impossibility of generating internal growth makes the promotion of exports through the undervaluation of the currency an appealing tool to make the economy grow<sup>5</sup>. An intentional undervaluation can be achieved by lowering domestic interest rates, printing money or by unilateral foreign exchange market interventions. For this reason, we argue that FEI may lead to currency wars.

There are several examples of currency wars throughout the history, but we are going to focus in the first global currency war of the twentieth century. Rickards (2012) argues that in years after the World War I there was a global currency war between nations that begun with the massive money printing of the German marc, which led to a hyperinflation in Germany. In this way, the *Reichsbank* was able to promote exports and encourage tourism and foreign investment, which helped to achieve the foreign exchange needed to pay the war's reparations assigned in the Treaty of Versailles<sup>6</sup>. The social consequences of the hyperinflation were catastrophic, but Germany managed to grow in this period.

The rest of the countries took different paths. For instance, the French franc collapsed between 1923 and 1925, but not as bad as the German marc did in the past years. The undervaluation permitted France to collect inflows of gold, as its exports became cheaper for the rest of the countries. For this reason, by 1927 gold and foreign

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<sup>3</sup> Rodrik, 2008, p. 366

<sup>4</sup> Rickards, 2012, p. 38

<sup>5</sup> Rickards, 2012, pp.38-39

<sup>6</sup> Rickards, 2012, p. 57

exchange was being heavily accumulated by France and flowing away mostly from England<sup>7</sup>. In 1931, the British Empire ended up leaving the gold standard due to the unsustainable outflows of gold, and the sterling ended up being devaluated against the dollar. Other countries such as Japan and the Scandinavian nations also left the gold standard in this period, while France, Netherlands and Italy remained pegging their currencies to the gold<sup>8</sup>.

	Countries that stayed in the Gold Standard...	Countries that abandoned the Gold Standard...
<b>Currency</b>	Appreciated	Depreciated
<b>Competitiveness</b>	Decrease	Increase
<b>Exports</b>	Decrease	Increase
<b>Economic Recovery</b>	Slow	Quick
<b>Reserves stock</b>	Gold	Only part in Gold

**Table 1.** Comparison between countries who stayed and who abandoned the gold Standard

Albers (2020) identifies that those countries that abandoned the gold standard gain more than those who stayed in the second half of the 1920's, as we can see in Table 1. However, things changed in the next few years. As we mentioned before, Albers (2020) suggests that the advantages of devaluations in the long run were limited, as we can see in the example presented in the Appendix 6.1<sup>9</sup>. In the author's words:

"From a commercial policy perspective, the devaluations were a doubled-edged sword. While facilitating a faster recovery and less protectionism in devaluing countries, they directly fostered protectionism abroad and opened the doors for a third phase of commercial warfare. In this phase, the nature of protectionism shifted from general to discriminatory". (Albers, 2020, p. 254)

In 1933, the President of the United States, Franklin Delano Roosevelt, undertook a series of policies to confiscate the gold from American citizens, establishing in April an executive order that forced citizens to sell most of their gold to the Federal Reserve Bank for the equivalent of \$20,67 per ounce<sup>10</sup>. After this, the United States continued purchasing gold in the open market and devaluing the US dollar against it.

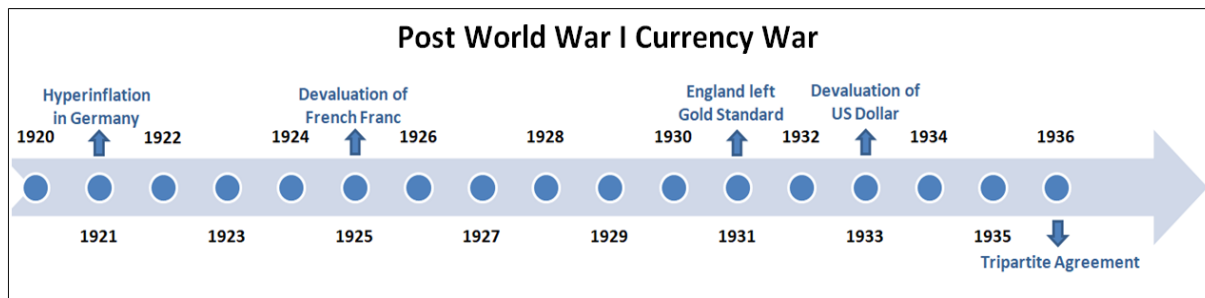
<sup>7</sup> Rickards, 2012, pp. 64-65.

<sup>8</sup> Rickards, 2012, p. 67-68.

<sup>9</sup> To have a better understanding of commercial implications of the application of "Beggars My Neighbor" policies, see the example developed by Staiger and Sykes in the Appendix 6.1 of this thesis.

<sup>10</sup> Rickards, 2012, p. 73.

The final chapter of the post-World War I currency war was the Tripartite Agreement signed in 1936 by the United States, France and Great Britain. The deal permitted both the Frankish and the British empires to devalue their currencies against gold and established a commitment of the three nations to stabilize their currencies<sup>11</sup>. The whole period that we have discussed is summarized in Figure 3:



*Figure 3. Timeline of the Post World War I Currency War*

As we can see, the post-World War I scenario is a useful example of how FEI may lead to a currency war that compromises the international monetary system. For this reason, international cooperation seems to be the path to follow to guarantee stability and peace among nations.

## 2.2 Benefits of FEI

So far we have discussed the limitations of unilateral interventions in the foreign exchange market. Now, we will analyze the main benefits that this monetary tool may bring to the economy if it is properly applied by central banks and governments. In particular, we will focus on five advantages of FEI: the management of nominal and real exchange rates, the increase in competitiveness of domestic tradable products, the increase in the monetary independence of the country, the accumulation of reserves and the capacity of FEI to strengthen institutions and solve market failures.

### 2.2.1 Nominal and Real Exchange Rate Management

According to Fanelli and Straub (2017), FEI can be a useful tool for managing the nominal exchange rate of a country. Furthermore, it could help to smooth out the exchange rate adjustments over time, to increase exports (and thus improving the terms of trade of the country) or to reduce the exchange rate volatility<sup>12</sup>. Adding to this last

<sup>11</sup> Rickards, 2012, p. 75

<sup>12</sup>Fanelli and Straub, 2017, p. 8

point, Bacchetta and van Wincoop (2000) suggest that exchange rate stability is not always related with more trade. Moreover, the authors conclude that commerce fluctuations will not strictly depend on the FX regime (that could be a float, fixed or mix system) chosen by the country. What really matters is to select the system that best adjusts to the monetary authorities' preferences<sup>13</sup>.

The approach of Bacchetta and van Wincoop (2000) seems to be partially correct. On the one hand, it is true that there is not one exchange rate system that is consistently better than other FX regimes. We consider that economics are dynamic, and what may be the best solution today, might not be the best alternative tomorrow. Besides, cultural, geographical, historical, and demographical factors may determine that what seems to be the best regime for a country A is totally different from the best regime for country B. On the other hand, it sounds controversial to ensure that exchange rate stability does not have any benefits for trade. To certain extent, we can understand the exchange rate as the level of confidence that people at home and abroad have on the local currency. A stable exchange rate may reflect a solid economy, and this could increase the amount of people abroad willing to trade with the country.

Despite all these arguments, Bacchetta and van Wincoop (2000) may be right in one thing: monetary authorities do not have the tools to alter the real exchange rate directly. However, as we have discussed before, they can use different monetary tools like FEI to change the value of the nominal exchange rate, and indirectly change the real exchange rate. To understand this idea, we should remember one of the most fundamental equations in macroeconomics:

$$\epsilon = e * \left( \frac{p^{Home}}{p^{Abroad}} \right) \quad (i)$$

Where “ $\epsilon$ ” represents the real exchange rate, “ $e$ ” represents the nominal exchange rate and “ $\left( \frac{p^{Home}}{p^{Abroad}} \right)$ ” is the ratio of price levels. If we applied logarithms and differentiate, equation (i) can be rewritten as follows:

$$\Delta\epsilon = \Delta e + (\Delta p^{Home} - \Delta p^{Abroad}) \quad (ii)$$

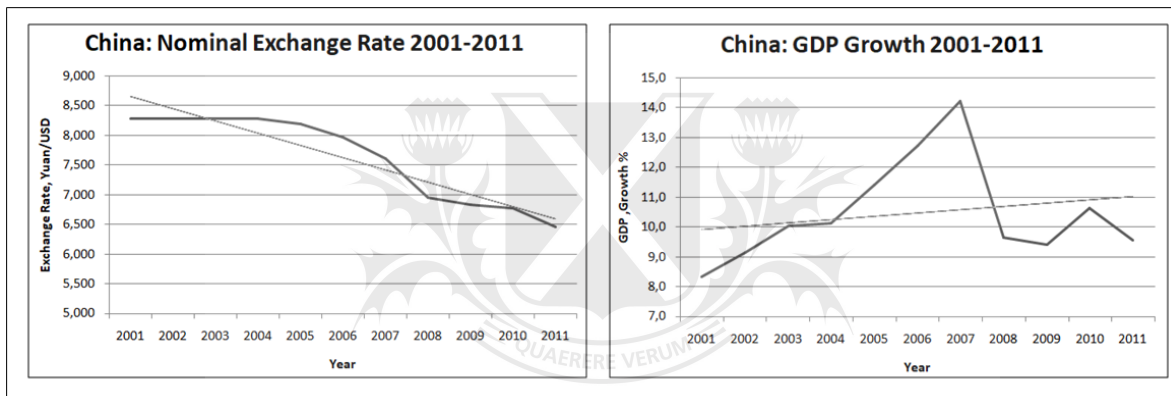
Or in simpler terms:

$$\% \text{ Real Exchange Rate} = \% \text{ Nominal Exchange Rate} + \text{Difference in Inflation Rates} \quad (ii')$$

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<sup>13</sup> Bacchetta and van Wincoop, 2000, p. 1095

Equation (ii') should be reminded to understand the view of Rodrik (2008), who remarks us that real exchange rate can be altered indirectly through changes in the nominal exchange rate<sup>14</sup>. The author also addresses the advantages of an undervaluation for economic growth, which can be achieved through FEI. Moreover, Rodrik (2008) estimates that a 50 per cent undervaluation is associated with an increase in the real income per capita of 1,3% in the same five-year period<sup>15</sup>. However, in the long run an undervalued real exchange rate seems to be insufficient to explain growth. For instance, the Chinese economy continue growing between 2001-2011 after they started to appreciate their currency against the US Dollar, as we can see in figure 4 based on OECD and The World Bank Data:



**Figure 4.** Chinese Nominal Exchange Rate and GDP Growth Rate in the period 2001-2011.

We also acknowledge the weakness of explaining the Chinese growth experience by only focusing on the exchange rate, but our aim is to emphasize this variable. Although a single country analysis, the Chinese case helps us to remind that we must not exaggerate the importance of the nominal and real exchange rate in determining the success of a country. However, we should understand that the correct management of this tool could help to boost the economy.

As we can see in Figure 5 and Figure 6 presented in the Appendix 6.2, during the last decade's developing countries' currencies have been depreciated in relationship

<sup>14</sup> Rodrik, 2008, p. 406

<sup>15</sup> Rodrik, 2008, p. 374

to the US Dollar, meanwhile the currencies of developed countries have remained relatively stable or even appreciated<sup>16</sup>.

### 2.2.2 Exports and Competitiveness

As, Staiger and Sykes (2008) suggests, central banks interventions in the foreign exchange market may stimulate exports<sup>17</sup>. This is true because when a country depreciates its currency, the competitiveness of its products increases. This is an economic fact, since the products at home would become cheaper for the rest of the world, and in the end more attractive. For this reason, many countries have decided to use FEI to boost exports, which seems to be beneficial for the economy as the nominal GDP will increase:

$$\text{Nominal GDP } \uparrow = C + I + G + (X \uparrow - M \downarrow) \quad (iii)$$

However, we should keep in mind Say's law, which argues that, taking the world as a whole, the sum of countries' commercial surplus should be equal to the sum of commercial deficits. In other words, not all the countries can have more exports than imports. Nowadays, a few countries are running huge deficits that sustain other nation's surpluses.

Why some countries keep running commercial deficits with the rest of the world? As bad as it may sound, this scenario is not something negative per se. On the one hand, local consumers would be benefited, as the price of some imported products would be lower. On the other hand, US firms would be harmed, as they would have more competition from firms abroad, and they would be forced to reduce their gains and seek for channels that could help them to reduce their costs. That is why the government's preferences would be fundamental in determining the outcome of an intervention in the foreign exchange market. If the authorities adopt a "protectionist" position, they will probably restrict imports to protect local firms. In contrast, if they adopt a "free market" approach, they will not impose trade barriers with other countries in order to encourage local consumption and competition.

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<sup>16</sup> See Appendix 6.2

<sup>17</sup> Staiger and Sykes, 2008, p. 1



### 2.2.3 Achieving Monetary Independence

As Fanelli and Straub (2017) argue, FEI helps those countries that applied it to regain monetary independence from the rest of the world. By being able to freely participate in purchasing or selling operations in the foreign exchange market, nations can define the policy objectives that best adjust to the economic reality they are facing. For instance, perhaps a country would like to increase the amount of FX reserves to protect itself against a “sudden stop”. To the contrary, maybe another country needs to sell FX reserves to obtain liquidity to satisfy the local demand for foreign currency.

The possible scenarios are infinite so it's essential for a country to have FEI to confront any obstacle that arises. However, we should keep in mind that in most of the cases this monetary policy is not going to be enough, as it is a limited tool. For example, in the case of a sudden loss of confidence in the local currency due to an external shock, the operations in the foreign exchange market done by the central bank are not always going to recover the trust of people in the national currency, but at least would provide some “oxygen” to the economy in the short run. This has been the case of the Argentinean economy in the last decade, for instance.

### 2.2.4 Reserves Accumulation and Smoothing Financial Sector

As Fanelli and Straub (2017) suggests, this point is particularly true for emerging market economies after the “sudden stops” episodes of the 1990s, as they were seeking to protect themselves from another similar situation<sup>18</sup>. Therefore, many emerging economies engage in reserve-accumulation policies to protect themselves from becoming illiquid during a crisis. Furthermore, many governments decide to increase reserves to maintain price stability<sup>19</sup>. In Figure 7 presented in the Appendix 6.3, we present the evolution of the reserves of several Emerging Economies for the period 1990-2019 based on The World Bank data<sup>20</sup>. Another reason for controlling the nominal exchange rate through FEI is the central banks objective of smoothing the financial sector<sup>21</sup>. By reducing exchange rate's fluctuations, the volatility of debts and credits in the financial system will be reduced.

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<sup>18</sup> Fanelli and Straub, 2017, p. 7

<sup>19</sup> Arslan and Cantú, 2019, p.7

<sup>20</sup> See Appendix 6.3

<sup>21</sup> Arslan and Cantú, 2019, p.8

### 2.2.5 Rodrik's view: FEI as Market Failure's Solver and Institutional Strengthener

Rodrik (2008) suggests that undervaluation of the currency stimulates economic growth through two channels: by alleviating the consequences of market failures and by reducing institutional weaknesses. Let's start by discussing the second point. Weak institutions reduce the ability of private investors to appropriate the returns on their investment. Some of the drawbacks that may occur are lack of protection of property rights, corruption, insufficient contract enforcement and hold-up problems. Rodrik (2008) argues that these obstacles are more controversial in tradables than in non-tradables, basically because tradable goods usually have more complex structures. This is the reason why the author suggests that weak institutions penalize with higher "taxes" on tradables than in non-tradables, which generates a misallocation of investments that takes the economy outside of the optimal scenario. Consequently, the author suggests that increasing the relative price of tradables can increase growth, as it will work as a second-best solution, reducing the impact of weak institutions, which can be understood as negative externalities<sup>22</sup>.

The second hypothesis of Rodrik (2008) is that tradables suffer more from the market failures than non-tradables. Some of the most important issues are coordination externalities among firms in the same industry, credit market imperfections and dealing with unions in the settlement of wages and working conditions. The first best solution for these problems would be identifying each one of them and applying the appropriate policy to fix it. As we know, most of the time this is not possible in real life. That is why undervaluation is so important, because once again it emerges as a second-best solution that substitutes an industrial policy for a monetary policy<sup>23</sup>.

To sum up, we have concluded the first topic of our thesis. Overall, it seems that benefits of foreign exchange interventions outweigh the costs if the institutions manage to deal with social tension at home and commercial friction abroad. Despite the fact that our analysis is limited, we believe that it gives us a proper idea of why FEI has been a very popular monetary tool in the last decades, as we can appreciate in the figures and

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<sup>22</sup> Rodrik, 2008, pp.392-396

<sup>23</sup> Rodrik, 2008, p. 393

data that we have provided so far. In the next section, we will discuss the second topic of our work: the current account global imbalances.

### 3. Current Account Global Imbalances

The current account global imbalances consist in those situations in which a group of countries run current account deficits while others have current account surpluses. We will argue that the current account constitutes a useful parameter to understand the behavior of trade, investments and savings of a country. Then, we will analyze the evolution of current account global imbalances in the period 1980 to 2019. Besides, we will explain why current account deficits cannot last forever and we will discuss if there are dangers in sustaining a considerable current account deficit for an extended period of time. After this, we will describe a narrative based on several assumptions with the aim of providing a brief perspective under the background of the global imbalances. It is important to remark that this narrative is not going to be supported by a concrete economic model, but we believe the analysis includes reasonable rationale stemming from the literature.

#### 3.1 *The Importance of the Current Account*

To understand what global imbalances are, we should start by talking about the current account. Why? Because it condenses the economy as a whole. It is one of the components of the balance of payment of a country, and it includes the following elements:

- Trade in goods and services (net exports).
- Investment Incomes (Net Investment Income plus Net International Compensations to Employees).
- Unilateral Transfers (like gifts or foreign aid).

Following Schmitt-Grohé et al (2019) notation, we can write the current account of a country as follows<sup>24</sup>:

$$CA_t = r^* * B_{t-1}^* + TB_t \quad (iv)$$

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<sup>24</sup> Schmitt-Grohé et al, 2019, p. 57

Where “ $CA_t$ ” represents the current account, “ $r^*$ ” represents the international interest rate, “ $B_{t-1}^*$ ” denotes the country’s net investment position (if  $B_{t-1}^* > 0$  the country is a creditor and if  $B_{t-1}^* < 0$  the country is a debtor) and “ $TB_t$ ” represents the trade balance in period  $t$ .

If we assume that there is no investment, we can write the trade balance as:

$$TB_t = X_t - M_t = Q_t - C_t - G_t \quad (v)$$

Where “ $Q_t$ ” represents the nominal GDP, “ $C_t$ ” represents the domestic consumption, “ $G_t$ ” represents the public spending and “ $(X_t - M_t)$ ” the trade balance. Let  $B_t^{i,j}$  denote bonds issued by agent “ $i$ ” and hold by agent “ $j$ ”. For simplicity, we are going to assume that there are only three agents in this economy: the government (G), the private sector (P) and the rest of the world (RoW). We can write the budget restriction of the private sector as:

$$Q_t + r * B_{t-1}^{G,P} + r * B_{t-1}^{RoW,P} = T_t + C_t + \Delta B_t^{G,P} + \Delta B_t^{RoW,P} \quad (vi)$$

Where “ $T_t$ ” represents taxes and “ $C_t$ ” represents consumption. We can also write the budget restriction of the government as:

$$T_t + \Delta B_t^{G,P} + \Delta B_t^{G,RoW} = G_t + r * B_{t-1}^{G,P} + r * B_{t-1}^{G,RoW} \quad (vii)$$

Now, we are going to define  $B_t^*$  as the net foreign asset position of the country in period “ $t$ ”:

$$B_t^* = B_t^{RoW,P} - B_t^{G,RoW} \quad (viii)$$

Where  $B_t^{RoW,P}$  represents the bonds issued by the rest of the world and hold by the domestic private sector and  $B_t^{G,RoW}$  represents the bonds issued by the government and hold by the rest of the world. Consolidating conditions (vi) and (vii) and applying condition (viii), we obtain the following expression:

$$Q_t + r * B_{t-1}^* - C_t - G_t = \Delta B_t^* \quad (ix)$$

Rewriting condition (ix) we obtain the following expression<sup>25</sup>:

$$TB_t + r * B_{t-1}^* = CA_t = \Delta B_t^* \quad (x)$$

<sup>25</sup> Class notes taken from the course “International Monetary Economy” dictated by Professor Damián Pierri at Universidad de San Andrés.

Equation (x) shows that the current account can be defined as the sum of the trade balance and the interests of the external assets, which in the end also represents the variations in the holding of foreign assets. Now that we have this in mind, we can proceed to discuss the relationship between the current account, savings and investment.

### 3.2 The Current Account, Savings and Investments

The current account of a country can also be seen as the gap between total savings and total investments<sup>26</sup>. To understand why, let us once again look at the notation of Schmitt-Grohé et al (2019), that define the GDP as:

$$Q_t = C_t + I_t + G_t + (X_t - M_t) \quad (xi)$$

Where “ $Q_t$ ” represents the nominal GDP, “ $C_t$ ” represents the domestic consumption, “ $I_t$ ” represents the domestic investment, “ $G_t$ ” represents the public spending and “ $(X_t - M_t)$ ” is the trade balance. We can rewrite expression (xi) as:

$$(X_t - M_t) = Q_t - C_t - I_t - G_t \quad (xii)$$

If we consolidate conditions (x) and (xii) we obtain the following expression:

$$CA_t = (Q_t - C_t - I_t - G_t) + r * B_{t-1}^* \quad (xiii)$$

Schmitt-Grohé et al (2019) underline that the sum between the nominal GDP and net investment income equals the Gross National Product, denoted by “ $Y_t$ ”<sup>27</sup>:

$$Y_t = Q_t + r * B_{t-1}^* \quad (xiv)$$

By plugging condition (xiv) into expression (xiii), we obtain<sup>28</sup>:

$$CA_t = (Y_t - C_t - G_t) - I_t \quad (xv)$$

Where “ $(Y_t - C_t - G_t)$ ” represents the national savings:

$$CA_t = S_t - I_t \quad (xvi)$$

Expression (xvi) shows as how the current account of a country can be seen as the gap between total savings and total investments.

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<sup>26</sup> Schmitt-Grohé et al, 2019, p. 57

<sup>27</sup> Schmitt-Grohé et al, 2019, p. 58

<sup>28</sup> Schmitt-Grohé et al, 2019, p. 59

### 3.3 Evolution of Global Imbalances in 1980-2019

Following the example of Edwards (2004), we decided to divide several countries in six different regions according to geographical and economical factors: Industrial Countries, Latin American and Caribbean, Asia, Africa, Middle East and Eastern Europe. In Appendix 6.4, we present a detailed list of the composition of each one of these groups<sup>29</sup>. We studied the evolution of current accounts of each region for the period 1980-2019 based on The World Bank data. The results that we obtained are presented in tables 2 to 4. In the Appendix 6.5 we present a year to year evolution of the mean and median current account of each region in Figures 8 to 19<sup>30</sup>. As we can see in Table 2, approximately 71,5% of the 5.318 observations correspond to current account deficits. The remaining 28,5% correspond to current account surpluses.

	Current Account Balance (% GDP)						
	Industrial Countries	Latin America & Caribbean	Asia	Africa	Middle East	Eastern Europe	Total
n° Observations	802	1263	747	1490	396	620	5318
% Deficits	52,6%	82,3%	64,1%	79,9%	53,8%	74,4%	71,5%
% Surplus	47,4%	17,7%	35,9%	20,1%	46,2%	25,6%	28,5%

**Table 2.** Current Account Balance (% GDP) in each region for the period 1980-2019.

Current Account Balance Mean (GDP, %)					
Region	1980-1989	1990-1999	2000-2009	2010-2019	1980-2019
Industrial Countries	-0,83	-0,23	-0,26	1,57	0,15
Latin America and Caribbean	-5,97	-5,40	-5,11	-4,98	-5,36
Asia	-4,90	-1,85	0,57	-0,89	-1,61
Africa	-4,66	-4,40	-3,16	-7,10	-4,88
Middle East	1,95	-3,18	4,29	-0,38	0,72
Eastern Europe	-8,19	-5,04	-4,49	-2,55	-4,18

**Table 3.** Current Account Balance Mean (% GDP) in each region for each decade of the period 1980-2019.

<sup>29</sup> See Appendix 6.4

<sup>30</sup> See Appendix 6.5

<b>Current Account Balance Median (GDP, %)</b>					
<b>Region</b>	<b>1980-1989</b>	<b>1990-1999</b>	<b>2000-2009</b>	<b>2010-2019</b>	<b>1980-2019</b>
Industrial Countries	-0,80	-0,68	-0,14	1,10	-0,27
Latin America and Caribbean	-4,80	-4,08	-3,82	-3,46	-4,09
Asia	-3,66	-2,72	0,10	-1,08	-1,95
Africa	-4,75	-4,30	-4,19	-6,40	-4,89
Middle East	-1,61	-1,10	2,49	-2,37	-0,74
Eastern Europe	-1,76	-3,63	-5,13	-1,78	-3,47

**Table 4.** *Current Account Balance Median (% GDP) in each region for each decade of the period 1980-2019.*

Latin America and the Caribbean reduced their current account deficits during the 1980's. The mean deficit of this region for the period 1980-1984 was approximately 7% of the GDP, while in the period 1984-1989 the mean deficit was less than 5%. As Edwards (2004) suggests, this reduction can be explained by the external adjustment undertaken during the debt crisis of those years<sup>31</sup>. This situation was replicated in other regions of the world. In Asia, for instance, the mean deficit for the period 1980-1984 was approximately 7,3% of the GDP, while in the second half of the decade it was reduced to 2,8%. Similarly, Africa reduced their mean current account deficit from 6,6% of the GDP to less than 3% in the second half of the decade.

In the case of Industrial Countries and Eastern Europe, both regions kept running current account deficits during the 1980's without significant changes. The average deficit of the former group was less than 1% of the GDP, and the latter kept an average deficit of 8,2% of the GDP<sup>32</sup>. The case of the Middle East countries was different, because for the period 1980-1984 these countries kept an average surplus of 3,4% and for the second half of the decade they had a mean surplus of 0,5% of the GDP. One of the main reasons behind this abrupt reduction in the current account surplus average of those countries could be the decrease in the average price of the crude oil during the 1980's.

As we can see in Table 3, the six regions experienced reductions in their average current account deficits during 1990's. As Edwards (2004) suggests, these reductions

<sup>31</sup> Edwards, 2004, p. 9

<sup>32</sup> In the case of Eastern Europe, there is a considerable difference between the mean and the median of the period 1980-1989 due to the scarcity of data.

might be related to the currency crises of the second half of the decade<sup>33</sup>. The Tequila Effect in 1994, the Asian financial crisis in 1997, the Russian financial crisis in 1998 and the Brazilian financial crisis in 1999 constitute some of the most disruptive events of the decade, forcing most of the countries to reduce their net investments and thus reducing their current account deficits.

Most of the 2000's decade continued with the reduction in current account deficits in most of the regions. Between 2000-2007, Industrial Countries averaged a current account surplus of approximately 1% of the GDP, while the Middle East and Asia averaged a surplus of 4,9% and 0,9% of the GDP, respectively. At the same time, Latin America and Caribbean, Africa and Eastern Europe managed to keep reducing their current account deficit to 4,8%, 2,2% and 4,4% respectively for the same period.

The global financial crisis developed in 2008 as a consequence of the collapse of the housing bubble in the United States had several implications for the last years of the decade. Between 2005-2007, the United States averaged a current account deficit equivalent to 5,6% of the GDP. After the crisis, the American economy suffered a contraction of net investments, which caused a reduction in the current account deficit. In the period 2008-2010, the United States averaged a deficit of 3,4% of the GDP.

The effects in the rest of the world were different. Following the line of Bernanke (2007), during the first half of the 2000's emerging economies managed to increase their net savings, and thus reduce their deficits<sup>34</sup>. However, the global financial crisis in 2008 forced these countries to reduce their savings and increase their deficits again. For instance, the Industrial Countries and Asia stopped having surpluses in the period 2008-2010, respectively averaging deficits of 0,6% and 0,8% of the GDP. The Middle East countries reduced their average surplus to 1,74% of the GDP for the same period, but they managed to keep running surpluses mostly due to the increase in the price of crude oil. Latin America and Caribbean and Africa increased their deficits during this period, averaging respectively 6,1%, 6,3% of the GDP. Eastern Europe kept running deficits of more than 4% of the GDP during this period.

During the 2010's, the Industrial Countries recovered from the global financial crisis of 2008 and managed to sustain an average current account surplus of 1,6% of the

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<sup>33</sup> Edwards, 2004, pp. 9-10

<sup>34</sup> Bernanke, 2007, p. 3



GDP. Asia kept running an average deficit of less than 1% of the GDP during all the decade. However, the case of China was different from the rest of the Asian nations, as they kept an average surplus of 1,9% of the GDP. As Yang (2012) explains, China was able to keep a current account surplus because of an increase in household savings originated by structural shifts in the labor market, poor social welfare reforms that failed to increase equality in society and demographic fluctuations produced by population control policies<sup>35</sup>. On top of that, Yang (2012) suggests that the weak financial Chinese market failed in channeling the increase savings, which ended up in a huge inversion in foreign exchange reserves, which most of it consisted of low-yielding US government bonds. This is one of the reasons why the United States was one of the few Industrial Countries that averaged a current account deficit in the period 2010-2019 (approximately, 2,3% of the GDP).

Latin America and the Caribbean kept running current account deficits during the 2010's, averaging a deficit close to 5% of the GDP. Africa did the same, averaging a current account deficit of more than 7% of the GDP. Eastern Europe managed to keep reducing the current account deficits of the last decades, especially in the 2015-2019 when they averaged a deficit of 1,7% of the GDP. The case of the Middle East countries was particular, as they suffered several fluctuations once again mostly due to the changes in the prices of crude oil. Meanwhile in the period 2010-2014 they ran an average current account surplus of 3,3% of the GDP, in the second half of the decade they averaged a current account deficit of 4,26% of the GDP.

### *3.4 Can Current Account Deficits be Perpetual?*<sup>36</sup>

Now that we have discussed the importance and the evolution of current accounts in the past decades, we will ask ourselves if it is possible for a country to run a perpetual current account deficit. Let us suppose that we are on a two period scenario for a close economy. The current account in period 1 can be written as follows<sup>37</sup>:

$$CA_1 = r * B_0^* + TB_1 \quad (xvii)$$

$$CA_1 = B_1^* - B_0^* \quad (xviii)$$

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<sup>35</sup> Yang, 2012, p. 126

<sup>36</sup> Based on class notes taken from the course "International Monetary Economy" dictated by Professor Damián Pierri in Universidad de San Andrés.

<sup>37</sup> Schmitt-Grohé et al, 2019, p. 54

By combining both conditions we obtain:

$$B_1^* = (1 + r) * B_0^* + TB_1 \quad (xix)$$

Similarly, the current account in period 2 can be written as:

$$CA_2 = r * B_1^* + TB_2 \quad (xx)$$

$$CA_2 = B_2^* - B_1^* \quad (xxi)$$

By consolidating these two expressions we obtain:

$$B_2^* = (1 + r) * B_1^* + TB_2 \quad (xxii)$$

By combining expressions (xix) and (xxii) we obtain:

$$\frac{B_2^*}{1 + r} - \frac{TB_2}{1 + r} - TB_1 = (1 + r) * B_0^* \quad (xxiii)$$

Equation (xxiii) can be simplified if we assume that the transversality condition ( $B_2^* = 0$ ) holds<sup>38</sup>:

$$-\left(\frac{TB_2}{1 + r} + TB_1\right) = (1 + r) * B_0^* \quad (xxiv)$$

As we can see, equation (xxiv) applies for a two-period scenario, and it can be rewritten as follows:

$$-(CA_1 + CA_2) = (1 + r) * B_0^* \quad (xxv)$$

Where “ $CA_i$ ” represents the current account in period “ $i$ ”. If we want to replicate it for an infinite period case, we can rewrite the equation as follows:

$$B_0^* = -\sum_{i=1}^T \frac{TB_i}{(1 + r)^i} = -\left(\sum_{i=1}^T CA_i\right) \quad (xxvi)$$

Equation (xxvi) is the key to understand that if a country is a net debtor at period zero ( $B_0^* < 0$ ), it should have at least in one period a commercial superavit ( $TB_i > 0$ ), which in the end means that it should run a current account surplus in at least one

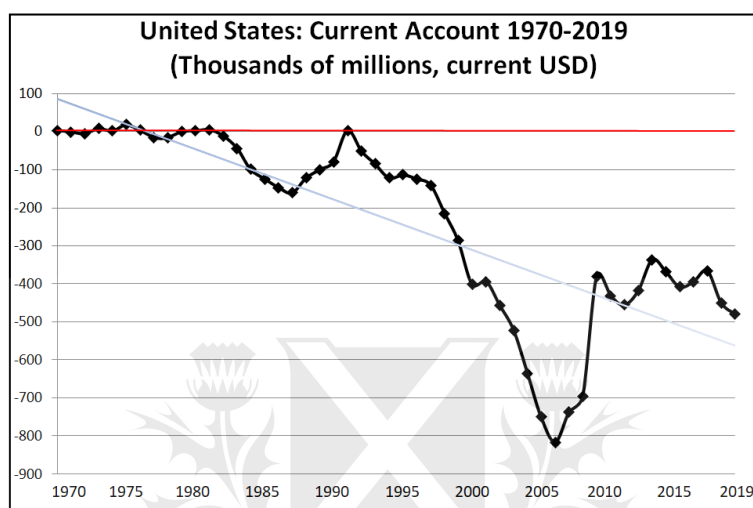
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<sup>38</sup> The transversality condition establishes that in the last period of our model, no one would be willing to lend us money because the world is coming to an ending in that period. As there are no lenders or borrowers,  $B_2^*$  is assumed to be equal to zero. For more detail see Schmitt-Grohé et al, 2019, p. 52.

period<sup>39</sup>. If not, the debt acquired by the country in period zero would not be sustainable in time. For this reason, current account deficits cannot last forever.

### 3.5 Are Current Account Deficits Dangerous?

In the past four decades, the United States has been running a persistent current account deficit, as we can see in Figure 20 based on the World Bank data<sup>40</sup>:



**Figure 20.** USA Current Account in 1970-2019 (Thousands of Millions)

As we have argued in section 3.4, current account deficits cannot last forever. However, the case of the United States suggests that countries may be able to run deficits for a relatively long period of time without facing major consequences. So, the question that may arise is the following: How long can a country be in this position? Unfortunately, the answer to this question is not simple. Analyzing the current bibliography on this subject we can find two different groups: those who believe that current account deficits are undesirable and those who think that they do not have a negative impact the economy in a significant way.

On the one hand, in the group of those in favor of the sustainability of global imbalances we can find authors like Frankel and Rose (1996) that argue that current account deficits do not increase the probabilities of suffering currency crisis at home. Similarly, Calvo and Talvi (2006) understand that current account global imbalances do not necessarily indicate the possibility of occurrence of a global financial crisis. Instead, they suggest that the world will turn softly to a sustainable equilibrium if deficit

<sup>39</sup> Schmitt-Grohé et al, 2019, p. 54

<sup>40</sup> The World Bank Data, 2019a

countries like the United States apply expansionary policies<sup>41</sup>. Following the same argumentative line, Caballero and Gourinchas (2006) believe that sustained current account deficits like the one of the United States reflect the attractiveness of the American economy and its liquidity. In other words, they suggest that deficits are in some way a positive indicator, as they represent the robustness of both the financial and capital markets of a country.

On the other hand, several authors warn us about the dangers of keeping current account deficits for long periods of time. For instance, Fischer (2002) argues that global imbalances may increase the political tension among countries, affect the behavior of exchange rates and harm the financial system and the distribution of wealth among debtors and creditors<sup>42</sup>. On the same way, Milesi-Ferretti and Razin (1996) argue that global imbalances are not something negative per se. However, they find that current account deficits constitute only a negative indicator in those countries in which the export sector constitutes only a small part of the economy, the cost of the debt service is large, the savings ratio and equity financing are small, and the financial sector remains undeveloped<sup>43</sup>.

Despite there is not a clear agreement about the dangers of keeping current account deficits, several economists argue that in the end global imbalances should be reduced. For example, models like the ones developed by Obstfeld and Rogoff (2004, 2005), Blanchard et al (2005) and Kouri (1981) predict an unavoidable real depreciation of the US Dollar that in the end would reduce global imbalances in the world. Similarly, Bernanke (2007) believes that there are four reasons why global imbalances will eventually fall. First, the industrial countries are going under demographic changes, as the population is aging faster than the workforces' growth. Second, the US current account deficit cannot last forever as both the ability of the American economy to make debt service payments and the foreign desire to hold American assets in their portfolios are limited<sup>44</sup>. Third, if global imbalances persist for a long time, foreign countries will reach a point in which they would not have any more desire for American assets, thus making difficult to keep financing the US deficit. Fourth, in the long run developing

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<sup>41</sup> Calvo and Talvi, 2006, pp. 612-613

<sup>42</sup> Fischer, 2002, pp. 4-5

<sup>43</sup> Milesi-Ferretti and Razin, 1996, p.20

<sup>44</sup> Bernanke, 2007, p. 5

countries should become deficit countries, as they would need the resources to keep operating at the border of the technological frontier<sup>45</sup>.

### 3.6 *Global Imbalances Dynamics*

Now that we have discussed what current account global imbalances are and how they have behaved in the last decades, we will try to understand the dynamics behind the variations in the composition of global imbalances. As Corden (2007) suggests, governments do not actually have current account targets, mainly because they cannot directly determine them due to the large number of private actors like households and corporations involved<sup>46</sup>. In equilibrium, the sum of deficits should be equal to the sum of surpluses. For instance, if there are N+J countries in the global economy, N experiencing external deficits and J having external surplus, we can see that the next condition holds:

$$\sum_{n=1}^N def_n = \sum_{j=1}^J sup_j \quad (xxvii)$$

To understand how global imbalances work, we are going to discuss a two different scenario. In the first one, we will see how global imbalances behave if there is an increase in local consumption in those countries that have a current account surplus. In the second case, we will see what happens if there is a reduction in the domestic consumption of these nations.

It is relevant to note that our approach is based on concepts developed by Corden (2007) and represents hypothetical economic variables responses that are not based on a particular macro model. Instead, we will provide a narrative based on likely economic events<sup>47</sup>. The aim of the exercise is to provide perspectives for the path of trade balances that are likely to occur if the premises of our analysis are satisfied.

#### 3.6.1 Example 1: Increase in Consumption of Surplus Countries

We will start by discussing what would happen if there is an increase in the domestic consumption of surplus countries and the incremental expenditure is financed

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<sup>45</sup> Bernanke, 2007, p. 6

<sup>46</sup> Corden, 2007, pp. 3-4

<sup>47</sup> For simplicity, in our narrative we will assume that the world's real interest rate equals the domestic's real interest rate, that we are in an open economy and that the domestic investment is endogenous and determined by the world's real interest rate.

through a reduction in the demand for bonds<sup>48</sup>. In this case, an increase in consumption would lead to a decrease in the saving glut of surplus countries<sup>49</sup>. This will have several implications. Firstly, the demand for bonds can decrease. As a consequence, the price of bonds would decrease too, and the real interest rate would increase. Secondly, the current account surplus of the surplus countries would also decrease. Thirdly, the current account deficit of the deficit countries would be reduced. To understand why, we should think of the consequences that an increase in the real interest rate may bring to the domestic economy of deficit countries. On the one hand, it would reduce the domestic investment. In addition, the increasing costs of borrowing fund can lead to a fiscal contraction by the government, which translates into a decrease in the public spending and an increase in taxes, assuming that the government follows a defined deficit goal.

If there is an increase in taxes, this would lead to a decrease in the disposable income of households, which in the end would translate into a reduction of the domestic consumption. As a consequence of this reduction in domestic consumption and domestic investment, deficit countries would also suffer a reduction in the total output. To offset the deflationary effects of a fiscal contraction, Corden (2007) suggests that deficit countries would decide to depreciate their currency through FEI in order to increase net exports<sup>50</sup>. An improvement of the trade balance would generate a reduction in the current account deficit of the deficit countries. In Figures 21 and 22 presented at the Appendix 6.6, we provide brief summary of the main ideas that we have discussed in this section<sup>51</sup>.

In this first case, therefore, although the increase in consumption carried out by surplus countries trigger a decline in global imbalances, the example highlights a policy response from deficit countries consisting of an exchange rate depreciation. This depreciation could be an outcome that enhances the decline in global imbalances since the surplus countries lose and the deficit countries gain competitiveness. In summary, the increase in the world interest rates triggers an increase in the demand for foreign

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<sup>48</sup> For simplicity, we are going to use the term “surplus countries” to refer to those nations that have a current account surplus. In contrast, we are going to use the term “deficit countries” to refer to those nations that have a current account deficit.

<sup>49</sup> The term “Savings Glut” refers to those cases in which total savings of a country exceeds total investment. It was established by Bernanke (2005).

<sup>50</sup> Corden, 2007, pp. 12-13

<sup>51</sup> See Appendix 6.6

exchange in the deficit countries that leads to a currency depreciation which, in turn, explains an improvement in the trade balance.

### 3.6.2 Example 2: Reduction in Consumption of Surplus Countries

Let us now analyze the case in which domestic consumption in “surplus countries” decrease. In this case, a reduction in the consumption would lead to an increase in the saving glut of surplus countries. This will have several implications. Firstly, the demand for bonds would increase, including those bonds issued by the central banks of deficit countries. As a consequence, the price of bonds would increase too, and the real interest rate would decrease. Secondly, the current account surplus of the surplus countries would increase. Thirdly, the current account deficit of the deficit countries would increase.

To understand why, once again we should think of the consequences of a decrease in the real interest rate may bring to the domestic economy of “deficit countries”. On the one hand, it would increase both the domestic investment and domestic consumption in deficit countries, which would lead to an increase in the total output of those nations. However, this is not the end of the story. As we mentioned before, the demand for deficit countries bonds would increase due to the increase of surplus countries savings. This would translate into an increase in the demand for deficit countries currencies, which in the end would generate an appreciation of them. As a consequence, the trade balance of these nations would decrease, and this could offset the positive impact generated from the increase in consumption and investment that we discussed before. In the Appendix 6.6 we present in Figures 23 and 24 a brief summary of the main ideas that we have discussed in this section.

In summary, the decline in the surplus country consumption leads to a reduction in world real interest rates, prompting a decline in the demand for foreign currency in the deficit countries’ exchange rate market. This causes an appreciation of deficit countries’ currencies that translates into a deteriorating trade balance.

## *3.7 International Cooperation Scenario*

In the previous section we addressed two hypothetical examples of policies decided by a major surplus country and how the trade balance of this country and a small-open one is likely to evolved given the assumptions made. On the real world,

though, the problem of global imbalances involves major countries standing in opposite fronts in terms of their trade balances. As shown in Figure 20, the United States has a relevant deficit, whereas countries like China and Germany run sizable surpluses. Our analysis was carried out with the aim of describing a small picture of the current account global imbalances problem.

Consequently, and from the wider perspective of addressing major countries, let us suppose that the finance ministers and central banks governors of the most important economies in the world decide to cooperate to reduce global imbalances<sup>52</sup>. As we mentioned before, the United States has been huge current account deficit in the last decades, and for this reason we are going to assume in our example that the American nation would intend to depreciate the value of the US Dollar. To avoid any possible currency and trade war between nations, all the representatives involved in the meeting should engage in intervening in the foreign exchange market to appreciate the rest of the currencies relative to the US Dollar. In addition, we assume that the agreement also includes the fixing of the interest rate at the current levels. We will analyze what would happen in this international cooperation case. In the analysis, we consider one path of economic variables response out of the many alternatives that different models, shocks and reaction functions would present. Although not based in a concrete model, the analysis includes reasonable rationale stemming from the literature and its aim to provide a perspective under the background of the global imbalances.

Let us start by analyzing the immediate impact in these deficit countries that depreciated their currency. First, the net trade of goods and services would increase, as domestic products would gain competitiveness and become cheaper for the rest of the world. Second, some governments should decide to reduce domestic spending in order to improve the fiscal position of the nation as a tool to mitigate the increase in demand caused by the external sector expansion. For this reason, a reasonable policy would include a combination of more taxes and less public spending. This would have a direct impact in the domestic consumption, as more taxes would imply a reduction of disposable incomes of the households.

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<sup>52</sup> In the ideal scenario, it would be great that all the nations could cooperate together to benefit the economy all around the world. In practice, this scenario seems impossible. However, an arrangement that includes the United States, China, the Euro Zone, Japan, the United Kingdom and some developing countries like India, Russia, Brazil and South Africa seems to be good enough to considerably reduce global imbalances.



Concerning the total output of the deficit countries and lacking a concrete model, the impact of the depreciation and the fiscal consolidation is not clear. On the one hand, it would be boost by the increase in the net exports of goods and services. On the other hand, it would be contracted by a reduction in the domestic spending. For simplicity, we assume that the magnitude of both forces would cancel each other out. Concerning domestic savings of deficit countries, we can see that they would increase due to the reduction in public spending and the wealth effect operating through the accumulated external debt. As the real interest rate is constant due to the international cooperation of central banks, the domestic investment of deficit countries would remain unchanged. Therefore, there will be an increase in the saving-investment balance and, as a consequence, a reduction in the current account deficits of these nations.

Now that we have understood how current accounts of deficit countries could be reduced through a depreciation of these nations' currencies, we should see how these measures would impact on surplus countries on an international cooperation scenario. As we mentioned before, a depreciation of deficit countries currencies implies and appreciation of surplus countries currencies. This translates into a loss of competitiveness of surplus countries products, as they would become more expensive in relationship to deficit countries goods and services. For this reason, imports may increase in surplus countries and net trade would suffer a reduction.

From the point of view of surplus countries aggregate demand, the initial effect of the appreciation is unclear. The decline in absorption triggered by the shrinking trade balance could be compensated by the increase in consumption determined by wealth effects. In our narrative, we are going to assume that total output remains unchanged and that absorption increase by the wealth effects or by an expansionary fiscal policy. What we know, guided by equation (xvi), is that for deteriorating the current account, a narrow gap between saving and investment is needed. Concerning the saving glut of surplus countries, we can see it would be considerably reduced due to the increase in private consumption and/or public spending. As the real interest rate still is constant due to the international cooperation of central banks, the domestic investment of deficit countries would remain unchanged too.

In summary, and based on our narrative of likely economic events after an international agreement, we have seen in this section how global imbalances can be reduced through international cooperation. Our narrative does not include every single

macroeconomic variable involve in the real world. However, it serves us as a good point of start to think about how global imbalances react to changes in the real exchange rate and unilateral interventions of central banks in the foreign exchange market to depreciate currencies. Teamwork between different countries seems crucial to avoid trade and currency wars that could potentially harm the world's economy. In the Appendix 6.7 we present a brief summary of the ideas that we have discussed in this section in Figure 25<sup>53</sup>.

### *3.8 A Predecessor of Cooperation: The Plaza Accord*

In 1985, the ministers of finance and central bank's governors of the G5 nations signed at the Plaza Hotel in New York an agreement known as the "Plaza Accord"<sup>54</sup>. By that time, the United States was running a historical current account deficit, as we can see in Figure 20. Protectionism was harming the US commercial relationships, and the sustained negative trade balance of the country was forcing both the private and the public sector to issue bonds to finance the deficit. Most of these bonds were acquired by European countries and Japan. This had a great impact in the current account of these countries, as we can see reflected in figures 26 to 30 for the G5 members. The idea behind the meeting in the Plaza Hotel in 1985 was simple: avoid a currency war. If an agreement between the leading nations was not achieved, the United States would choose to retaliate against its commercial partners for applying protectionist policies to obtain a benefit from trading with the US.

Instead of taking the conflictive path, the representatives of the G5 nations decided to cooperate to reach an agreement<sup>55</sup>. The Plaza Accord established that the five nations would intervene in the foreign exchange market to depreciate the US Dollar. The accord had a huge impact in the US economy in the short run. Firstly, the net trade of goods and services increased considerably due to the increase in the competitiveness of US products. Secondly, the US debt became cheaper because the bonds that were in hands of European countries and Japan were issued in US dollars. In other words, as the American currency lost value, so did the real value of the debt. The other side of the story concerns the rest of the countries that signed the agreement. As we can see once

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<sup>53</sup> See Appendix 6.7

<sup>54</sup> The G5 members are the United States, the United Kingdom, Japan, France and Germany.

<sup>55</sup> See Margaret Thatcher Foundation (1985) to see the complete version of the Plaza Accord signed by the G5 representatives in September 22, 1985.

again in figures 23 to 26 presented in the Appendix 6.9, the currencies of Germany, Japan, the United Kingdom and France were appreciated in the next few years<sup>56</sup>. However, the GDP of the four nations kept growing despite the loss of competitiveness relative to the US goods.

Why is the Plaza Accord so relevant? Mainly because it is a good example in which several nations decide to cooperate through interventions in the foreign exchange market to reduce global imbalances. Besides, it shows how commercial conflicts could be avoided through cooperation. Furthermore, nowadays the economic situation of the US looks very similar to the one in the years before the accord. Of course, the current account deficit of 2019 is much larger than the one in 1984, as we can see in figure 20, and today a new agreement must include the largest commercial partner of the US: China. As we mentioned in the Introduction of this thesis, During the Trump Administration a commercial war was established between China and the United States, and countless tariffs were applied by each government to punish it's peer abroad. However, the current account deficit of the US got even worse during these years, as we can see once again in figure 20. For this reason, a new strategy must be adopted by the leaders of the most powerful economies to reduce global imbalances without falling into a trade war. The agreement signed by the Presidents of China and the United States in 2020 seems to be a good starting point to address these matters.

## 4. Conclusions

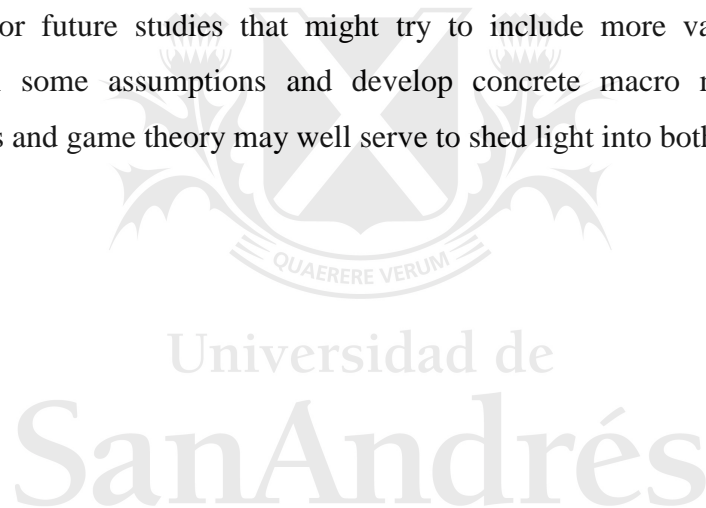
As we mentioned in the introduction of this thesis, our first goal was to understand the risks and benefits of unilateral interventions in the foreign exchange market. After a detailed analysis of the current bibliography and macroeconomic variables of different nations, it seems to us that the benefits of foreign exchange interventions outweigh the costs if the institutions manage to deal with social tension at home and commercial friction abroad. Despite the limitations of our analysis, we believe that it constitutes a good reference point to understand why FEI has been extensively used by most of the countries in the last decades.

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<sup>56</sup> See Appendix 6.9

Our second goal was to describe what current account global imbalances are, why are they important, how they have evolved in the last four decades, which are its dangers and how can they be reduced without major costs for the global economy. We reached to the conclusion that global imbalances cannot last forever and at some point should be reduced. Besides, we developed a brief narrative based mostly on concepts developed by Corden (2007) to have a better understanding of how hypothetical economic variables behave in this context. Despite the fact that our narrative is not based on a particular macro model, we think that it provides perspectives for the path of trade balances that are likely to occur if the premises of our analysis are satisfied.

Needless to say, this thesis has not analyzed every single effect of unilateral foreign exchange market interventions. Besides, our global imbalances' narrative rests on several assumptions and lacks a concrete model to support it. However, it's a good starting point for future studies that might try to include more variables into this approach, relax some assumptions and develop concrete macro models. Besides, microeconomics and game theory may well serve to shed light into both topics.



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## 6. Appendix

### 6.1 Staiger and Sykes Example of “Beggar my Neighbor” Policies

To have a better understanding of the limitations of FEI, we should remind one of the most fundamental concepts in international economics: in the long run prices are assumed to be flexible. Let’s take an example described by Staiger and Sykes (2008), where we have only two countries (US and China), where each country has a specialized good (“1” for the US and “2” for China) and trades with the other country in order to consume both goods. Let “\$” denote the US dollar and let “¥” denote the Renminbi. Finally, let “ $e$ ” denote the nominal exchange rate between both currencies (\$/¥)<sup>57</sup>. Following the example set by the authors, we can establish the next international arbitrage conditions between both countries<sup>58</sup>:

$$e * P_2^{\text{¥}} = P_2^{\text{\$}} \quad (\text{xxviii}) \quad ; \quad e * P_1^{\text{¥}} = P_1^{\text{\$}} \quad (\text{xxix})$$

Combining these two expressions, we obtain the equality between relative prices in both countries<sup>59</sup>:

$$\frac{P_1^{\text{\$}}}{P_2^{\text{\$}}} = \frac{P_1^{\text{¥}}}{P_2^{\text{¥}}} \quad (\text{xxx})$$

As we can see, relative prices remain unchanged by changes in the nominal exchange rate, so a depreciation of the Chinese currency will not generate any commercial advantage for the country in the long run, once again if we assume that prices are flexible. What happens if the Chinese government decides to establish an export subsidy ( $s_2$ ) and an import tariff ( $t_1$ )? In this case, the international arbitrage conditions will be<sup>60</sup>:

$$\frac{e}{(1 + s_2)} * P_2^{\text{¥}} = P_2^{\text{\$}} \quad (\text{xxxix}) \quad ; \quad \frac{e}{(1 + t_1)} * P_1^{\text{¥}} = P_1^{\text{\$}} \quad (\text{xxxixii})$$

<sup>57</sup> Staiger and Sykes, 2008, p. 9

<sup>58</sup> Staiger and Sykes, 2008, p. 10

<sup>59</sup> Staiger and Sykes, 2008, p. 11

<sup>60</sup> Staiger and Sykes, 2008, p. 10

Combining both expressions, we obtain the next equality between relative prices in both countries<sup>61</sup>:

$$\frac{P_1^{\$}}{P_2^{\$}} = \frac{P_1^{\text{¥}}}{P_2^{\text{¥}}} * \frac{(1 + s_2)}{(1 + t_1)} \quad (xxxiii)$$

As we can see, if  $s_2 = t_1$ , then the intervention of the Chinese government will have no real effect in the terms of trade of the country. However, Staiger and Sykes (2008) suggest that if the United States decides to retaliate China for this unfair commercial politics, then there would be a noticeable effect in the relative prices of both countries. Following the authors example, lets imagine that the US decides to retaliate China by establishing a countervailing tax on Chinese exports ( $t_2^{CV}$ ) and a retaliatory tariff ( $t_2^{RT}$ ) on his commercial partner. In this case, the international arbitrage conditions will be equal to<sup>62</sup>:

$$\frac{e * (1 + t_2^{CV})}{(1 + s_2)} * P_2^{\text{¥}} = P_2^{\$} \quad (xxxiv) ; \quad \frac{e * (1 + t_2^{RT})}{(1 + t_1)} * P_1^{\text{¥}} = P_1^{\$} \quad (xxxv)$$

Combining both conditions, we obtain:

$$\frac{P_1^{\$}}{P_2^{\$}} = \frac{P_1^{\text{¥}}}{P_2^{\text{¥}}} * \frac{(1 + s_2)}{(1 + t_1)} * \frac{1}{(1 + t_2^{CV}) * (1 + t_2^{RT})} \quad (xxxvi)$$

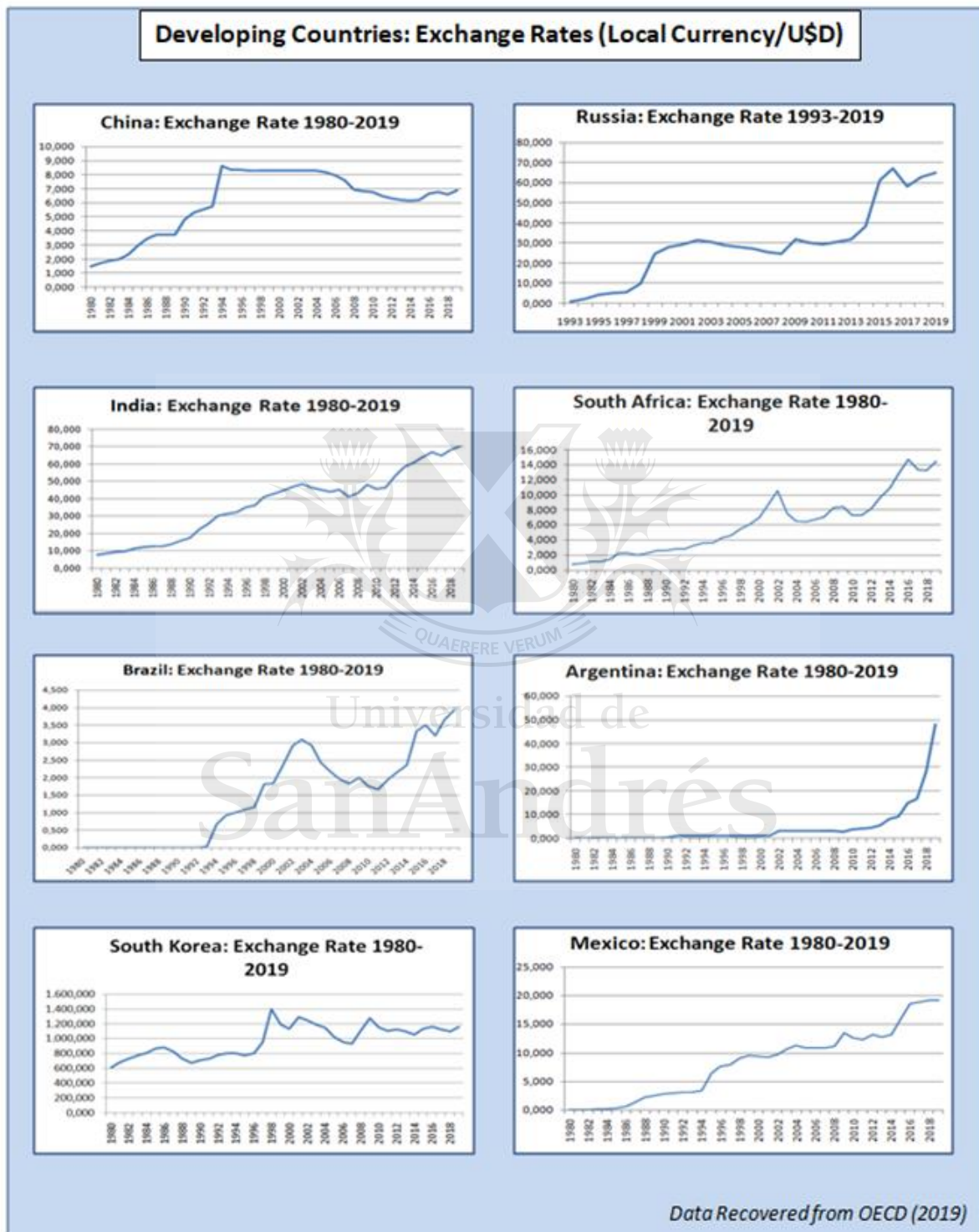
Equation (xii) states that even if Chinese policies may not have a direct impact in the terms of trade of the country relative to the US, if the American government decides to retaliate China for its interventions in the FX market this would be harmful for the Chinese economy. In other words, applying FEI in the long run may bring more complications than benefits for a country if it's applied consistently to sustain an undervalued currency without taking into account the reaction of other nations.

In summary, intentional undervaluation of the real exchange rate can be achieved through FEI to obtain several benefits in the short run, but the political tension that arises from this “Beggars My Neighbor” approach could complicate the sustainment of growth.

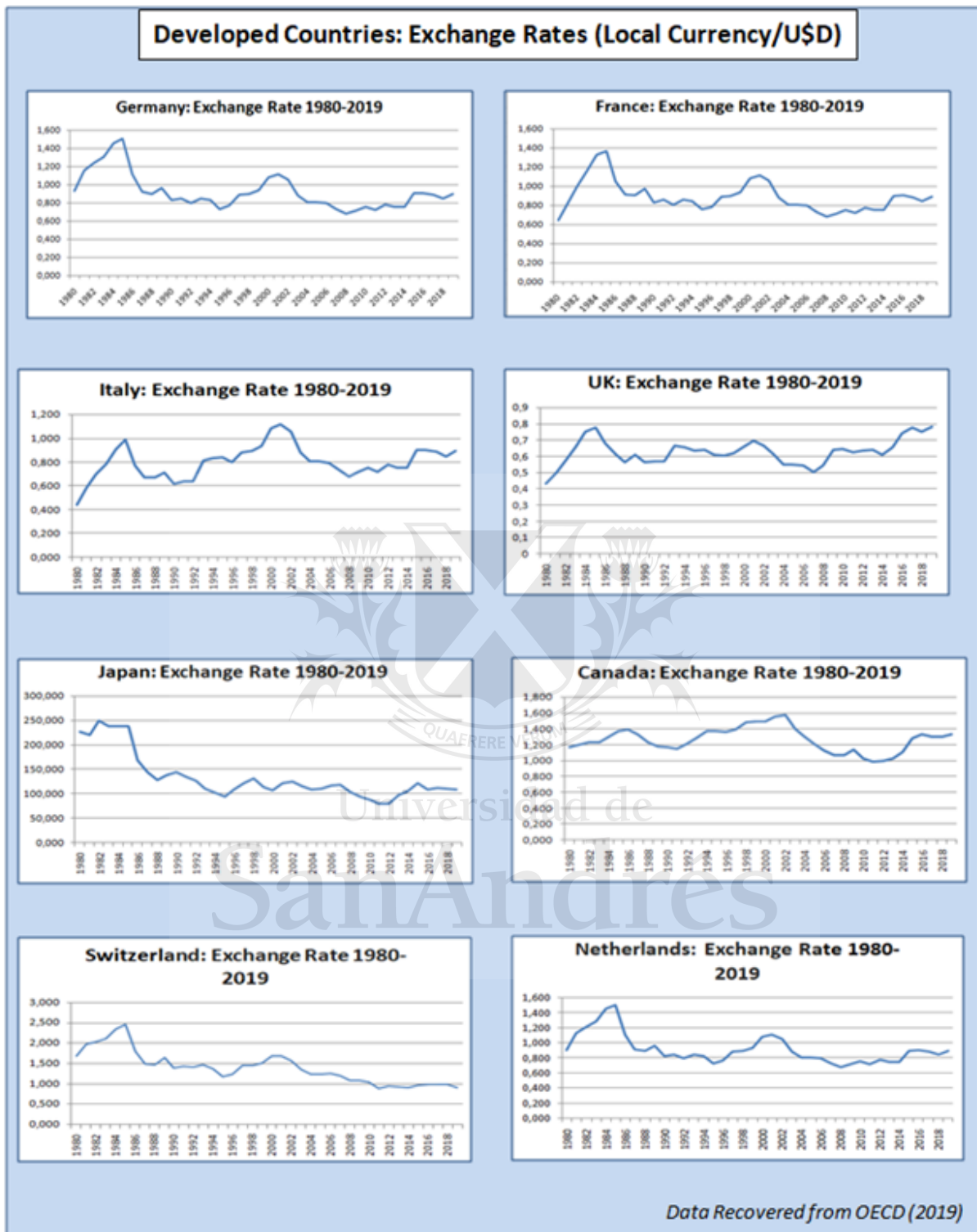
<sup>61</sup> Staiger and Sykes, 2008, p.13

<sup>62</sup> Staiger and Sykes, 2008, p. 14

## 6.2 Evolution of Exchange Rates of Developing and Developed Countries



**Figure 5.** Exchange Rates of Developing Countries (Local Currency/USD)



**Figure 6.** Exchange Rates of Developed Countries (Local Currency/USD)

### 6.3 Evolution of Reserves of Developing Countries in 1990-2019

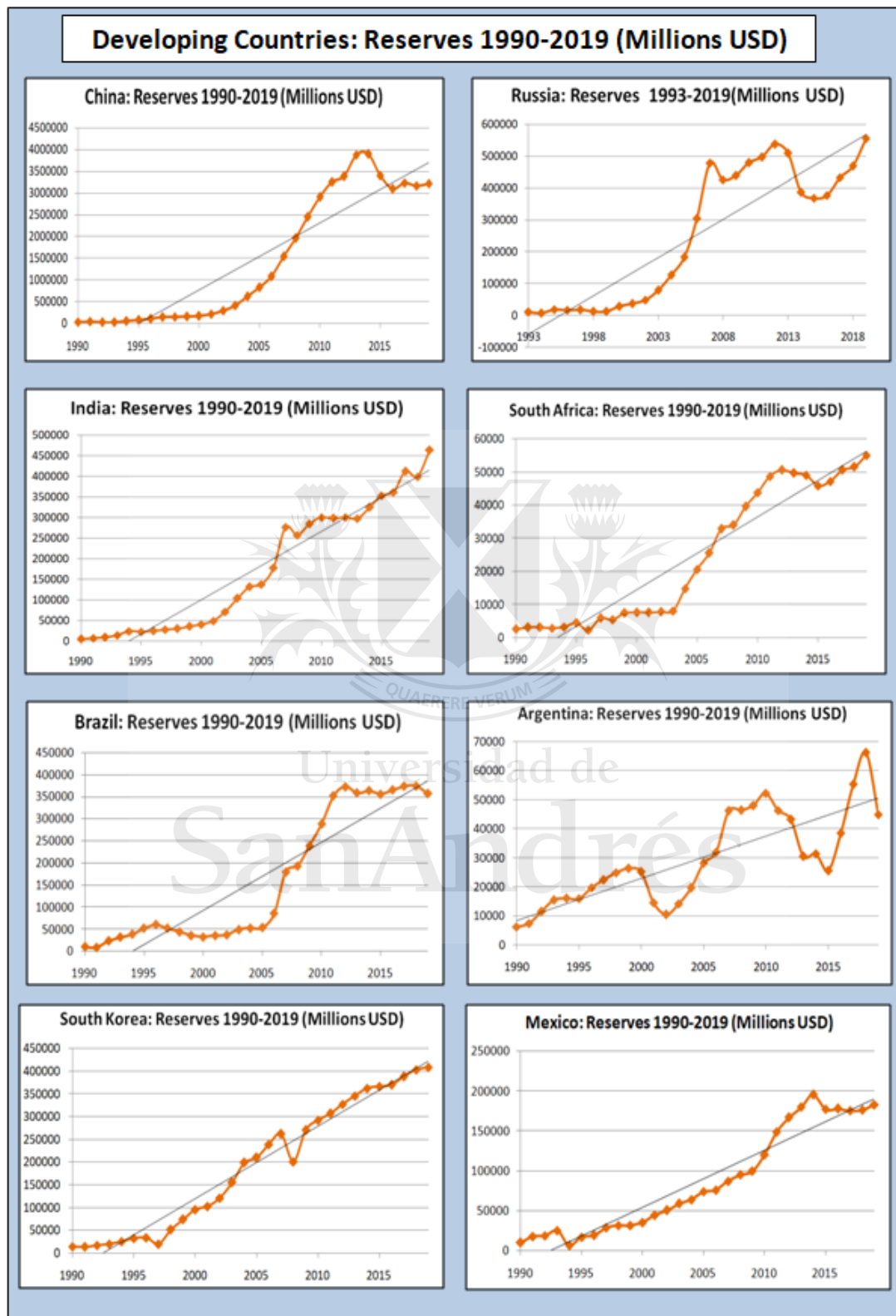


Figure 7. Reserves of Developing Countries (Millions USD)

## 6.4 Regions

<b>Industrial Countries</b>			
Australia	France	Japan	Spain
Austria	Germany	Malta	Sweden
Belgium	Greece	Netherlands	Switzerland
Canada	Iceland	New Zealand	United Kingdom
Denmark	Ireland	Norway	United States
Finland	Italy	Portugal	

<b>Latin America and Caribbean</b>			
Antigua and Barbuda	Colombia	Haiti	St. Lucia
Argentina	Costa Rica	Honduras	St. Vinc. & Gren.
Aruba	Dominica	Jamaica	Suriname
Bahamas	Dominican Republic	Mexico	Trinidad & Tobago
Barbados	Ecuador	Nicaragua	Uruguay
Belize	El Salvador	Panama	Venezuela
Bolivia	Grenada	Paraguay	
Brazil	Guatemala	Peru	
Chile	Guyana	St. Kittis & Nevis	

<b>Asia</b>			
Bangladesh	India	Nepal	Sri Lanka
Bhutan	Indonesia	Pakistan	Thailand
Cambodia	Kiribati	Papua New Guinea	Vietnam
China	Lao PDR	Philippines	
Fiji	Malaysia	Singapore	
Hong Kong	Maldives	Solomon Islands	

<b>Africa</b>			
Angola	Cote d'ivoire	Malawi	Seychelles
Benin	Djibouti	Mali	Sierra Leone
Botswana	Ethiopia	Mauritania	South Africa
Burkina Faso	Gabon	Mauritius	Sudan
Burundi	Gambia	Morocco	Eswatini
Cameroon	Ghana	Mozambique	Tanzania
Cape Verde	Guinea	Namibia	Togo
Central Africa Rep.	Guinea-Bissau	Niger	Tonga
Chad	Kenya	Nigeria	Tunisia
Comoros	Lesotho	Rwanda	Uganda
Congo Rep.	Madagascar	Senegal	Zimbabwe

<b>Middle East</b>			
Bahrain	Iran, Islamic Rep.	Kuwait	Saudi Arabia
Cyprus	Israel	Lebanon	Syrian Arab Rep.
Egypt, Arab Rep	Jordan	Oman	Yemen, Rep.

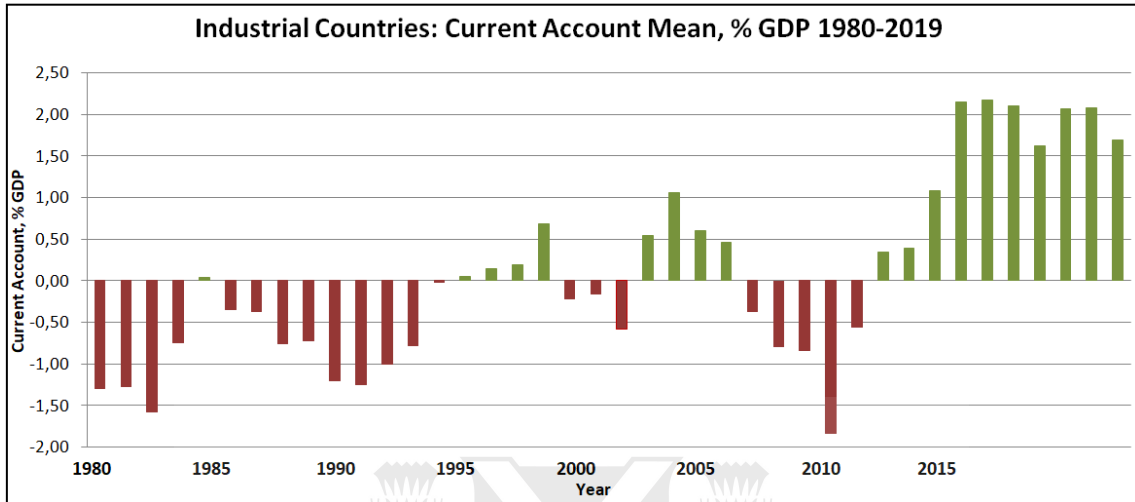
<b>Eastern Europe</b>			
Albania	Estonia	Moldova	Slovenia
Armenia	Hungary	Mongolia	Turkey
Azerbaijan	Kazakhstan	Poland	Ukraine
Belarus	Kyrgyz Republic	Romania	Uzbekistan
Bulgaria	Latvia	Russian Federation	
Czech Republic	Lithuania	Slovak Republic	



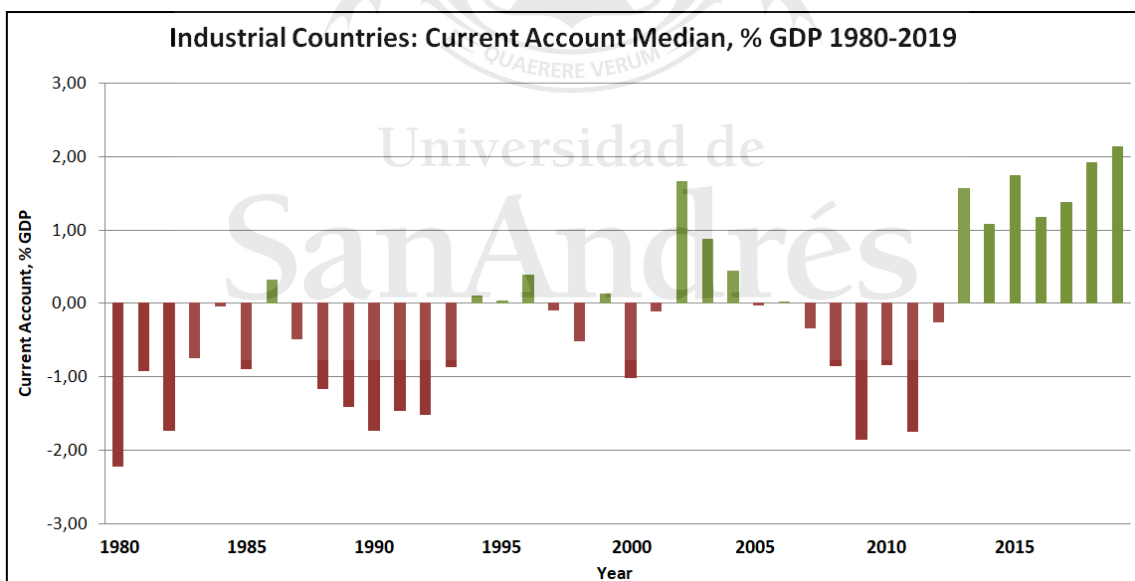
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## 6.5 Evolution of Current Account of Each Region

### Industrial Countries



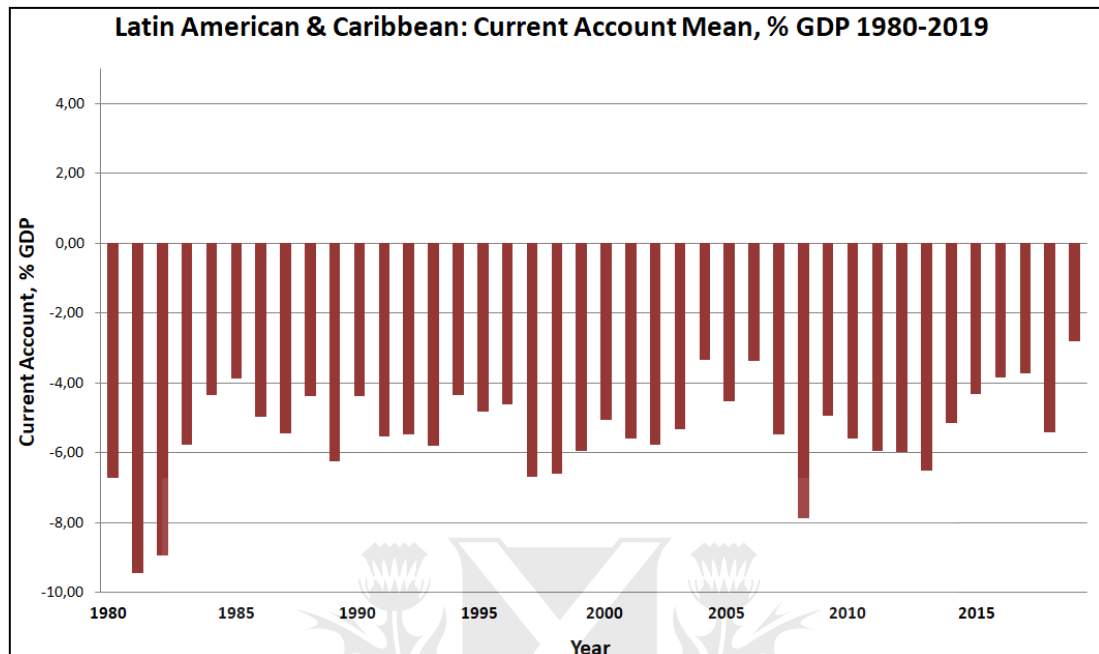
**Figure 8.** Current Account Balance Mean (% GDP in the period 1980-2019 in Industrial Countries



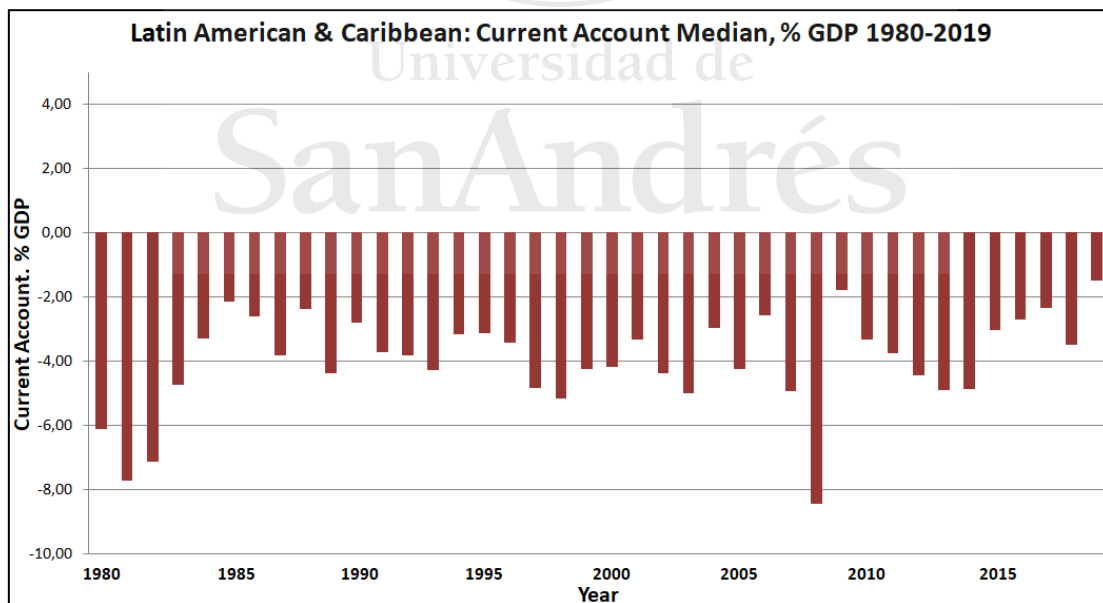
**Figure 9.** Current Account Balance Median (% GDP in the period 1980-2019 in Industrial Countries



## Latin American & Caribbean

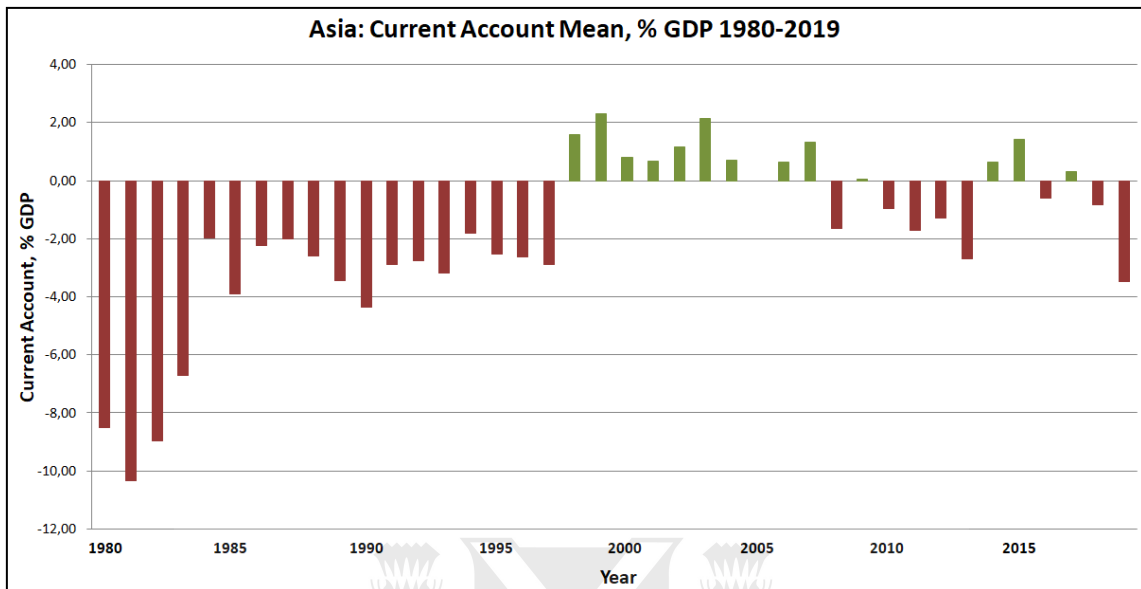


*Figure 10.* Current Account Balance Mean (% GDP in the period 1980-2019 in Latin America and Caribbean

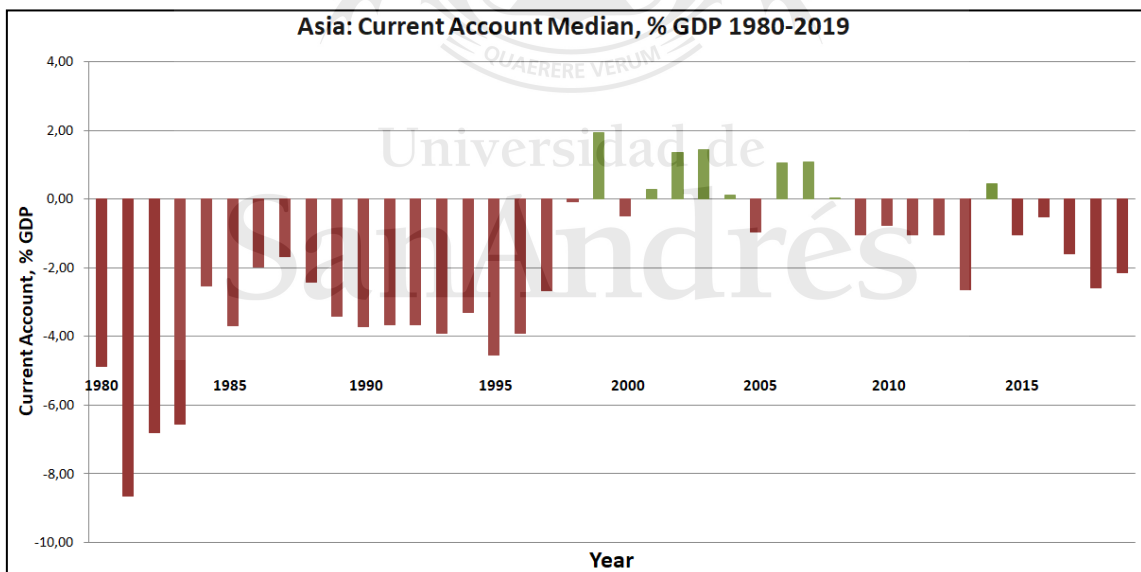


*Figure 11.* Current Account Balance Median (% GDP in the period 1980-2019 in Latin America and Caribbean

## Asia

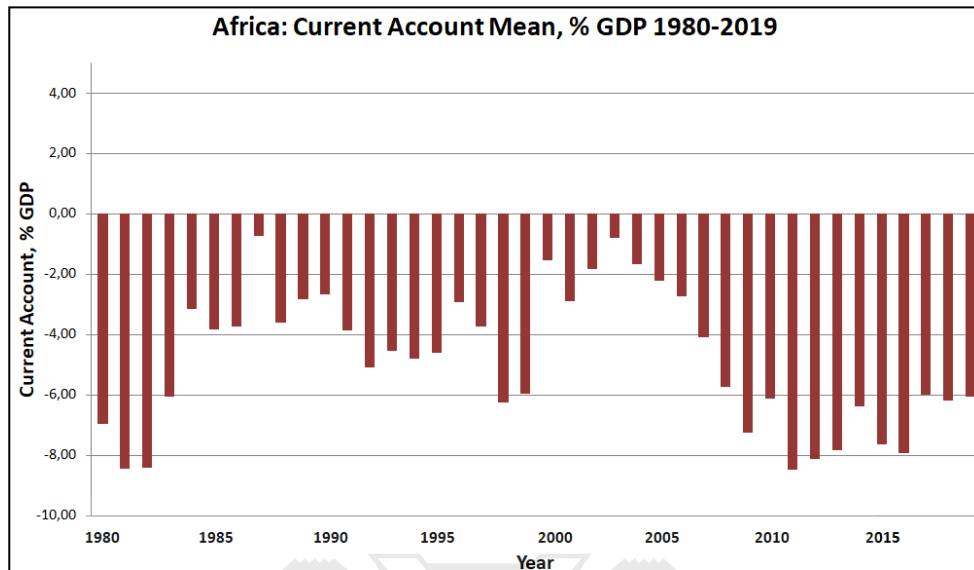


*Figure 12. Current Account Balance Mean (% GDP in the period 1980-2019 in Asia*

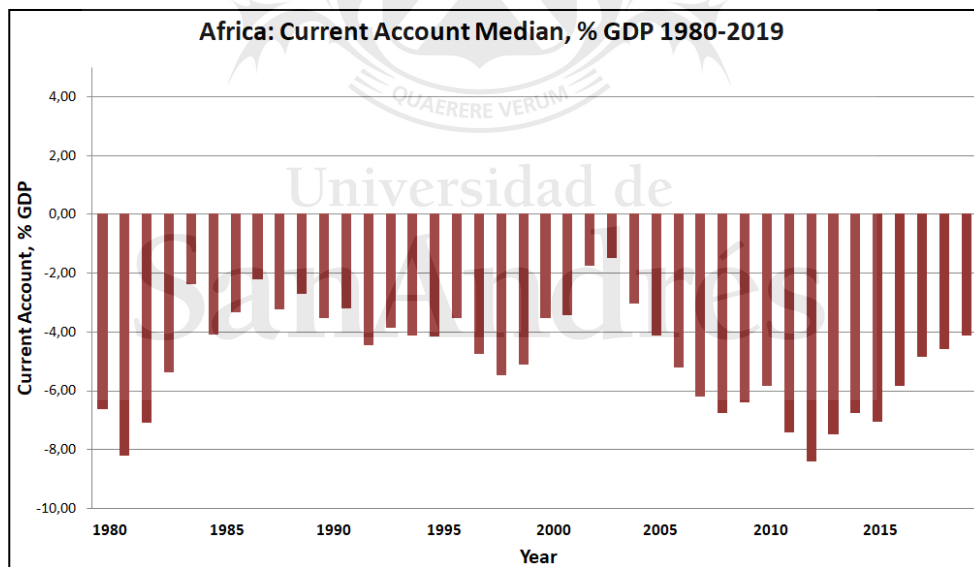


*Figure 13. Current Account Balance Median (% GDP in the period 1980-2019 in Asia*

## Africa

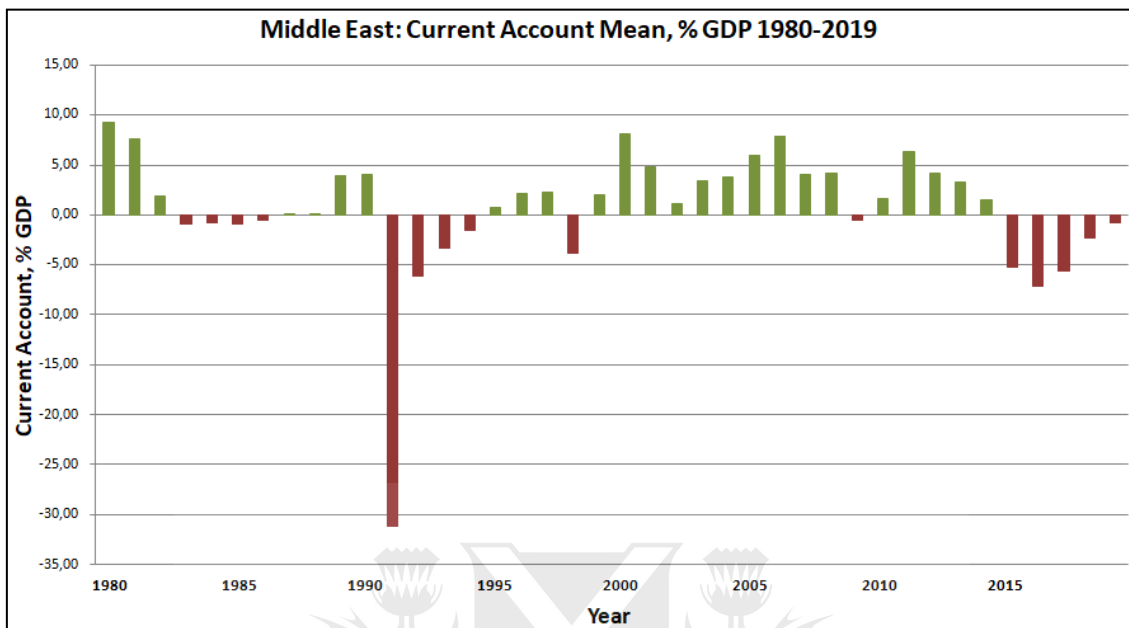


*Figure 14. Current Account Balance Mean (% GDP in the period 1980-2019 in Africa*

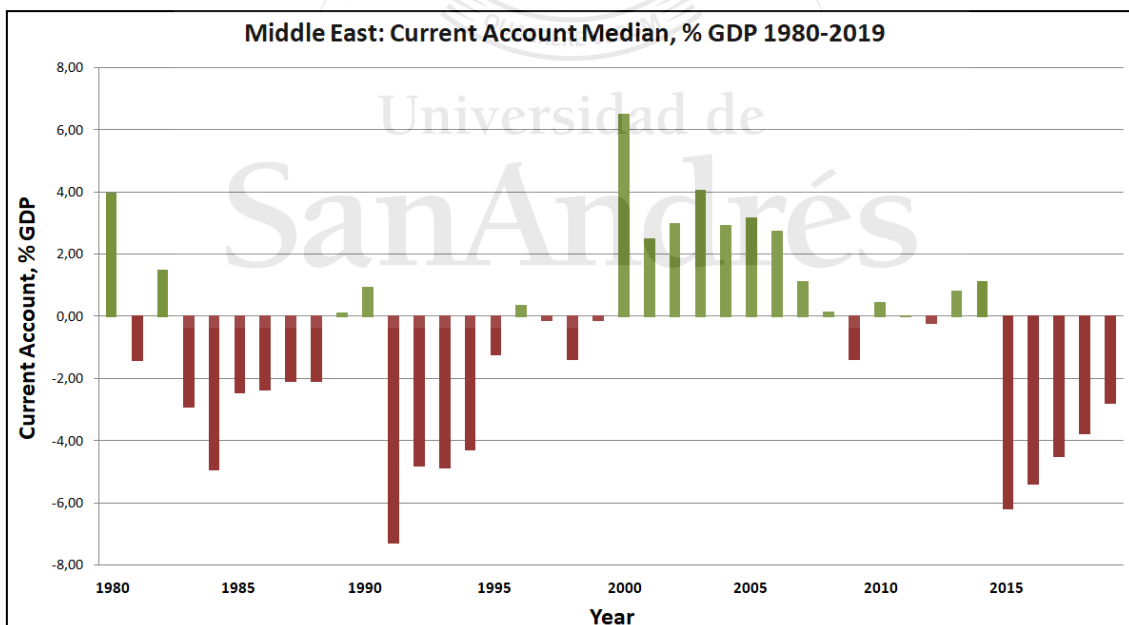


*Figure 15. Current Account Balance Median (% GDP in the period 1980-2019 in Africa*

## Middle East

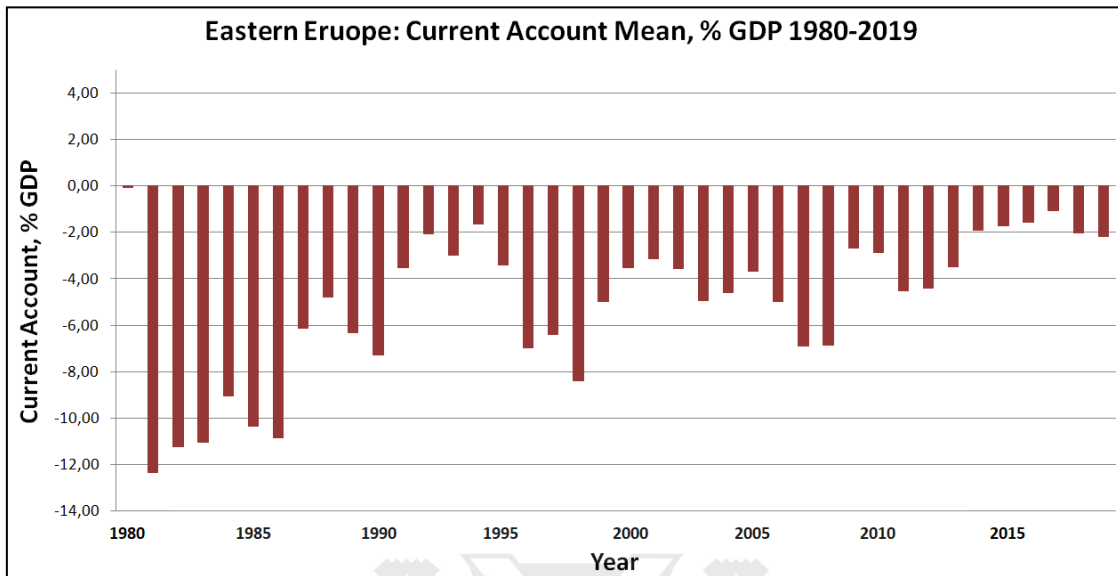


*Figure 16. Current Account Balance Mean (% GDP in the period 1980-2019 in Middle East*

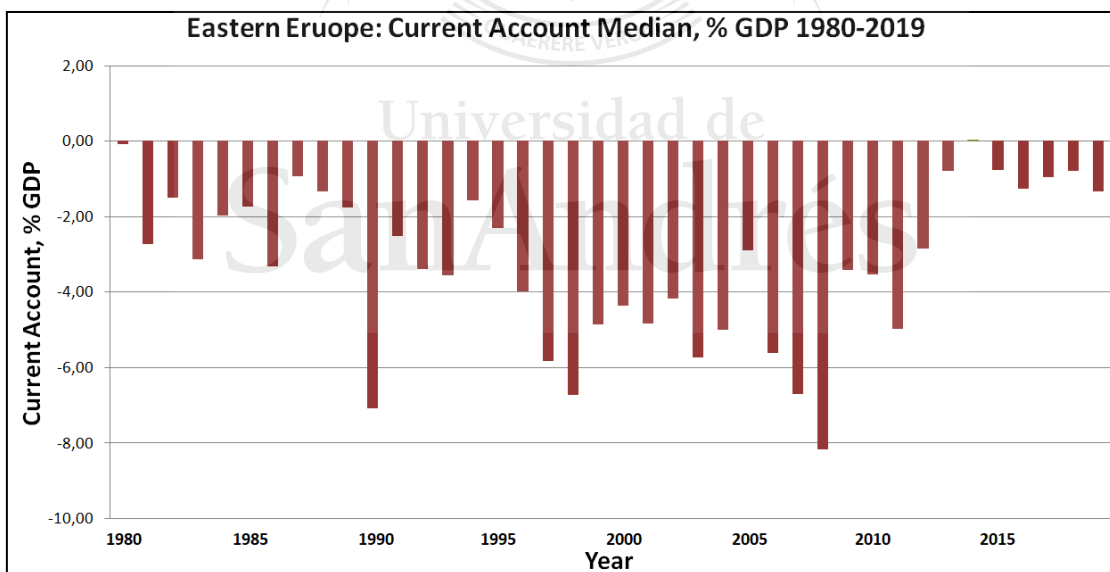


*Figure 17. Current Account Balance Median (% GDP in the period 1980-2019 in Middle East*

## Eastern Europe



*Figure 18. Current Account Balance Mean (% GDP in the period 1980-2019 in Eastern Europe*



*Figure 19. Current Account Balance Median (% GDP in the period 1980-2019 in Eastern Europe*

6.6 Example: Increase in Consumption of Surplus Countries

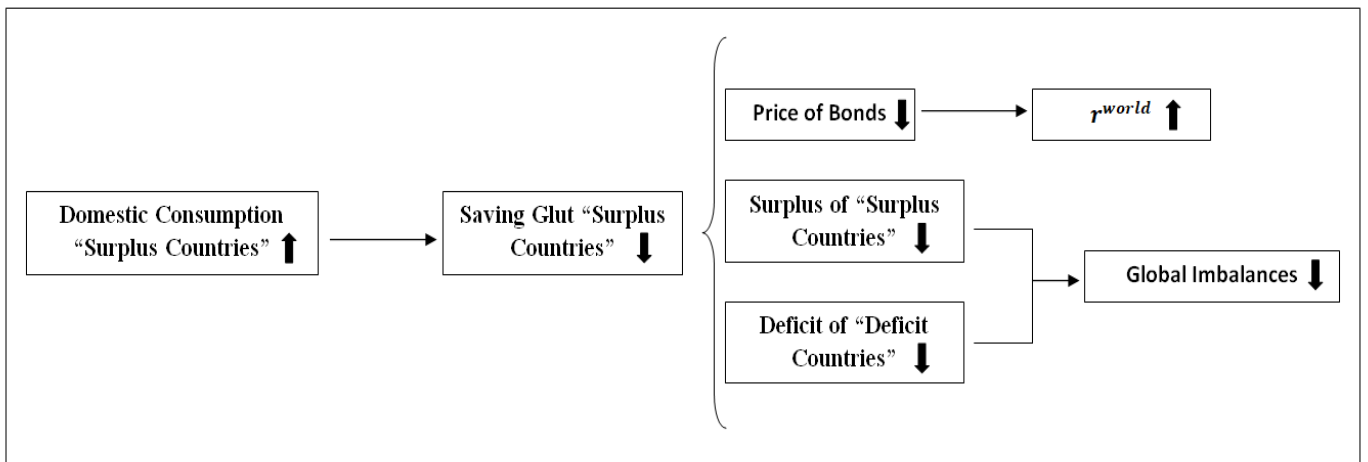


Figure 21. General Effects on Global Imbalances of an Increase in the Real Exchange Rate

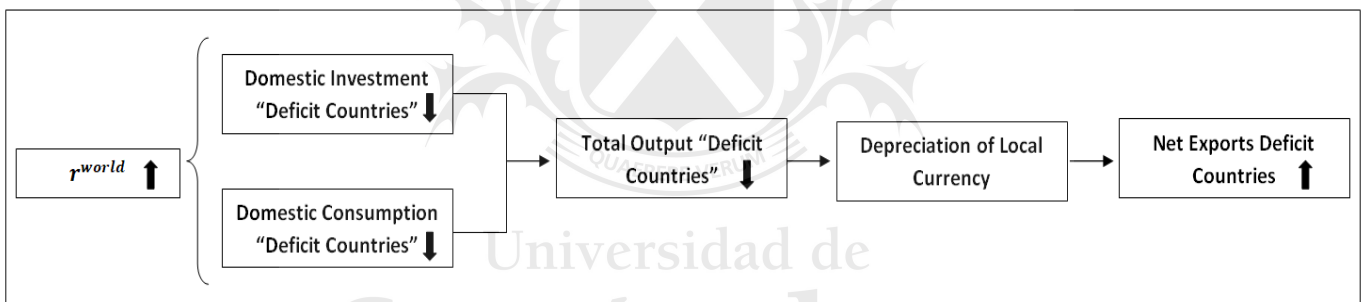


Figure 22. Domestic Effects of an Increase in the Real Exchange Rate in Deficit Countries

6.7 Example: Reduction in Consumption of Surplus Countries

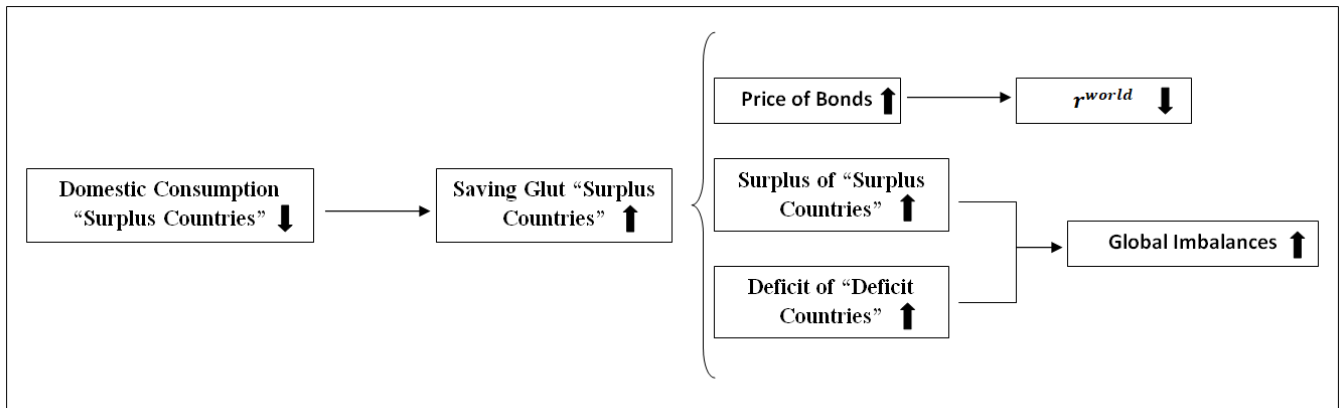


Figure 23. General Effects on Global Imbalances of a Decrease in the Real Exchange Rate

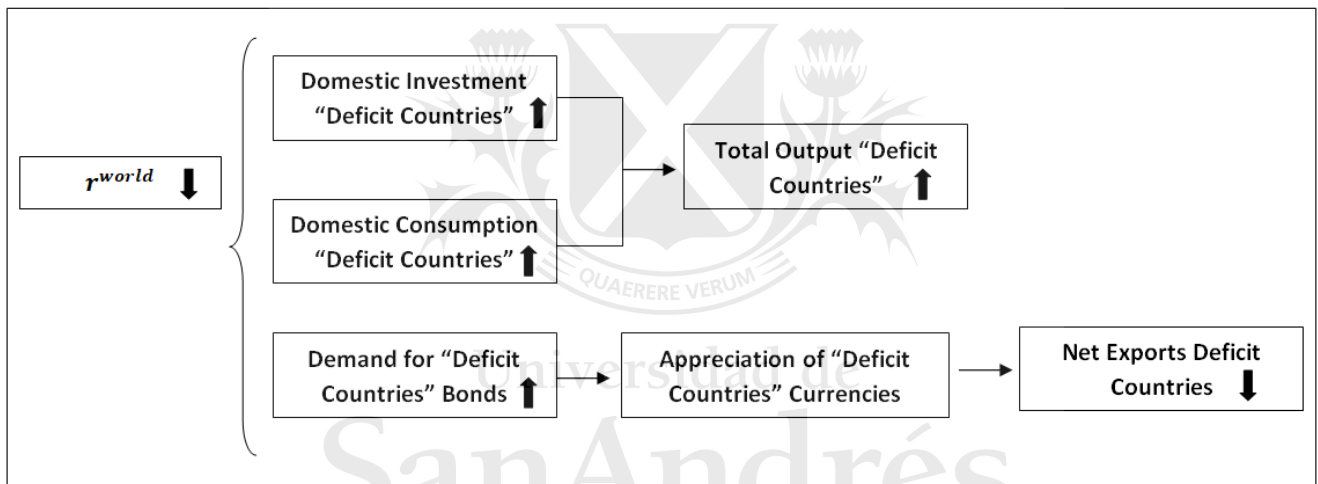


Figure 24. Domestic Effects of a Decrease in the Real Exchange Rate in Deficit Countries

### 6.8 International Cooperation Scenario

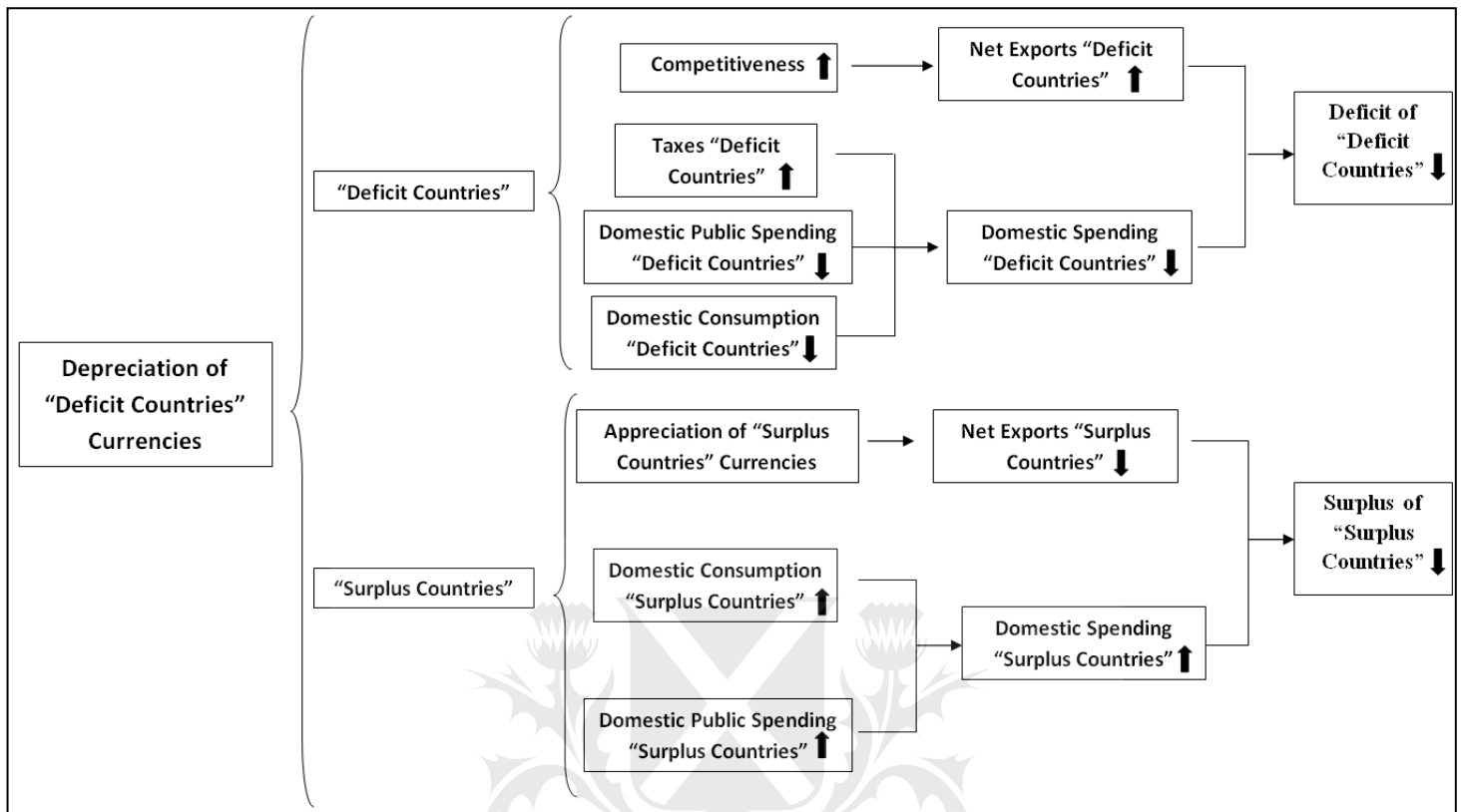


Figure 25. Reduction of Global Imbalances through International Cooperation



### 6.9 Plaza Accord: 1980-1990 Macroeconomics

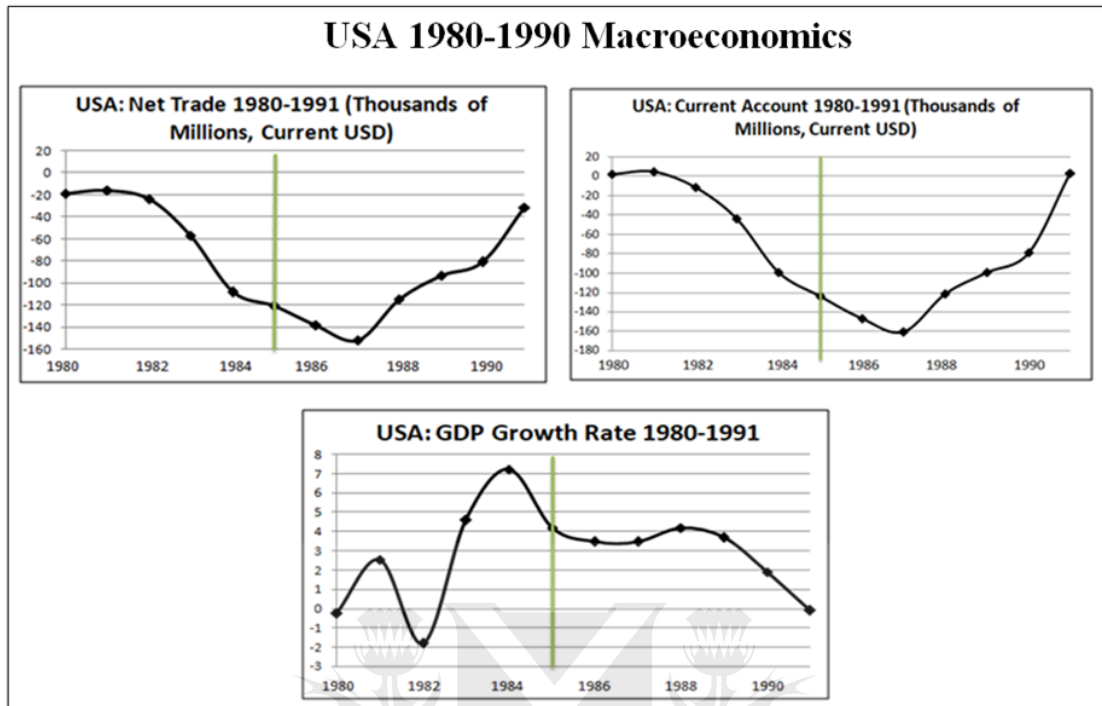


Figure 26. Net Trade, Current Account and GDP Growth Rate in the United States 1980-1991

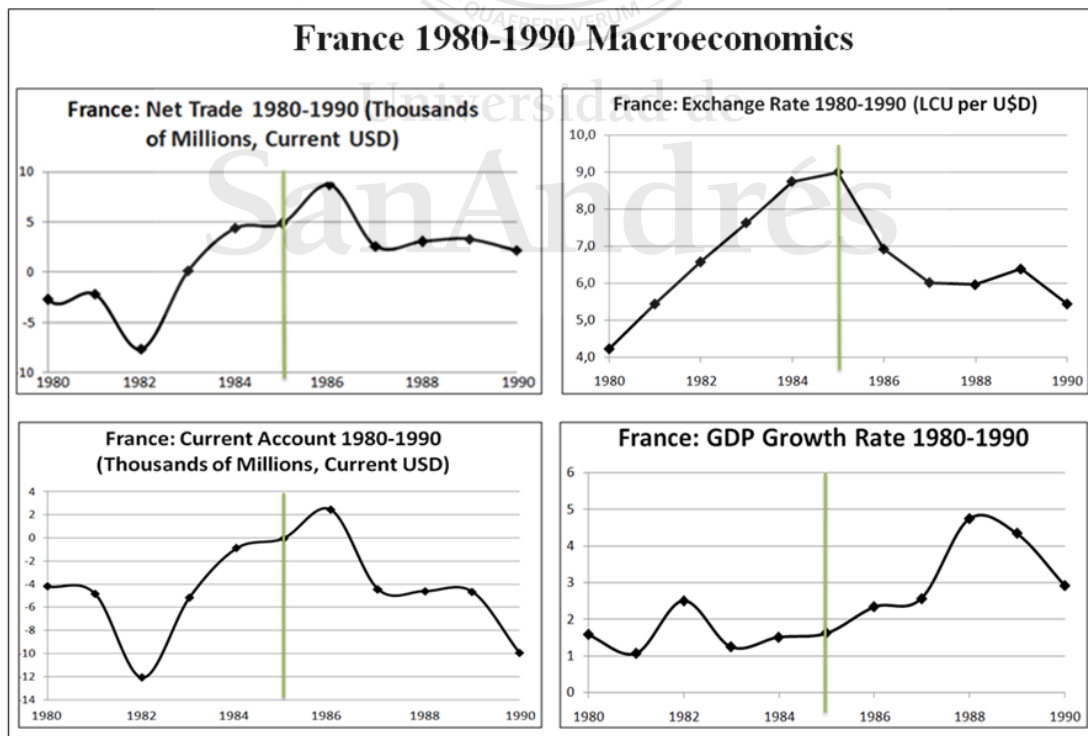
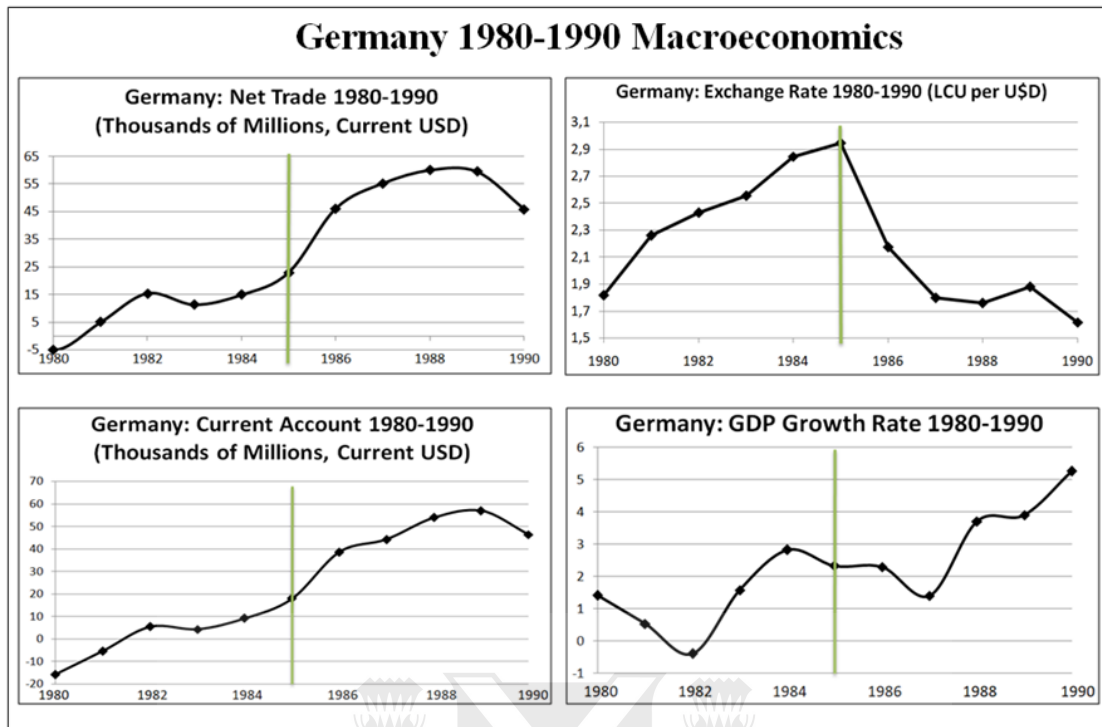
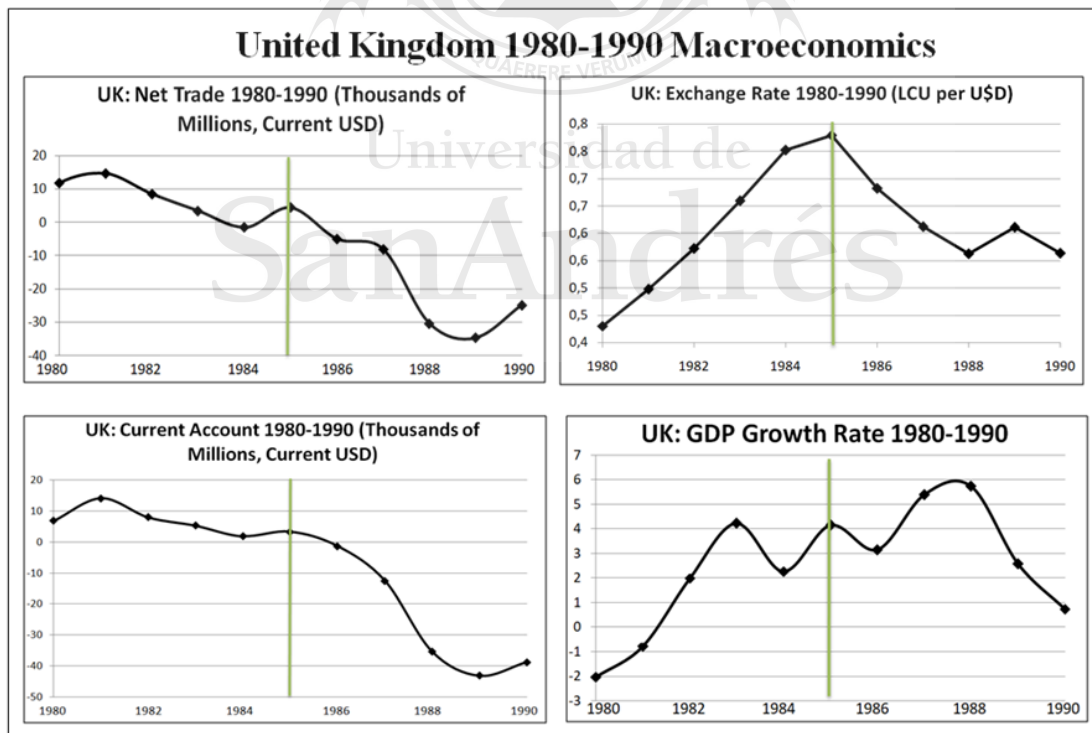


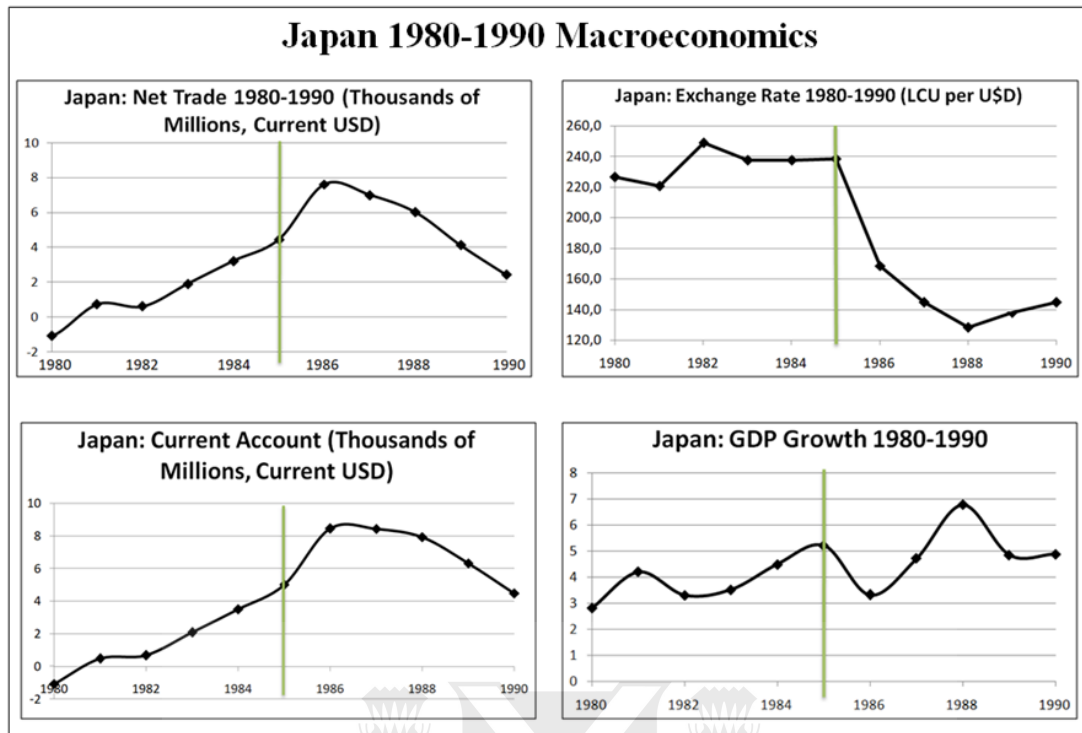
Figure 27. Net Trade, Current Account and GDP Growth Rate in France 1980-1991



*Figure 28. Net Trade, Current Account and GDP Growth Rate in Germany 1980-1991*



*Figure 29. Net Trade, Current Account and GDP Growth Rate in the United Kingdom 1980-1991*



*Figure 30. Net Trade, Current Account and GDP Growth Rate in Japan 1980-1991*