Is the USA’s Current Account Sustainable?

Wissenschaftliche Arbeit
zur Erlangung des Grades eines Diplom-Volkswirtes
im Fachbereich Wirtschaftswissenschaften
der Universität Konstanz

Verfasser:
Florian Bubla
Fischerstraße 1
78464 Konstanz


1. Gutachter: Prof. Dr. Ursprung
2. Gutachter: Prof. Dr. Ramser

Is the USA’s Current Account Sustainable?

*I am grateful for the advice and encouraging words of Dr. Phillip Harms.
# Contents

List of Figures ii  
List of Tables ii  
Glossary and Symbols iii  

1 Introduction 1  
1.1 Motivation 1  
1.2 Sustainability and central questions 1  
1.3 The course of investigation 4  

2 The United States’ external balance and accounting principles 5  
2.1 The balance of payments 5  
2.1.1 The current account 6  
2.1.2 The capital account 6  
2.1.3 The financial account 7  
2.1.4 The double entry system 8  
2.1.5 The overall balance 8  
2.2 International investment position 9  
2.3 Caveats on accounting data 10  
2.4 Historical aspects of the U.S. balance of payments 10  
2.5 Summary 12  
2.6 Appendix A 15  
2.6.1 U.S. balance of payments in 2000 15  
2.6.2 U.S. international investment position in 2000 16  

3 National income and product accounts 17  

4 Real aspects of the current account 21  
4.1 What is special about the U.S. budget constraint 21  
4.2 A naïve assessment 22  
4.3 The microeconomic foundation of the current account 24  
4.3.1 Infinitely living households 24  
4.3.2 Overlapping generations 31  
4.3.3 An important shortcoming 35  
4.4 Summary 37  

5 Monetary aspects of the current account 38  
5.1 A short-run portfolio balance model 38  
5.2 The medium and long-run extension 42  
5.3 Empirical evidence 47
5.4 Determinants of U.S. dollar demand ........................................ 49
  5.4.1 Conventional U.S. dollar demand ................................. 50
  5.4.2 The "dollar-standard" .................................................. 50
5.5 Caveats on the models ....................................................... 53
5.6 A curious fact ............................................................... 53
5.7 Summary ........................................................................... 56

6 Final assessment .................................................................. 58

7 Conclusion ......................................................................... 61

References ............................................................................ 63

List of Figures

1  Trade balance and the current account 1955–2003 .................. 11
2  Capital&financial account and the current account 1971–2000 ... 12
3  Major U.S. stock market indices 1900–2001 .......................... 13
4  Net international investment position 1980–2000 ................... 13
6  U.S. NIIP to GDP ratio 1980–2000 ....................................... 23
7  Net foreign asset to GDP ratio and the steady state level ......... 24
8  U.S. private consumption 1955–2000 .................................... 29
10 U.S. GDP growth rates 1955–2003 ....................................... 30
11 U.S. population growth rate 1901–2050 ............................... 34
13 A short-run portfolio balance model .................................... 41
14 U.S. interest rates ............................................................. 42
15 Long-run adjustment .......................................................... 45
16 U.S. inflation rates ............................................................. 46
17 U.S. household’s wealth 1988–2000 .................................... 47
18 U.S. dollar exchange rates 1979–2000 ................................ 48
19 The CPF and the euro-dollar exchange rate 1979–2000 ........... 49
20 Total capital flow 1971–2000 ............................................... 54
21 The income account 1971–2000 ............................................ 55

List of Tables

1  U.S. balance of payments in 2000 ........................................... 15
2  U.S. international investment position in 2000 ....................... 16
Notation Conventions and Symbol Glossary

Symbols

$A, \alpha$ Domestic absorption or technical progress, absorption quote

$B_t$ Net foreign assets at time $t$

$C$ Consumption

$E(\xi_y)$ Spot rate in price notation

$F(\cdot)$ Production function

$I$ Investment

$IM$ Imports

$K$ Capital stock

$M, m$ Money supply and money demand, real money demand, resp.

$N, n$ Population size, Population growth rate

$NX$ Net Exports

$OB$ Overall Balance

$OR$ Official Reserves

$S, s$ Aggregated saving, saving rate

$TB$ Trade Balance

$X$ Exports

$Y, y$ Income, young generation (OLG-model)

† Break in comparability of data

$\infty$ Estimated data

$\pi$ Inflation

$g, \gamma$ Income growth rate

$i, r$ Domestic nominal interest rate, real interest rate

$i^*, r^*$ Foreign nominal interest rate, real interest rate

$p, p^*$ Domestic price level, foreign price level

$q$ Real exchange rate

$s, t$ Time index

B

BoP Balance of Payments
C

c.p. ceteris paribus

CA Current Account

CP Capital Account

CPF Capital and Financial Account

E

e.g. exempli gratia, for instance

ECU European Currency Unit

eq. Equation

et al. and others

EU European Union

F

FA Financial Account

FDI Foreign Direct Investment

Fed U.S. Federal Reserve Bank of New York

FOFA Flow of Fund Accounts

FX Foreign exchange

G

GATS General Agreement on Trade in Services

GDP Gross Domestic Product

GNP Gross National Product

I

i.e. id est, that is

i.rep.ec. in reporting economy

ibid ibidem, same author same place as cited just before

IFS International Financial Statistics

IIE Institute for International Economics

IIP International Investment Position

IMF International Monetary Fund
IT  Information Technology

M

MIT  Massachusetts Institute of Technology

N

n.i.e. not included elsewhere

NAIRU  Non Accelerating Inflation Rate of Unemployment

NBER  National Bureau of Economic Research

NIIP  Net International Investment Position

NIPA  National Income and Product Accounts

no.  number

O

OECD  Organisation for Economic Cooperation and Development

op. cit.  opere citato, in the author’s publication as cited before

P

pp.  pages

PPP  Purchasing power parity

R

r.h.s.  right hand side

resp.  respectively

S

SDR  Special Drawing Right (IMF accounting unit)

SNA  System of National Accounts

U

U.K.  United Kingdom

U.S., USA  United States

UIP  Uncovered interest parity

V

vol.  volume
1 Introduction

1.1 Motivation

The author's interest in the topic "Is the USA's Current Account Sustainable?" has initially been attracted by an article published in The Economist\(^\text{1}\) basing on a paper written by McKinnon\(^\text{2}\) in which the latter asserts:

"[...] My own view is that the only real threat to the dollar-based institutions of international exchange could come from chronic inflation in the U.S. itself. Absent monetary instability in the center country, the dollar standard is robust and could continue without the U.S. running up against significant borrowing constraints from the rest of the world.\(^\text{3}\)

Now, this is puzzling! Why should the U.S. not have a borrowing constraint? And what is the relation between the borrowing constraint, the dollar standard, and the title of the thesis "Is the USA's Current Account Sustainable?". What actually is the significance of "sustainability"?

1.2 Sustainability and central questions

As will show up later on, the conclusion drawn on the current account’s sustainability crucially depends on the operational definition of the word "sustainability". Thus, it seems worth closer scrutiny.

A variety of articles and smaller comments on the subject of current account sustainability have been published in the last decade without a proper definition of the term\(^4\) and it is left to the reader to conclude by himself on the word "sustainability" from the context. However, there are several sources available that adequately define "sustainability" and draw a conclusion with reference to this definition. Notwithstanding, these differ from each other.

In their textbook on international macroeconomics, Obstfeld and Rogoff\(^5\) deliver a definition of "sustainability" as follows:

"Both government policymakers and private actors in world capital markets spend a good deal of time analyzing the ‘sustainability’ of indebted countries’ cur-

---

4 Even McKinnon (2001), op. cit., does not define it.
rent account deficits. Their purpose is to detect situations in which countries might become bankrupt, that is, unable to pay off foreign obligations at their face values.\(^6\)

Following this, the term "sustainability" is applied to a situation in which a country runs a current account deficit and the question arises if the deficit is still justified with respect to its future income, i.e., its budget constraint. Hence, the word "sustainability" seems closely related to "solvency"\(^7\), whereas "unsustainability" would indicate a violation of the budget constraint, i.e., a situation of "insolvency". In contrast to this definition, MANN\(^8\) takes a different approach:

"‘Sustainable’ in the context of the economics of external balance refers to ‘stasis’, that is, a stable state or a stable path where the external balance generates no economic forces of its own to change its trajectory. A sustainable external balance is one in which the feedback relationships between the external balance and exchange rates and interest rates are relatively weak in comparison to other macroeconomic forces that affect these asset prices. For example, a large current account deficit may make investors worry that they might not be repaid. They might then decide to sell some assets, which would generate upward pressure on interest rates or depreciation pressure on the exchange rate. In this case, the current account deficit would not be sustainable by this definition. […]"\(^9\)

Obviously, this definition emphasises the narrow relation of "sustainability" and "persistency". It is a much broader definition, since any setting that has no directly observable influence on macroeconomic variables would be judged as "sustainable". Notably, a situation unsustainable following OBSTFELD and ROGOFF’s definition might be sustainable according to MANN’s definition if influence on fundamentals is not observed.

A third definition is worth mentioning here. In its ‘World Economic Outlook’, the IMF’s author discusses two approaches referring to "sustainability":

"A first approach to current account sustainability relies on projecting into the future the current policy stance or private sector behaviour; sustainability is ensured if the resulting path of the trade balance is consistent with intertemporal solvency. If an unchanged policy stance is eventually going to lead to a "drastic" shift to reverse the trade balance position (such as a sudden policy tightening, causing a large recession) or lead to a balance of payments crisis (such as an exchange rate collapse that raises the probability of default on external obligations), the current

\(^8\) Mann (1996), ‘Is the U.S. Trade Deficit Sustainable?’, Institute for International Economics, IIE, Washington, DC, U.S.
account position is assumed to be unsustainable. [...] A second approach to external sustainability, which is linked to the extensive literature on balance of payments and currency crisis, relies instead on a composite set of macroeconomic, financial, and external indicators to evaluate the risk of external crisis. [...] For these reasons, some authors are strongly critical of sustainability analysis that focus exclusively on solvency conditions and flow variables, such as the current account, and argue that external crisis can occur because of stock imbalances and capital market factors, and not just because of the current account position.”

Apparently, the first approach is equivalent to Obstfeld and Rogoff’s definition, whereas the second one refers to the one forwarded by Mann. Additionally, the "sustainability" is attached to a "policy stance or private sector behavior". However, in the latest ‘World Economic Outlook’, Bayoumi et al. obviously avoid the word "sustainability" in describing it

"Are the present imbalances viable in the medium-term and, if not, what can we say about how they will adjust?"

In sum, these definitions suggest a minimum requirement for current account "sustainability" with adherence to the intertemporal budget constraint such that no major adjustment processes in macroeconomic variables are triggered by the position of the current account in the medium-term. From this operational definition the author deduces two central questions to serve as guidelines through the text and that he will try to answer:

- Are the United States respecting the budget constraint applying to the country as a whole?
- Does the current account position trigger adjustment processes in fundamental variables in the medium-term and are these adjustment processes observable?

---

1.3 The course of investigation

Throughout the course of investigation positive analysis is performed exclusively, i.e., the focus is on efficiency and a consideration of the behaviour of fundamental variables. Distributional aspects and the evaluation of political and monetary decisions are neglected here. However, understanding the variety of political recommendations forwarded in most of the underlying literature requires the understanding of this positive analysis. Hence, positive analysis serves as a basis for political recommendations since it implicitly contains the relevant arguments.

To introduce terms and conventions, the analysis starts in the second section with an exposition of accounting principles and balance of payments characteristics, since a firm comprehension of these is indispensable for the detailed breakdown of the U.S. balance of payments proceeded throughout the text. Moreover, the U.S. balance of payments in 2000 and its historical development is presented in details. A variety of statistics illustrate the actual problem.

As will be shown in the second section, the current account can be deduced from a balance of payments by either considering the flow of capital or the flow of goods and income. As a first approach—in a real model—the microeconomic foundation of the current account out of the behaviour of utility and profit maximising agents is presented in the fourth section. Assuming that money is not neutral in the short-run, the second approach to the current account, an entirely nominal asset-market model, is exposed in the fifth section. However, the interaction of nominal and real variables realised via the adjustment of the price level shows up in a long-run portfolio balance model presented thereafter.

The close relation of the dollar standard to the U.S. current account deficit—as mentioned in McKINNON’s citation above—will be pointed out before a final assessment summarises the findings. Finally, the conclusion is drawn with respect to the central questions defined just before.

With respect to the topic, a variety of articles and comments have been published in the last decade. Most of these are political economy and are directly related to policy measures undertaken by the former and current U.S. government. The author found three different positions of economists in this literature. Whereas MANN’s position is the unsustainability of the U.S. current account, OBSTFELD and ROGOFF argue that the current account deficit as well as the U.S. external debt is sustainable at the very moment of their article. McKINNON’s opinion is the outsider one. His article reveals indefinite sustainability of the U.S. current account deficit. Correspondingly, his approach to the problem is different from this of MANN, OBSTFELD and ROGOFF, resp. Most of the "smaller" articles refer to either of these opinions. A multitude of papers published by the IMF, CEPR, NBER, and others are available on the subject—these partially cover very specific questions. Concerning the up-to-date events THE ECONOMIST is cited at various occasions.
2 The United States’ external balance and accounting principles

This section provides the conceptual framework underlying a balance of payments (henceforth BoP) and illustrates the current position of the U.S.-BoP. It starts with a description of the individual accounts and their subaccounts while following the accounting principles of the 5th BALANCE OF PAYMENTS MANUAL13 published by the IMF in 1993. Note that the IMF switched the accounting convention for the capital account from the 4th BALANCE OF PAYMENTS MANUAL14 and introduced a financial account.15 To give a quantitative idea, the U.S.-BoP for the year 2000, with reference to its publication in the IMF’s BALANCE OF PAYMENTS STATISTICS YEARBOOK16 is displayed in appendix A, table 1. The U.S.-IIP for 2000 as published in the IMF’s INTERNATIONAL FINANCIAL STATISTICS YEARBOOK17 follows thereafter in appendix A, table 2. Finally, the historical development of selected positions is exposed.

2.1 The balance of payments

In its 5th BoP-Manual the IMF defines the BoP as follows:

"The balance of payments is a statistical statement that systematically summarises, for a specific time period, the economic transactions of an economy with the rest of the world. Transactions, for the most part between residents and nonresidents [footnote related to exceptions], consist of those involving goods, services, and income; those involving financial claims on, and liabilities to, the rest of the world; and those (such as gifts) classified as transfers, which involve offsetting entries to balance—in an accounting sense—one-sided transactions [...]"18

This definition indicates that a BoP is a flow concept—it does not record stocks, but transactions realised within one year—and that a BoP is constituted out of three major accounts. These are the current account, the capital account and the financial account.

15 Several textbooks on this subject did not adapt these new conventions and still stick to the convention of the 4th edition. However, the author of this text strictly obeys to the new convention to assure compliance with terms and statistics.
2.1.1 The current account

It has already been indicated in the previous section that the U.S.’s current account (henceforth CA) is in deficit and that this gives rise to concerns with respect to sustainability. A U.S. CA-deficit *per se* is actually not the reason for this—it is the tremendous negative number of the balance that bothers economists and politicians. The CA consists of four subaccounts covering transactions in *goods, services, income* and *current transfers*. Transactions recorded in the *goods account* are exports (credit entry) and imports (debit entry). The balance on the *goods account* is referred to as the *trade balance*. As is visualised in appendix A, table 1, the *trade balance* is with U.S. dollar billions $-449.57$ extremely negative in 2000. The *services account* records exported (credit entry) and imported services such as construction, insurance and financial fees, royalties, etc. With a balance of U.S. dollar billions $73.81$ it is the only positive item in the U.S.-CA. The sum of the *trade balance* and the balance on the *services* is usually referred to as the *merchandise balance*, indicated in brackets. Income of domestic residents from foreign resources such as labour and capital investment is covered in the *income account* with a credit entry, whereas income of foreign residents from domestic resources is registered with a debit entry. The balance on the *income account* is negative with U.S. dollar billions $-54.15$, reflecting the high investment service the U.S. is facing since several years. The *current transfers account* records unilateral transactions such as government transfers to international organisations, and workers’ remittances, e.g. With a negative balance of U.S. dollar billions $-54.15$ it is a further negative contribution to the CA-balance resulting from the sum of the four subaccounts with U.S. dollar billions $-444.69$. Alternatively, the expression *external balance* is often referred to this number in the literature.

According to the flow concept, the CA-balance exhibits the value of future resources transferred back or, in other words, reflects a nation’s accumulation of debt against the rest of the world. This significance will be shown in detail in subsequent sections.

2.1.2 The capital account

"[...] The capital account covers all transactions that involve the receipt or payment of capital transfers and acquisitions/disposal of non-produced, nonfinancial assets."  

---

19 A minus in front of a number indicates an outflow of funds, hence, because imports have to be payed for, they are displayed with a minus. Under the *financial account*, the item *assets* is displayed with a minus sign, since the capital is invested by U.S. residents and funds flew out of the U.S., whereas *liabilities* are displayed with a positive sign since these were funds that flew into the U.S.

In contrast to its definition according to the 4th BoP-manual, the capital account (henceforth CP) experiences a quantitatively minor role in the new definition of the 5th BoP-manual, since the balance is—with U.S. dollar billions $68 in 2000—of minor importance facing the huge numbers of the CA and financial account.

2.1.3 The financial account

"[...] The financial account covers all transactions associated with changes of ownership in the foreign financial assets and liabilities of an economy. Such changes include the creation and liquidation of claims on, or by, the rest of the world." 21

The financial account (henceforth FA) has been introduced in the 5th BoP-manual and was formerly included in the CP. It is divided further into three subaccounts according to the function of capital—direct-investment, portfolio-investment and other-investment. The direct-investment account covers direct-investment into the reporting economy (i.rep.ec.), henceforth FDI, with a credit entry, U.S. dollar billions $287.68 in 2000, and direct-investment abroad with a debit entry, U.S. dollar billions $−152.44 in 2000. Thus, FDI in the U.S. is much higher than investment abroad by U.S. residents as the balance of U.S. dollar billions $135.24 exposes. In the item direct investment all recorded transactions consist exclusively of equity. From portfolio-investment, direct-investment is distinguished by a persistent investor interest:

"The direct investor seeks a significant voice in the management of an enterprise operating outside his or her resident economy. To achieve this position, the investor must almost invariably provide a certain, often substantial, amount of the equity capital of the enterprise." 22

However, the final judgement of a "significant voice" is operationalised at "10 per cent or more of the ordinary shares or voting power [...]" 23. The portfolio-investment account is classified into assets and liabilities, thereof equity (shares, American Depository Receipts, etc.) and debt (bonds, notes, etc.), resp. The item portfolio assets displays U.S. investors’ portfolio investment abroad in 2000. An interesting fact is that equity securities investment is more than three times higher than debt security investment. The intuition would be that the debt item is higher because fixed income volumes usually far exceed equity volumes. However, the decomposition of portfolio and direct investment flows into equity and debt proposes that foreign investors generally acquire far more U.S. debt securities than equity securities 24, whereas

21 IMF (1993), ibid.
24 However, taking into account of FDI inflow shows, that total equity investment in the U.S. exploded in the second half of the 1990s catching up with the total volume of "debt"-inflow. Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., section VI., ‘Country episodes and policy
U.S. investors prefer the acquisition of foreign equity instead of debt securities. As will show up in subsequent sections, portfolio investment is the fastest moving capital and the account holds an eminent place for conclusions on fundamental variables. All investment transactions not covered by the direct-investment account, portfolio-investment account, resp., are integrated into the other-investment account and as well differentiated into assets and liabilities, thereof equity and debt, resp. The balance on other investment is negative at U.S. dollar billions $-41.31$ indicating that other investment assets exceed liabilities.

For convenience, the CP and the FA are usually consolidated to the capital and financial account (henceforth CPF) without any loss of information because of the double entry system.

### 2.1.4 The double entry system

Any transaction in the BoP is represented by two entries. A credit entry in the CA has an equivalent offsetting debit entry in the CPF and vice versa. Thus, in principal, the sum of all credit entries in the BoP adds up to zero with the sum of all credit entries. However, in reality, the data for the account entries derive from different information sources and, therefore, deviations in reported values are offset by a net errors and omissions position.

### 2.1.5 The overall balance

Since U.S. authorities realise a floating U.S. dollar—the dollar exchange rate is determined by market forces only and monetary authorities do not intervene to sustain a certain rate—the reserve and related items account, $OR$, is of inferior significance and not considered for the purpose of the topic. However, the position exists and the Federal Reserve Bank (henceforth Fed) sold reserves of U.S. dollar billions $3$ in market transactions.

The overall balance, $OB$, is represented in the sum of the three major accounts plus the acquisition of reserves, i.e.

$$OB = CA + CP + FA + OR \geq 0.$$  \hspace{1cm} (1)

A positive number of the overall balance indicates central bank intervention in foreign exchange markets (henceforth FX)—here, the Fed sold reserves—and exactly this number is displayed in the balance on reserves with the inverse arithmetic sign of the number, resp. Thus, for the overall balance to equilibrate and $OR = 0$ assumed

---

*lessons*, p. 19, state: "[...] A seventh factor is the composition of capital inflows. Australia has relied more heavily on equity than the developing countries we have examined, and Ireland has received substantial inflows of foreign direct investment. This implies that the risk of domestic and external shocks is shared between foreign investors and the country, reducing the vulnerability of the external position.[...]"
at floating exchange rates,
\[ (-CA) = CPF. \]  
(2)

From the CA-balance, U.S. dollar billions \(-444.69\), and the CPF-balance, U.S. dollar billions \(444.26\), this holds nearly exact. Hence, as already mentioned above, under flexible exchange rates and due to the double entry system, the balance on the CA is equivalent to the balance on the CPF, and vice versa. If the balance on the CPF is known, e.g., one could conclude on the CA-balance. However, a conclusion on the composition and origin of these balances is not possible. For these to experience, a closer scrutiny of the subaccounts of the CA and the CPF is indispensable.

### 2.2 International investment position

The international investment position (henceforth IIP) is similar to a corporation’s balance sheet and described by the IMF’s BoP-manual as follows:

“Closely related to the flow-oriented balance of payments framework is the stock oriented international investment position. Compiled at a specified date such as year end, this investment position is a statistical statement of: (i) the value and composition of the stock of an economy’s financial assets, or the economy’s liabilities to the rest of the world [...]”\(^{25}\).

Whereas BoP-accounts reflect transactions exclusively, changes in the stock of foreign assets, liabilities, resp., are due to transactions in financial claims but moreover reflect changes in the valuation basis such as prices and exchange rates etc., all of which influence the value of claims. As an indicator of net wealth, net debt according to the algebraic sign, resp., the net international investment position (henceforth NIIP) is presented graphically in the literature.\(^{26}\) The NIIP results from the accumulation of trade deficits and additional borrowing needed to service the already existing stock of debt. Note here, that the NIIP is not the correct measure for the net wealth of a country, since the latter also comprises nonfinancial assets. Thus, the correct balance sheet and the corresponding net position derives from its stock of domestic nonfinancial assets plus NIIP. The IMF explicitly notes that with

\[ [...] \text{Rather, it is more relevant to view only the nonequity components of the position as debt (i.e., all recorded liabilities other than equity securities and direct investment equity capital, including reinvested earnings). Such a view is in general concordance with the core definition [footnote to gross external debt] of gross external debt in the joint study External Debt: Definition, Statistical Coverage, and} \]


\(^{26}\) A comprehensive and differentiated exposition with alternative measurement of the external wealth provides Milesi-Ferretti, Gian Maria and Lane, Phillip R. (1999), ‘The external wealth of nations: Measures of foreign assets and liabilities for industrial and developing countries’, Sept., discussion paper no. 2231, Center for Economic Policy Research, CEPR, London, U.K.
The IIP balance sheet presented in appendix A, table 2, shows that the U.S. international liabilities exceed international assets by U.S. dollars 2.18 trillion—i.e. the NIIP. This number makes the U.S. the world’s largest debtor country.

2.3 Caveats on accounting data

The above presented BoP-accounting deserves careful and attentive consideration. Note, that BoP-accounting data are imperfect since only registered transactions are accounted for. Moreover, the data valuation basis shifts in time, often is asymmetric with respect to imports and exports, and merchandise data are registered in different time periods. Theoretically, the sum of all nations’ current accounts is equivalent to zero, because one country’s export is another country’s import. In reality, however, an increasing current account discrepancy (i.e., the sum of all CAs is different from zero) amounting to 2% of global imports in 2002 is observed. This might be an important point:

"Clearly, this significantly complicates the analysis of global imbalances. For instance, it raises the question how much of the U.S. current account deficit is simply the result of measurement errors. In addition, even if the U.S. current account deficit is correctly measured, the discrepancy means that a significant portion of the recent increase has no counterpart in the rest of the world. [..]"  

2.4 Historical aspects of the U.S. balance of payments

The charts presented on the basis of the IMF’s time series might differ from those published elsewhere (the author found several cases). The reason for these deviations lay in the different accounting principles. Throughout the text the IMF’s 5th BALANCE OF PAYMENTS MANUAL represents the exclusive basis for all descriptions on account characteristics. The data derive from the IMF’s time series published in the INTERNATIONAL FINANCIAL STATISTICS YEARBOOK, its monthly issues (IFS), the BALANCE OF PAYMENTS STATISTICS YEARBOOK, from the OECD’S ECONOMIC OUTLOOK and several other U.S. departments publishing statistics. Hence,

28 Intra-industry and intra-firm trade are not recorded to their full extent. Since these heavily increased in the last decade due to a strong internationalisation of production (for a current review see OECD (2002), ‘Economic Outlook’, June, ‘VI. Intra-industry and intra-firm trade and the internationalisation of production’, pp. 159–169), the correction required might be significant. Moreover, there is probably a high number of unregistered fund flows because of underreporting of investment income (tax evasion).
since the data of 2001 and 2002 are still not published entirely, some charts are not up to date but stop in 2000. For those ranging to 2002 and further the author took OECD data as far as the time series are consistent. Any break in the comparability of data is indicated by a †, whereas a projection into the future is marked by a ⊿ ◁. Figure 1 visualises the evolution of the trade and CA-balance since 1955. Obviously, the trade balance began falling into negative area in the mid 1980s. However, the CA-balance followed reluctantly—the income account still compensated some amount of the imports in the 1980s and first half of the 1990s. Whereas the negative balances of the 1980s are related to excessive government consumption\(^\text{31}\) (see figure 5 on page 19), the slump of the CA at the beginning of the 1990s is closely related to an increase in private consumption. Since 1990, both—trade balance and CA—seem to fall into bottomless area.\(^\text{32}\)

Figure 2 visualises that the CPF-balance strongly increased since 1990. Note from appendix A, table 1, that this is related to high fund inflow—i.e. FDI, portfolios in equity and U.S. treasury acquired by foreign agents.

\(^{31}\) Mann (1996), op. cit., section II, ‘Whatever happened to the "twin-deficits"?’, pp. 13–25. See also the following section 3 for a description of the twin deficit.

\(^{32}\) At this point the evolution of the CA/GDP ratio is usually presented. The CA-balance of 2000 is near to the 5% "red" mark, as it is referred to in the literature (see Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., section I, ‘Introduction’, first paragraph, e.g.). Various investment banks consider such ratios as an indicator of sustainability. The 5% ratio is probably empirically indicating a turning point. However, the number is arbitrary and should not be projected to the U.S. case. "[...] Moreover, this simple exercise indicates that relying on current account ratios—even ratios calculated using current ‘sustainability’ frameworks—can be highly misleading", see Edwards, Sebastian (2001), op. cit., p. 19. Also, Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., section VII, ‘Concluding remarks’, p. 20: "[...] We conclude that a specific threshold on persistent current account deficits (such as 5 percent of GDP for 3–4 years) is not per se a sufficiently informative indicator of sustainability.[...]".


\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{trade_balance.png}
\caption{Trade balance (solid line) and current account balance (dotted line) in US-dollar billions for the US from 1955–2003.}
\end{figure}
Additionally, the figure reveals that the CA (here shown with the data row multiplied by \((-1)\)) is determined by the CPF since the latter is always faster (this is outstanding in the capital inflow from 1991–2000), i.e., moving first and the CA is following successively. Figure 3 depicts the surge in the stock market that took place in the 1990s causing the DowJones to raise to a record height of 12,000 points.\footnote{33} The U.S. IIP is visualised in figure 4. Obviously, at the same time the high fund inflow started, the net international investment position began to drift smoothly into negative area. However, this does not happen because of a falling stock of international assets, but because international liabilities increased stronger than assets. But this is small wonder facing the huge fund inflow the U.S. experienced in the 1990s.

2.5 Summary

The U.S. trade balance is falling into bottomless area since a decade. Due to the initially positive balance on the income account, the CA-balance followed reluctantly but caught up in the second half of the 1990s, when the positive contribution of the income account vanished due to debt servicing from the heavily negative NIIP. The tremendous number of U.S. dollar billions $-444.69$ gives rise to the question\footnote{33} The very common explanation for this phenomenon is the "IT-bubble" that expressed itself in an explosion of asset prices. A somewhat more sophisticated explanation would be the prospect of high returns on equity from high growth prospects due to a higher technological level, persistent overall political stability, and a fully diversified capital market with respect to risk and tradeability. These features in combination with the Asian financial crisis, the official Russian default on its public debt, the economic slowdown in Latin America—all in the second half of the 1990s—and the uncertainty of the launching of the euro in 1999, in short, a lack of alternatives for investment in the rest of the world triggered the excessive inflow of funds.

Figure 3: Major U.S. stock market indices at year-end; DowJones Industrials Average (solid line), Standard&Poors 500 Composite (dotted line) and NASDAQ Composite Index (dashed line) for the U.S. from 1900–2001.


Figure 4: NIIP, Net International Investment Position (bars) as the residual of total asset stock (solid line) and total liabilities stock (dashed line) in U.S. dollar billions for the U.S. from 1980–2000.
of sustainability of the U.S. CA-deficit. From the fundamental BoP equation under flexible exchange rates, eq. 2, it follows that the balance on the CA is mirrored by an equivalent balance on the CPF due to the double-entry system. Hence, at the same time the CA was worsening, fund inflow—as registered in the CPF—surged. However, fund inflow was first and happened much faster. The CA was following, thus, the CA is determined by the CPF. Apparently, international financial markets are willing to finance the U.S. CA-deficit. In line with the strong fund inflow was the surge in the U.S. stock market. The DowJones increased to nearly 12,000 points—a historically high level.
### 2.6 Appendix A

#### 2.6.1 U.S. balance of payments in 2000

<table>
<thead>
<tr>
<th>Current Account</th>
<th>Goods</th>
<th>Services</th>
<th>Income</th>
<th>Current Transfers (n.i.e.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Exports (f.o.b.)</td>
<td>774.86</td>
<td>1) Credit</td>
<td>290.88</td>
<td>1) Credit</td>
</tr>
<tr>
<td>2) Imports (f.o.b.)</td>
<td>-1224.43</td>
<td>2) Debit</td>
<td>-217.07</td>
<td>2) Debit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-14.78 Balance on Income</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-54.15 Balance on Current Transfers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-444.69 Balance on Current Account (=External Balance)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-449.57 Trade Balance</td>
<td>73.81 Balance on Services</td>
<td>(-375.76 Merchandise Balance)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-375.76 Merchandise Balance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Account (n.i.e.)</td>
<td>Credit .68</td>
<td>Debit 0</td>
<td></td>
<td>.68 Balance on Capital Account</td>
</tr>
<tr>
<td>Financial Account</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Investment</td>
<td>Direct Investment abroad -152.44</td>
<td></td>
<td></td>
<td>135.24 Balance on Direct Investment</td>
</tr>
<tr>
<td>1) Direct Investment abroad</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Direct Investment i.rep.ec.</td>
<td>287.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portfolio Investment Assets</td>
<td>-99.74</td>
<td></td>
<td></td>
<td>-124.94 Portfolio Assets</td>
</tr>
<tr>
<td>Portfolio Investment Liabilities (n.i.e.)</td>
<td>193.85</td>
<td></td>
<td></td>
<td>474.59 Portfolio Liabilities</td>
</tr>
<tr>
<td>1) Equity Securities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Debt Securities</td>
<td>-25.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Investment Assets</td>
<td>-123.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Monetary Authorities</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) General Government</td>
<td>-94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Banks</td>
<td>-138.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Other Sectors</td>
<td>-463.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Investment Liabilities (n.i.e.)</td>
<td>-6.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Monetary Authorities</td>
<td>-6.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) General Government</td>
<td>-55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Banks</td>
<td>93.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Other Sectors</td>
<td>175.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Investment Assets</td>
<td>-303.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserves and Related Items</td>
<td>Reserve Assets -30</td>
<td></td>
<td></td>
<td>-30 Balance on Reserve Account</td>
</tr>
<tr>
<td>Net Errors and Omissions</td>
<td>CA-Balance -444.69</td>
<td>CP-Balance 68</td>
<td>FA-Balance 443.58</td>
<td>.73 Net Errors and Omissions</td>
</tr>
<tr>
<td>Overall Balance</td>
<td>CA-Balance -444.69</td>
<td>CP-Balance 68</td>
<td>FA-Balance 443.58</td>
<td>.30 Overall Balance</td>
</tr>
</tbody>
</table>

*Source: IMF, Balance of Payments Yearbook 2001, country code 111, lines 78ald–79dbd*

**Table 1:** U.S. balance of payments in U.S. dollar billions for the year 2000.
### 2.6.2 U.S. international investment position in 2000

<table>
<thead>
<tr>
<th>Assets</th>
<th>Direct Investment abroad</th>
<th>-2467.76</th>
<th>-2467.76</th>
<th>Direct Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portfolio Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Equity Securities</td>
<td>-1828.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) Debt Securities</td>
<td>-577.69</td>
<td>-2406.50</td>
<td>Portfolio Investment</td>
</tr>
<tr>
<td></td>
<td>Other Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Monetary Authorities</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) General Government</td>
<td>-85.17</td>
<td>-2187.14</td>
<td>Other Investment</td>
</tr>
<tr>
<td></td>
<td>3) Banks</td>
<td>-1276.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) Other Sectors</td>
<td>-825.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reserve Assets</td>
<td>-128.40</td>
<td>-128.40</td>
<td>Reserve Assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Investment</td>
<td>-2187.14</td>
<td></td>
<td>Other Investment</td>
</tr>
<tr>
<td></td>
<td>Reserve Assets</td>
<td>-128.40</td>
<td>-128.40</td>
<td>Reserve Assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liability Assets</td>
<td>-7189.80</td>
<td></td>
<td>International Assets</td>
</tr>
<tr>
<td>Liabilities</td>
<td>Direct Investment i.rep.ec.</td>
<td>2736.87</td>
<td>2736.87</td>
<td>Direct Investment i.rep.ec.</td>
</tr>
<tr>
<td></td>
<td>Portfolio Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Equity Securities</td>
<td>1665.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) Debt Securities</td>
<td>2702.36</td>
<td>4367.94</td>
<td>Portfolio Investment</td>
</tr>
<tr>
<td></td>
<td>Other Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Monetary Authorities</td>
<td>251.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) General Government</td>
<td>13.50</td>
<td>2272.44</td>
<td>Other Investment</td>
</tr>
<tr>
<td></td>
<td>3) Banks</td>
<td>1284.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) Other Sectors</td>
<td>722.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reserve Assets</td>
<td>-128.40</td>
<td>-128.40</td>
<td>Reserve Assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Investment</td>
<td>-2272.44</td>
<td></td>
<td>Other Investment</td>
</tr>
<tr>
<td></td>
<td>Reserve Assets</td>
<td>-128.40</td>
<td>-128.40</td>
<td>Reserve Assets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liability Assets</td>
<td>9377.25</td>
<td></td>
<td>International Liabilities</td>
</tr>
<tr>
<td>Net International Investment Position</td>
<td>International Assets</td>
<td>-7189.80</td>
<td></td>
<td>NIIP</td>
</tr>
<tr>
<td></td>
<td>International Liabilities</td>
<td>9377.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** IMF, International Financial Statistics Yearbook 2001, country code 111, lines 79aad–79ljd

**Table 2:** U.S. international investment position in U.S. dollar billions for the year 2000.
3 National income and product accounts

The NIPA-approach\footnote{This is a standard textbook approach, see Mankiw (2000), ‘Macroeconomics’, 4th ed., chp. VIII, pp. 193–197, Worth Publishers, New York, U.S., e.g.} relates the external balance to the broader System of National Accounts and gives an easy access to understanding the relation between inner disequilibria affecting the external balance.

Let $Y_{GDP}$ denote the gross domestic product (henceforth GDP) of an open economy. Domestic expenditure on goods and services is

$$Y_{GDP} = C^d + I^d + G^d + X$$  \hspace{1cm} (3)

with $C^d$ as total private spending on domestic goods and services, $I^d$ total domestic investment in domestic goods and services, $G^d$ as government expenditure on domestic goods and services, and $X$ as exports, i.e. domestic goods sold to foreigners. Because in an open economy domestic spending must not take place in domestic goods and services exclusively, but may also take place in foreign goods and services, denote private consumption on foreign goods and services with $C^f$, investment into foreign goods and services $I^f$, and government expenditure on foreign goods and services $G^f$. Thus, total consumption expenditure is $C = C^d + C^f$, total investment $I = I^d + I^f$ and total government expenditure $G = G^d + G^f$. Substitute the latter into eq. 3 and rearranging of terms results in $Y_{GDP} = C + I + G + X - (C^f + I^f + G^f)$ with the term in brackets on the right hand side as aggregate domestic expenditure on foreign goods and services, in short, imports $IM$. In defining net exports, $NX$, as the difference of exports $X$ and imports $IM$, the latter eq. can be expressed as

$$Y_{GDP} = C + I + G + NX$$  \hspace{1cm} (4)

Defining domestic absorption, $A$, as the sum of all final expenditure, i.e. $C + I + G \equiv A$ modifies eq. 4 to $Y_{GDP} = A + NX$; GDP as the sum of domestic absorption and net exports. Enhancing the GDP by the net foreign income of domestic factors, $Y^F$, i.e. the income account, and net unilateral transfers, $Tr$, i.e. the current transfers account, results in the gross national product, $Y_{GNP}$, thus $Y_{GNP} = A + NX + (Y^F + Tr)$. Because the CA-balance is defined as $CA \equiv NX + Y^F + Tr$, the latter eq. reveals that

$$CA = Y_{GNP} - A,$$  \hspace{1cm} (5)

the CA is equivalent to the difference between GNP and domestic absorption. Taking account of the fact that $Y_{GNP} - A + I = S$, with $S$ as aggregate national saving, the equation

$$CA = S - I$$  \hspace{1cm} (6)
finally results. The CA is equivalent to the difference between domestic saving and domestic investment. If domestic saving is higher than domestic investment, i.e. $S > I$, the surplus is lend to foreigners. Replacing $S$ in eq. 6 with $S = S^d + S^f$, i.e. domestic saving plus foreign saving, and $I$ with $I = I^d + I^f$, i.e. total investment as the sum of domestic and foreign investment, gives $CA = (S^d - I^f) + (S^f - I^f)$. Suppose, the world exists of two economies and the world’s total CA is equivalent to zero, i.e. $CA^w = CA^d + CA^f$. Then domestic dissaving or excessive investment, i.e. $I^d > S^d$ and $CA^d < 0$ requires an equivalent offsetting in the foreign country’s CA, i.e. $I^f < S^f$ and, hence, $CA^f > 0$ in other words, a surplus in foreign saving. From this point of view, eq. 6 also features net foreign investment or, if $I > S$, the absorption of world savings because excess domestic investment is financed with foreign savings. Thus, a CA-deficit crowds out private saving.

Equations 5 and 6 allow a first principal statement of global validity: A negative CA-balance implies $A > Y \text{GNP}$, domestic absorption is higher than GNP, and $I > S$, investment higher than saving. This might be brought about by either a sudden slump in GNP or in national saving, a sudden excessive absorption or excessive investment, resp. Allowing for international capital mobility, domestic residents are free in devoting their savings to the most productive investment opportunity in the world. Thus, a changing investors’ preference might trigger a CA-deficit. Further expanding eq. 6 by including government saving $S^g$ and investment $I^g$, i.e. $S = S^g + S^p$, total saving as the sum of government saving and private saving and $I = I^g + I^p$, total investment as the sum of government investment and private investment reveals $CA = S - I = (S^g - I^g) + (S^p - I^p).$

Allow for $S^p = I^p$, private savings and private investment equilibrate, then either a sudden fall in government saving or a sudden increase in government investment leads to a CA-deficit.

---

35 In 2001, the U.S. CA-deficit was absorbing an estimated 7.5% of world savings contrast to an average of 2.5% in most years of the last decade. See IMF (2001c), ‘World Economic Outlook’, May, Box 1.2, Sustainability of the U.S. External Current Account, pp. 14–15.

36 However, the Feldstein and Horioka saving-investment puzzle (Feldstein, Martin and Horioka, Charles (1980), ‘Domestic savings and international capital flows’, Economic Journal, vol. 90, June, pp. 314–329) suggests that this is often not observed in the data. However, Obstfeld, Maurice and Rogoff, Kenneth (2000), ‘Perspectives on OECD Economic Integration: Implications for U.S. Current Account Adjustment’, Institute of Business and Economic Research—Center for International and Development Economics Research, University of California at Berkeley, paper C00-116, section 2.2, The Feldstein-Horioka puzzle, pp. 8–10, state that a later sample of their own, comprising OECD without Korea from 1990–1997, predicts the saving coefficient to have fallen from .89 to .6. For slight variations in the sample, by excluding outliers, e.g., the coefficient reacts extremely sensitive. The Feldstein and Horioka puzzle has several potential explanations. Trade costs in the tradables sector, for instance. Anyway, the Feldstein and Horioka puzzle suggests that the large and persistent U.S. CA-deficit is extraordinary.

37 At this point recall from the IMF’s two approaches to sustainability (citation on p. 2, footnote 10) that "A first approach to current account sustainability relies on projecting into the future the current policy stance or private sector behaviour; sustainability is ensured if the resulting path of the trade balance is consistent with intertemporal solvency." Hence, the inclusion of the government
Substituting \( S^g = T - G \), i.e. government savings as the difference between tax revenues \( T \) and government spending \( G \), into eq. 7 and allowing for \( S^p = I^p \) reveals

\[
CA = T - G
\]

that the government budget balance moves 1:1 with the CA-balance if private saving is equal to total investment (note that \( G \) incorporates \( I^g \)). Figure 5 depicts the U.S. government fiscal balance since 1955. Obviously, the growing CA-deficit in the 1980s\(^{38} \) is narrowly related to the budget-deficit. However, the budget balance is strongly improving\(^{39} \) since the first half of the 1990s, whereas the CA-deficit widened simultaneously. Hence, eq. 8 seems to be of limited validity. Because of this fact, the author abstains from a detailed consideration of government activity.

Recall from the definition of an equilibrating overall balance at flexible exchange policy stance is relevant for the conclusion on sustainability.

\(^{38} \) Recall this from figure 1 on page 11. The literature refers to this phenomenon as "twin-deficit" since a negative budget balance implies a negative CA-balance. This is a crowding out effect. See also footnote 31 on page 11. The Lawson doctrine states that CA-deficits are nothing to worry about if the fiscal budget is balanced. Facing the numbers of a high budget surplus in combination with a high CA-deficit, the Lawson doctrine should be considered cautiously.

\(^{39} \) This fact speaks for a "strong" U.S. government. "[.] The political situation can affect the sustainability of external liabilities for different reasons. For example, a 'weak' government may have difficulties in undertaking economic adjustment that may be needed in response to a shock, because of the difficulty inherent in gathering sufficient political support.[.]", Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., subsection V.3, 'Political economy factors', p. 16, second paragraph. Rise to concern from a high government budget surplus rather emerges for it will ultimately result in a redemption of outstanding government debt, a shortfall of new issued bonds and, thus, a reduction in the diversified bond market with respect to a consistent yield curve. Since foreigners acquire U.S. bonds preferentially, mind this from 1 on page 15, Financial Account: Liabilities (n.i.e.), item 2), Debt Securities, this might hamper the future fund inflow.
rates, described by eq. 2—repeated here, for convenience—requires

\[ (-CA) = CPF. \]

Thus, an excessive capital inflow, high investment by foreign agents, e.g., forces the CA to become negative. Moreover, eq. 2 exposes that the net acquisition of resources from foreign agents—i.e. the CA-balance—implies increasing liabilities by either accumulating debt or accepting change in ownership of domestic equity capital in favour of nonresidents. From this perspective the \( OB = 0 \) condition represents the budget constraint for the economy as a whole.\(^{40}\)

Again, the fact that the CA is determined by the CPF—as depicted in figure 2 on page 12—is pointed out in this equation.

With respect to the NIPA-approach, all equations presented are definitions and do not take into consideration the relation between the variables since there is no microeconomic foundation. Note that it is a demand-side description. Additionally, the equations are static and do not expose explicitly the intertemporal character of the CA (this is exposed in subsequent sections). However, they are simple and easily to remember and useful for understanding the complex consideration of the CA that is presented in the proceeding sections.

In sum, the NIPA approach provides three simple equations of global validity. The first equation, eq. 5, suggests that a CA-deficit emerges if domestic absorption is higher than gross national product. The second one shows that the latter is the same as the difference between domestic saving and domestic investment such that a plunge in saving will produce a CA-deficit. It also reveals that the CA-balance reflects net foreign investment, thus, a CA-deficit indicates negative net foreign investment, i.e. absorption of world savings. A third equation, eq. 8, proposes that if domestic investment and domestic private saving equalise, than the CA-balance is determined from the government budget. Thus, a surge in government expenditure might cause a CA-deficit. Apparently, this third equation made a good figure in describing the CA-deficits in the 1980s—excessive government investment crowding out private saving. For the 1990s, however, it proves unfit to use, since a high budget surplus in conjunction with a high CA-deficit is observed. Notwithstanding, it suggests that the statements of the first two equations is genuine, i.e. the U.S. CA-deficit is due to an internal disequilibrium between gross national product and domestic absorption as well as domestic saving and investment.

\(^{40}\) At this point recall Obstfeld and Rogoff’s definition of "sustainability" on pp. 1–2 (footnote 6). With respect to equity, the CA might fall into deficit up to the point at which the nations complete domestic capital is in possession of foreign agents.
4 Real aspects of the current account

Intertemporal borrowing and lending between open economies is realised by CA-deficits, CA-surpluses, resp. Thus, CA imbalances express the striving of nations for efficient resource allocation, consumption smoothing and faster capital accumulation. From the NIPA-approach, the intertemporal character of the CA is not obvious. Because this intertemporal view is a crucial point for understanding the United States’ actual problem, this section presents the microeconomic foundation of the CA out of the behaviour of utility and profit maximising agents. However, as an easy access, a naïve assessment of the situation is presented first.

4.1 What is special about the U.S. budget constraint

The U.S. principally—and in contrast to all other nations—borrows and lends in its own currency, i.e. U.S. dollar. Whereas any other country would face a run on its currency if borrowing becomes overleveraged, the U.S. liabilities are immune with respect to a U.S. dollar depreciation. Assume, that the U.K. borrows excessively from EU states and that the debt is denoted in euro (this example is chosen arbitrarily). At some future point, the U.K. is forced to repay its debt in euro, thus, it has to acquire euro in the foreign exchange market (henceforth FX-market). The resulting high demand for euro and a corresponding supply in British pound will imply a depreciation of the British pound against the euro. Clearly, the depreciation of pound entails that the U.K. is forced to pay ever more of its own currency to buy the euros it needs to redeem its obligations to the EU and this still worsens the excessive debt position—a vicious cycle starts here and might end up in a U.K. default. However, the depreciation will not take place because of the high demand of euros by the U.K. government, but much earlier since currency traders will anticipate the shortage and sell British pound short ("run" on the sterling) either directly or in forward agreements, swaps, options and futures, i.e. derivatives. Such a speculative attack happened several times in the European Monetary System’s successive crisis—however, this was due to a participating central bank’s obligation to defend the parity grid maintained with all the other participants. Such a situation could basically not occur with the U.S. If all foreign liabilities are denoted in U.S. dollars, the U.S. cannot incur a situation in which they are forced to acquire the respective debt currency in FX-markets. Moreover, the U.S. has the possibility of inflating its liabilities by simply printing dollars and repay with "new" currency whatever amount is necessary. Thus, the U.S. faces a softer budget constraint.
4.2 A naïve assessment

Denoting this setting formally

\[ CA_t = B_{t+1} - B_t = Y_t - A_t + r \cdot B_t + (M_{t+1} - M_t) \]  \(9\)

with \(t\) as the time index, \(B_t\) as the net foreign asset at time \(t\), \(Y_t, A_t\) as GDP, domestic absorption, resp., \(r\) as the real interest rate, and \(M_t\) as the outstanding amount of money, eq. 9 describes the CA as the difference between the net foreign assets of two successively following time periods. Thus, the CA is determined out of the familiar term \(CA = Y - A\) (eq. 5 from the NIPA), the term \(r \cdot B_t\) as the service on existing debt, and a seigniorage option \((M_{t+1} - M_t)\) describing the monetary expansion path. Assume, for simplicity, that the Fed does not exploit the seigniorage option, i.e. \(M_{t+1} - M_t = 0\), and the term simply drops out. Consolidating eq. 9 and dividing both sides by \(Y_{t+1}\) yields

\[
\frac{B_{t+1}}{Y_{t+1}} = \frac{Y_t}{Y_{t+1}} - \frac{A_t}{Y_{t+1}} + (1 - r) \cdot \frac{B_t}{Y_{t+1}}. \]

(10)

Define \(\frac{Y_{t+1}}{Y_t} = 1 + \gamma\) as the gross GDP growth rate and \(\frac{A_t}{Y_t} = \alpha\) as the (constant) absorption quote and eq. 10 becomes

\[
\frac{B_{t+1}}{Y_{t+1}} = \left( \frac{1 - \alpha}{1 + \gamma} \right) + \left( \frac{1 + r}{1 + \gamma} \right) \cdot \frac{B_t}{Y_t}. \]

(11)

with the first term in brackets on the r.h.s. as the axis interception and the second term, \(\left( \frac{1 + r}{1 + \gamma} \right)\), as the slope of the first order difference function \(\frac{B_{t+1}}{Y_{t+1}} \left[ \frac{B_t}{Y_t} \right]\). Assuming that a steady state exists in which a stable relation of net foreign assets to GDP, i.e. \(\frac{B_{t+1}}{Y_{t+1}} = \frac{B_t}{Y_t} = \text{const.}\), holds, the eq.

\[
\left( \frac{B_t}{Y_t} \right)^* = \frac{1 - \alpha}{\gamma - r} \]

(12)

finally results. Thus, the absolute height of the steady state depends on the constellation of the variables \(\gamma, r, \alpha\), as defined above. Note that the fraction \(\frac{B_t}{Y_t}\) is nothing but the relation of NIIP to GDP.

As figure 6 visualises, the ratio (bars) is all but stable. Moreover, the real GDP growth rate seems to be higher than the real interest rate before 1980 and below

\[41\] The author’s decision to take the medium-term government bond yield and the consumer price index basis on Mankiw (2000), op. cit., part II, ‘7.4 Inflation and interest rates’, pp. 168–169:

"Economists call the interest rate that the bank pays the nominal interest rate and the increase in your purchasing power the real interest rate. If \(i\) denotes the nominal interest rate, \(r\) the real interest rate, and \(\pi\) the rate of inflation, then the relationship among these three variables can be written as \(r = i - \pi\)."

Note that this is the log-version of the accurate "Fisher equation". Since the numbers are below 10% this is an acceptable approximation. The justification of the medium-term government bond
from 1980–2000. For this case, suppose the real GDP growth rate is higher than the real interest rate, i.e. $\gamma > r$. For the CA-deficit observed an $\alpha > 1$ could also be concluded (recall this from eq. 5, $A > Y$). In eq. 11 this suggests a positive slope $< 1$, but a negative axis interception and in eq. 12 a negative steady state at some level. The graphical presentation of this situation is depicted in figure 7 on the next page. As in figure 6, the ratio of net foreign assets per GDP, i.e. $\frac{B_t}{Y_t}$, starts at a slightly positive number—such as the NIIP to GDP ratio in 1985 does—and then falls from period to period until it reaches a constant negative level (denoted in the figure 7 with $SS$). This naïve assessment suggests that according to the constellation of the variables, the U.S. is approaching a debt steady state characterised by persistent CA-deficits.

yield is that it probably possesses the smallest risk premium and is available to the public (short-term government bonds will be used in the money-market and in high volumes). The fact that $r < \gamma$ is probably important since it implies that debt servicing is guaranteed in future periods. However, it might imply dynamic inefficiency of the balanced growth path for the overall economy. A discussion of this problem can be found at Romer (1996), ‘Advanced Macroeconomics’, ‘2.13 The possibility of dynamic inefficiency’, pp. 81–85, especially the empirical application focusses on this observation in the U.S. The question arises, if the real interest rate is possibly better gauged by a stock-yield proxy. However, the paradigm of high real interest rates in countries with high CA-deficits and vice versa, obviously does not hold for the U.S.

42 This assumption will be relieved in the RAMSEY-CASS-KOOPMANS model.
4.3 The microeconomic foundation of the current account

This subsection discusses two different approaches to the microeconomic foundation of the current account. Whereas the first model is basically a RAMSEY\(^ {43}\), CASS\(^ {44}\), KOOPMANS\(^ {45}\) model which assumes infinitely living households, the second one is a DIAMOND\(^ {46}\) model—usually referred to as "overlapping-generations"—which assumes continual entry of new households in the economy. Both models are denoted in real terms, i.e. no money and prices exist, and are developed assuming a deterministic setting in discrete time for an open economy.\(^ {47}\)

4.3.1 Infinitely living households

Consider a small open economy with a large number of infinitely living and very similar households and firms. Since both, households and firms, are similar, there exists an average household, an average firm, resp. that will be taken as a proxy for


all others and which is referred to as the "representative" household, firm, resp. The representative household is provided with an initial amount of labour and capital, \( K \), that it rents to the firm. The representative firm hires labour and rents capital on a competitive factor market from the household and produces a \textit{widget}\footnote{A widget is a good that serves for production, as well as for consumption (cows, maïs, for instance).} that it sells to the household. To simplify, assume a production function of capital\footnote{Three markets exist: two factor markets and a market for goods. Since apart from that all preconditions for a Walrasian model are fulfilled, focussing on just two markets will not alter the optimal result—recall this from Walras law. Henceforth, the labour market will not be considered explicitly.} only, i.e. \( F(K_s) \), and an exogenously determined technical progress of \( A \), such that \( Y_s = A_s \cdot F(K_s) \). For the capital the household provides, it is payed for the real interest rate \( r \) from the firm’s profit. Thus, the representative firm is ultimately owned by the representative household. The capital stock, as well as all other values are measured in \textit{widgets}, i.e. in real terms. All decisions take place at \textit{perfect foresight}, i.e. there exists no risk in the economy, hence, all assets possess the same yield. The household divides its income into consumption and saving and seeks to maximise its utility in an infinite horizon. The CA is given by

\[
CA_t = B_{s+1} - B_s = r \cdot B_s + A_s \cdot F(K_s) - C_s - (K_{s+1} - K_s) - G_s
\]

(13)

with \( I_s = (K_{s+1} - K_s) \) as investment, and all other variables as defined before. Substituting for \( K_{s+1} - K_s = I_s \) and \( Y_s = A_s \cdot F(K_s) \) in eq. 13, successively eliminating \( B_{s+1} \) by applying \textit{forward iteration} up to the limit, and imposing the \textit{transversality condition}\footnote{Strictly speaking, the \textit{no-Ponzi-game} condition \( \lim_{T \to \infty} (1 + r)^{-T} \cdot B_{t+T+1} \geq 0 \) is the right boundary condition since the consumer is free not to consume all resources.} \( \lim_{T \to \infty} (1 + r)^{-T} \cdot B_{t+T+1} = 0 \) finally delivers the economy’s \textit{budget constraint} with

\[
-(1 + r) \cdot B_t = \sum_{s=t}^{\infty} \left( \frac{1}{1+r} \right)^{s-t} \cdot (Y_s - C_s - I_s - G_s)
\]

(14)

as the value of initial debt, \(-(1 + r) \cdot B_t\), equivalent to the sum of \textit{present values} of all future trade-balances \( TB \equiv Y_s - C_s - I_s - G_s \). Recall from figure 4 on page 13 that the U.S.-NIIP is extremely negative. Eq. 14 predicts that the U.S. has to run high future surpluses in the CA to transfer the resources back. However, it could maintain a stable debt-output ratio and run a CA-deficit perpetually if GDP growth is sufficiently high. Suppose that \( Y_s \) is growing at a constant rate \( g > 0 \), i.e. \( Y_{s+1} = g \cdot Y_s \), and that a steady state debt-output ratio \( \frac{B_s}{Y_s} \) exists, in which \( B_{s+1} = (1 + g) \cdot B_s \), then the CA identity in eq. 13 modifies to \( CA_s = g \cdot B_s = \)
Dividing both sides by $Y_s$, the debt-output-ratio

\[- \left( \frac{B_s}{Y_s} \right) = \left( \frac{1}{r-g} \right) \frac{TB_s}{Y_s} \tag{15} \]

reveals that a country needs to pay out the excess of the interest rate $r$ over the growth rate $g$ to maintain a constant debt-output-ratio at a negative trade balance without going bust. With respect to the consumers optimal consumption path, assume that the period utility-function is

\[ U_t = \lim_{T \to \infty} \left[ u(C_t) + \beta \cdot u(c_{t+1}) + \beta^2 \cdot u(C_{t+2}) + \cdots + \beta^T \cdot u(C_T) \right] \]

\[ = \sum_{s=t}^{\infty} \beta^{s-t} \cdot u(C_s) \tag{16} \]

with $\beta$ as the subjective discount rate. Solving for $C_s$ in eq. 13, substituting in eq. 16, and maximising $U(\cdot)$ with respect to $B_{s+1}$ delivers

\[ u'(C_s) = (1 + r) \cdot \beta \cdot u'(C_{s+1}) \tag{17} \]

the intertemporal Euler-equation, describing consumption tilting between any two points in time depending on the subjective discount rate $\beta$ and the world interest rate $r$. Equivalently maximising $U(\cdot)$ with respect to $K_{s+1}$ and in connection with eq. 17

\[ A_{s+1} \cdot F'(K_{s+1}) = r \tag{18} \]

results, describing marginal product of capital equivalent to the world real interest rate. Specifying the general expression for the period utility function in eq. 16 with an isoelastic\(^{52}\) one

\[ u(C_s) = \frac{C^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} \tag{19} \]

and substituting into the Euler-eq. 17 delivers

\[ C_{s+1} = (1 + r)^{\sigma} \cdot \beta^\sigma \cdot C_s. \tag{20} \]

\(^{51}\)Recall here from figure 6 on page 23 that possibly $r < g$ in the U.S.—this might be convenient for the U.S. could play a Ponzi game. However, from Obstfeld and Rogoff’s simple calculation: 

"[...] For example, even if the world interest rate was to exceed the U.S. real growth rate by 5 per cent throughout the 22nd century (the U.S. can’t own every century!), the U.S. would only have to pay over about 4.5 per cent of its output annually to keep its debt-GDP ratio constant [...]". see Obstfeld, Maurice and Rogoff, Kenneth (2000), section 4, ‘The current account and the dollar’, p. 24. All steady state equations presented here highlight the crucial role of the future real interest rates for the solvency-question.

\(^{52}\)With isoelastic utility, the Arrow-Pratt-measure of relative risk aversion (coefficient of relative risk aversion, CRRA) $\xi = - \left( \frac{u''(C)}{u'(C)} \right) \cdot C$ is constant at $\frac{1}{\sigma}$. If $\frac{1}{\sigma}$ is close to zero, utility is almost linear in $C$ and, thus, the household will accept high variations in consumption depending on the constellation of $r$ and personal $\beta$. However, since there’s no risk in the model this fact is not directly relevant.
Assuming convergence by \((1 + r)^\sigma \cdot \beta^\sigma < 1\), i.e. consumption path growth rate below \(r\), substituting subsequently for \(C_s\) in the budget constraint outlined in eq. 14 and collecting terms in defining \(\nu \equiv 1 - (1 + r)^\sigma \cdot \beta^\sigma\), i.e. assuming that a utility maximum exists, the expression

\[
C_t = \left(\frac{r + \nu}{1 + r}\right) \cdot \left[(1 + r) \cdot B_t + \sum_{s=t}^{\infty} \left(\frac{1}{1 + r}\right)^{s-t} \cdot (Y_s - G_s - I_s)\right]
\]  

(21)
derives, stating that consumption is a decreasing function of \(\beta\).

At \(\beta \neq \frac{1}{1+r}\), isoelastic utility, and consumption as defined in eq. 20, specify period-wealth as

\[
W_t \equiv (1 + r) \cdot B_t + \sum_{s=t}^{\infty} \left(\frac{1}{1 + r}\right)^{s-t} \cdot (Y_s - I_s - G_s)
\]  

(22)
including financial assets as well as future expected income. Equation 21 inserted into eq. 13 implies

\[
CA_t = (Y_t - \tilde{Y}_t) - (I_t - \tilde{I}_t) - (G_t - \tilde{G}_t) - \left(\frac{\nu}{1 + r}\right) \cdot W_t.
\]  

(23)

At \(\beta \neq \frac{1}{1+r}\) and if \(\nu\)—consumption tilt factor, as defined above—is greater than zero, the country is impatient in consumption.

Now consider the production sector of the economy. As mentioned above, suppose the production function is specified by

\[
Y = A \cdot F(K) = A \cdot K^\alpha
\]  

(24)
with \(\alpha < 1\) and exogenously given technical progress as \(A_{s+1} = (1 + g)^{1-\alpha} \cdot A_s\) at \(0 < g < \alpha\). Investment is expressed by \(I_s = K_{s+1} - K_s = \left(\frac{\alpha A_s}{r}\right) \cdot g\) since the capital stock \(K_s\) derives from the marginal productivity of capital in the production function. Assume government spending \(\varsigma\) to be a constant fraction of output such that \(\varsigma < 1 - \frac{\alpha \cdot g}{r}\), thus, output net of investment and government spending for \(s \geq t\) is

\[
Y_s - I_s - G_s = Y_t \cdot \left(1 - \frac{\alpha \cdot g}{r} - \varsigma\right) \cdot (1 + g)^{s-t}
\]  

(25)
combining the latter eq. 25 with eq. 23 the optimal CA is

\[
CA_s = B_{s+1} - B_s = -\nu \cdot B_s - \left(\frac{g + \nu}{r - g}\right) \cdot \left(1 - \frac{\alpha \cdot g}{r} - \varsigma\right) \cdot Y_s
\]  

(26)

53 Use the fact that \(\tilde{X}_t \equiv \left(\frac{1}{1+r}\right) \cdot \sum_{s=t}^{\infty} \left(\frac{1}{1+r}\right)^{s-t} \cdot X_s\). "A variable’s permanent level is its annuity value at the prevailing interest rate, that is, the hypothetical constant level of the variable with the same present value as the variable itself", Obstfeld & Rogoff (1996), op. cit., ‘2.2.1 A fundamental current account equation’, p. 74.
and shows that the CA is decreasing in $g$, i.e. a higher growth rate of $Y$ causes higher investment and lower saving. Thus, this is the same prediction as from eq. 6 on page 17. Solving for $B_{s+1}$ and dividing both sides of the equation by $Y_{s+1}$ gives the debt-output ratio

$$\frac{B_{s+1}}{Y_{s+1}} = -\left[\frac{(1 + g) - (1 + r)^\sigma \cdot \beta^\sigma}{(1 + g)(r - g)}\right] \left(1 - \frac{\alpha g}{r} - \varsigma\right) + \frac{(1 + r)^\sigma \cdot \beta^\sigma}{1 + g} \cdot \frac{B_s}{Y_s}$$

as familiar from eq. 11 from the naïve assessment in subsection 4.2. However, here it is optimal and the interrelations between variables are explicitly considered. The axis interception of the difference equation is given in the first term in square brackets (r.h.s.), whereas the slope is stated in the second term in square brackets.

Focussing on the stable case\(^{54}\) in assuming $(1 + r)^\sigma \cdot \beta^\sigma < 1 + g < 1 + r$, i.e. $g < r$, the graphical representation is the same as in figure 7 on page 24 depicted above\(^{55}\). The corresponding algebraic expression for the steady state level of foreign debt to output is

$$-\left(\frac{B}{Y}\right)^* = \left(\frac{1}{1 + r}\right) \cdot \frac{1}{Y_t} \cdot \sum_{s=t}^{\infty} \left(\frac{1 + g}{1 + r}\right)^{s-t} \cdot (Y_t - G_t - I_t)$$

$$= \frac{Y_t - G_t - I_t}{(r - g) \cdot Y_t} = \frac{1 - \varsigma - \frac{\alpha g}{r}}{r - g}$$

(28)

equivalent to $\frac{1}{1 + r}$ times the ratio of the sum of all present values of future outputs (net of government expenditure and investment) to current GDP. This steady state implies that the ratio of consumption to GDP will approach zero because the economy today anticipates future consumption. Mind this from the gross growth rate of private consumption $(1 + r)^\sigma \cdot \beta^\sigma$ being smaller than the gross growth rate of GDP, $(1 + g)$. Taking optimal consumption in eq. 21 and dividing both sides by $Y_t$ reveals

$$\frac{C_t}{Y_t} = (r + \nu) \cdot \left[\frac{B_t}{Y_t} + \frac{Y_t - G_t - I_t}{(r - g) \cdot Y_t}\right]$$

(29)

Thus, for $\frac{C_t}{Y_t} \to 0$, $\frac{B_t}{Y_t} \to -\frac{Y_t - G_t - I_t}{(r - g) \cdot Y_t}$, i.e. the steady state (see eq. 28 after the line-break). Figure 8 visualises the surge in private consumption of U.S. households since 1955. The right scale and the corresponding solid line indicate that the consumption-to-GDP ratio is increasing since the first half of the 1980s. Whereas it was at around 62% in the 1980s it was reaching nearly 68% in 2000.

Moreover, this steady state implies a saving-output ratio of

$$\frac{S_t}{Y_t} = \frac{g \cdot (\alpha - 1)}{r - g}$$

(30)

\(^{54}\) Alternatively $(1 + r)^\sigma > (1 + g)$, as well as $(1 + r)^\sigma = (1 + g)$ are further extensions. However, these would not fit in the context since the system shoots to $+\infty$, is stable at the initial debt-output ratio, resp.

\(^{55}\) However, remember that it was built following the observation $r < g$. Assuming $r > g$ in the naïve assessment gives and explosion in asset accumulation.
which states that saving is decreasing in $g$, i.e. higher expected income reduces current saving. Figure 9 tracks the evolution of the saving rates since 1982. Notably, private saving has been declining significantly from more than 10% in 1982 to around 2% in 2000. Contrarily, national saving slightly increased from 15% to 18% in the second half of the 90s. Recall from figure 5 on page 19 that this is due to the strong improvement in the fiscal balance. Hence, does the slump in the private saving rate suggest higher expected income from an increasing GDP growth rate? Figure 10 depicts the performance of the nominal and real GDP growth rates since 1955. High GDP growth rates were observed in the 80s and early 90s, whereas since 1990, both rates seem to move between 3% and 6% without high variations. A shift in technology is not obvious and current estimates\textsuperscript{56} have been downgraded to range between 2–3%. Hence, the decline in the saving rate is probably not founded in relatively constant GDP growth rates. Straightforward is the argument that the slump in the saving rate reflects the increase in its complement—i.e. private consumption. Recall from figure 8 that private consumption was continuously increasing from 1980 to 2000, where it reached 68% of GDP. However, one probably has to depart from the fact that both, the low saving and the high consumption quote is triggered by a "wealth effect"\textsuperscript{57} through the surge in asset prices starting in 1990. Recall this from figure 3 on page 13. This would imply that U.S. domestic residents "save in

\textsuperscript{56} The Economist (2002b), ‘Economic focus: Productivity promises—How much of America’s surge in productivity growth can be sustained?’, vol. 365, no. 8297, p. 82. See also footnote 60 on page 33.


Figure 9: U.S. households’ saving rate in per cent of disposable income (bars) and U.S. national saving (solid line) in per cent of nominal GDP from 1982–2003.


Figure 10: Nominal GDP growth rate (solid line), real GDP growth rate (dashed line), and the real interest rate (dotted line) in the U.S. from 1955–2003.
equity”. Basically, saving rate predictions have to be considered cautiously, since they usually result as a residual in the NIPA computing and, thus, reflect the cumulated measurement errors.

4.3.2 Overlapping generations

Instead of focusing on an infinitely living household, the overlapping generations model allows for a continuous entry and withdrawal of households in the economy. However, suppose that any of these households is "representative". Denoted in discrete time, the simplest case is a stable population (considered first), hence, for each new household entering the economy, an old household withdraws. Households are living for two periods; the first period, representing the young generation in period $t$, is producing and saving (widgets, as before) for the second period $t+1$, in which the household stops working and lives from his savings exclusively—imagine the second period as retirement. Hence, the young household of period $t$ is old in period $t+1$. However, in period $t+1$ a new young household attains entry to the economy. Thus, in each period $t$, the economy exists of two households, a young and producing one, and an old, just consuming one. These assumptions imply that a young household is confronted with the decision how to arrange its saving behaviour in the first period $t$ to have consumption in the first and in the second period $t+1$ of his live cycle. To simplify assume that there exists no intergenerational trade and inheritance such that a household will start with owning zero and leave with zero, i.e. organising its consumption path in order to consume anything it saved in the first period without leaving a rest to its predecessors. A government exists that levies a lump-sum tax on the young and the old generation of $\tau^y_t$, $\tau^o_{t+1}$, resp., hence, the households’ income is diminished for these taxes. Let $c^y_t$ describe a household’s first period consumption and $c^o_{t+1}$ its second period consumption. Hence, overall consumption in any period $t$ under consideration is $C_t = c^o_{t+1} + c^y_{t}$. In his first period, the young household produces output $Y^y_t$, whereas it produces nothing in his second

---

58 Further explanations are: an appreciation in the value of tangible assets, which constitute about one-third of the total asset holding, financial innovations relaxing liquidity constraints and the coincident rise in labour productivity in the second half of the 1990s. For an overview, see Marquis (2002), ‘What’s Behind the Low U.S. Personal Saving Rate?’, Federal Reserve Bank of San Francisco, Economic Letter of March 29th, no. 2002-09.

59 From the IMF’s WORLD ECONOMIC OUTLOOK:

"Household saving in the United States is officially estimated in two ways. [footnote related to a third survey of minor quality] The most often-cited measure—and the one that turned negative for a short period in late 1998 and early 1999—is based on the U.S. Commerce Department’s National Income and Product Accounts (NIPA). The second measure is based on the Federal Reserve’s Flow of Funds Accounts (FOFA). As household saving rates, both measures are usually expressed as a ratio to personal disposable income (see figure). Neither measure is free from technical or conceptual difficulties; both suffer from the fact that they are not direct measures of household saving."

period, i.e. \(Y_{t+1}^o\) is the income of the old generation which is simply its saving from the previous period. But the new, young household entering in period \(t + 1\) produces \(Y_{t+1}^y\). Thus, the budget constraint for a representative household living over two periods is given by

\[
c_t^y + \frac{c_{t+1}^o}{(1+r)} = Y_t^y - \tau_t^y + \frac{Y_{t+1}^o - \tau_{t+1}^o}{(1+r)} \quad (31)
\]

with \(r\) as the world interest rate and \((1+r)\) as the discount factor for future income. Thus, the present value of current and future income must equal the present value of current and future consumption. Since the household has utility from consumption, denote its utility function as

\[
U(c_t^y, c_{t+1}^o) = \log(c_t^y) + \beta \cdot \log(c_{t+1}^o) \quad (32)
\]

Maximising utility \(U(\cdot)\) with respect to the budget constraint as stated in eq. 31, yields the intertemporal Euler equation

\[
c_{t+1}^o = (1 + r) \cdot \beta \cdot c_t^y \quad (33)
\]

with \(\beta\) as the subjective discount factor and, thus \(\beta = (1 + r)\) providing a smooth consumption path \(c_{t+1}^o = c_t^y\) over the households’ live cycle. Eq. 33 and 31 then imply the period consumption demands

\[
c_t^y = \left(\frac{1}{1 + \beta}\right) \cdot \left(Y_t^y - \tau_t^y + \frac{Y_{t+1}^o - \tau_{t+1}^o}{1+r}\right) \quad (34)
\]

and

\[
c_{t+1}^o = (1 + r) \left(\frac{\beta}{1 + \beta}\right) \cdot \left(Y_t^y - \tau_t^y + \frac{Y_{t+1}^o - \tau_{t+1}^o}{1+r}\right) \quad (35)
\]

As with infinitely living households, the CA of the country is represented in the difference of net foreign assets in subsequent periods. Here, the distinction between government and private assets is included additionally. Thus, the CA is described by

\[
CA_t = B_{t+1} - B_t = (B_{t+1}^p - B_t^p) + (B_{t+1}^o - B_t^o) \quad (36)
\]

as the sum of net private saving and net government saving. Since the young generation’s assets are its savings, \(S_t^y\), i.e. \(S_t^y = B_{t+1}^p\) and the old generation decumulates its assets consisting of the previous period’s savings, i.e. \(S_t^o = -S_{t-1}^y = -B_t^p\), total and net private savings in period \(t\) are

\[
S_t^p = S_t^y + S_t^o = B_{t+1}^p - B_t^p \quad (37)
\]
and the economy’s overall net foreign assets given by \( B_{t+1} = S_t^y + B_t^y \). Assuming a flat consumption path with \( \beta = \frac{1}{1+\tau} \) and using period consumption demands in eq. 34 and eq. 35 gives private saving as

\[
S_t^y = B_{t+1} = \left( \frac{\beta}{1+\beta} \right) \cdot [(Y_t^y - \tau_t^y) - (y_{t+1}^o - \tau_{t+1}^o)].
\]

(38)

Including the decumulation of the old generation, \( S_t^o = -S_{t-1}^y = -B_t^y \), total private saving finally results as

\[
S_t^o = \left( \frac{\beta}{1+\beta} \right) \cdot \{ [(Y_t^y - \tau_t^y) - (Y_{t+1}^o - \tau_{t+1}^o)] - [(Y_{t-1}^y - \tau_{t-1}^y) - (Y_t^o - \tau_t^o)] \}.
\]

(39)

The first term in square brackets on the right hand side is nothing but the amount of a young household’s saving \( S_t^y \), whereas the second term in square brackets is the amount of saving of the previous young generation, \( S_{t-1}^y \), i.e. the old generation in \( t \). Notably, these two expressions reveal that private saving depends on the age-earnings profile, i.e. it is positively correlated with a rise in productivity affecting \( Y_t^y \).

Allowing for demographic change, suppose that the young generations size, \( N_t \), varies over time with \( N_t = (1+n) \cdot N_{t-1} \) and \( N_t + N_{t+1} \) as the overall population in any period \( t \). Assume that the saving behaviour of an average young is probably constant\(^{61}\) and, for simplicity, that income of the young and old generation living in any period \( t \) is constant. Combining eq. 37 and \( S_t^o = -S_{t-1}^y = -B_t^y \) and since overall production in period \( t \) is \( Y_t = Y_t^y + Y_t^o \), the saving to GDP ratio can be denoted as

\[
\frac{S_t^o}{Y_t} = \frac{(N_t - N_{t-1}) \cdot S_t^y}{N_t \cdot Y_t^y - N_{t-1} \cdot Y_{t-1}^o} = \frac{n \cdot S_t^y}{(1+n) \cdot Y_t^y + Y_t^o}
\]

(40)

and, thus, since

\[
\frac{\partial}{\partial n} \left( \frac{S_t^o}{Y_t} \right) = \frac{S_t^y \cdot (Y_t^y + Y_t^o)}{[(1+n) \cdot Y_t^y + Y_t^o]^2} > 0
\]

(41)

an increasing population growth rate implies a higher saving rate by increasing the proportion of young savers. This is analogous to the implication of the productivity growth as presented in eq. 39.

Figure 11 tracks the history of the U.S. population growth since 1900 and provides


\(^{61}\) However, \( \beta = \frac{1}{1+\tau} \) must not hold in this case.
Figure 11: U.S. population growth rate (solid line) and world population growth rate (dotted line) in per cent for the U.S. from 1901–2050.

The swings in the population growth rate were high up to 1960, however, since then, the growth rate stabilised at around 1% up to 2000 and is projected to remain between 1%–1.5% until 2050. In comparison, the world population growth rate experiences a smooth decline since the 60s when it was above 2% and is estimated to continue falling to .5% in 2050. However, in its special report, The Economist states:

"[..] America’s census in 2000 contained a shock. The population turned out to be rising faster than anyone had expected when the 1990 census was taken. There are disputes about exactly why this was (more on that shortly). What is not in doubt is that a gap is beginning to open with Europe. America’s fertility rate is rising. Europe’s is falling. America’s immigration outstrips Europe’s and its immigrant population is reproducing faster than native-born Americans. America’s population will soon be getting younger. Europe’s is ageing. [..] By the 1990s American fertility had rebounded, rising back to just below the 2.1% mark. [..]" ⁶³

Thus, the U.S. population increase is partly due to immigration and its higher fertility rate.

The model together with empirical evidence, as presented above, might have important consequences for the U.S. economy. Firstly, it might induce a higher saving rate

---


In drawing the U.S. population growth rate, the author decided to take the high estimate because of The Economist’s article.

⁶³ The Economist (2002d), ‘Demography and the West: Half a billion Americans?’, vol. 364, no. 8287, pp. 20–22. Note that this is a United Nations estimate and for .5% higher than depicted in figure 11.

---

and, hence, produce higher total saving while income remains growing constant or even stagnates (recall this from figure 10 on page 30 and footnote 56 on page 29). Secondly, an ageing population in the rest of the world—note, that the total world population growth rate is declining according to the U.S. DEPARTMENT OF CENSUS’ prognosis and especially Europeans are becoming older on average—would additionally support an improvement of the U.S. external balance since the old generations in the world’s rest would decumulate their saving and consume instead. Thirdly, as stated previously, the improvement in saving could also be triggered by higher productivity. Recall from above that labour productivity probably surged in the second half of the 90s.

4.3.3 An important shortcoming

The results of the two models presented above have to be considered with considerable caution. Above all, purchasing power parity, PPP, holds universally. Both models assume a world in which the "law of one price" rules, i.e. the price of foreign goods expressed in domestic currency terms is equivalent to the domestic price. The "law of one price" is empirically not observed in the short-run and only sometimes and rather weak in long-run evidence. The contradictory result with respect to the determinants of the saving rate are due to the fact that in the overlapping generations model households are supposed to consume anything in their second period, whereas they plan consumption in an infinite horizon in the RAMSEY-CASS-KOOPMANS model. Note, that Ricardo equivalence holds in the RAMSEY-CASS-KOOPMANS model, whereas it does not hold in the overlapping-generations model. It is not the seemingly strong simplification from the preconditions, but far more the conceptual lacks from the beginning which limit the outcome. Figure 12 depicts the U.S. exports’ share in per cent of global exports as well as its imports’ share in per cent of global imports. Whereas the U.S. exports’ share is ranging between 10% and 12% constantly, the imports’ share is throughout the last decades higher than 14% and reached almost 20% in 2000. For these numbers, the U.S. share in global trade is of a significant size and indicates the openness of the economy. Because

---

64 However, empirical evidence suggests the contrary result: "[..] At the other end of the population distribution, a society with a high youth dependency ratio may require heavy investment in social infrastructure (education, housing). A high youth dependency ratio may also reduce the savings rate, as households with children attempt to smooth consumption. Accordingly, we may expect to see a decline in net foreign assets in countries experiencing a rise in the youth dependency ratio [several reverences][..]", see Milesi-Ferretti, Gian Maria and Lane, Phillip R. (2001), ‘Long term capital movements’. Centre for Economic Policy Research, CEPR, discussion paper, July, no. 2873, p. 8, and table 2, p. 32.

65 See also footnote 84 on page 48.

66 Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., section V, ‘Operational indicators of sustainability’. point iii), ‘Openness’, p. 11, state: "The degree of openness can be defined as the ratio of exports to GDP. In order to service and reduce external indebtedness, a country needs to rely on traded goods’ production as a source of foreign exchange. Clearly, countries with a large exports sector can service external debts more easily, because debt service will absorb a lower fraction of their total export proceeds. [...] It should also be noted that an open economy has a lower incentive to default on external debt because the trade disruptions associated with debt
export and import flows need to be financed, they are always in conjunction with reciprocal debt arrangements. Foreigners give credit to U.S. residents and the demand for these credits is high—the CA-deficit is financed by absorption of foreign savings, i.e. U.S. net foreign investment is negative—there is potentially upward pressure on the world’s real interest rates.\textsuperscript{67} Hence, to be correct, one would actually have to consider a \textit{large} open economy and the real interest rate determined endogenously, and not from a \textit{small} open economy taking the real interest rate as exogenously given.\textsuperscript{68} Note, that the RAMSEY-CASS-KOOPMANS-model as presented here, implies the economy to be growing at a rate larger than the world’s average and this is probably not observed persistently.\textsuperscript{69}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure12.png}
\caption{U.S. exports’ share in world exports (solid line) and its imports’ share in world imports (dotted line) for the U.S. from 1984–2003.}
\end{figure}

\textsuperscript{67} This fact is usually shown in a Metzler-diagram following the model of Metzler (1960), ‘The process of international adjustment under conditions of full employment: A Keynesian view’, in: ‘Readings in international economics’, Caves, Richard E. and Johnson, Harry G., eds., Homewood, IL, Richard D. Irwin, publ.

\textsuperscript{68} The author preferred to expose the behaviour of utility and profit maximising agents in an open economy setting as simply as possible. To tackle the problem of an endogenously determined real interest rate, Mankiw (2000), op. cit., part II, chp. VIII, ‘8.4 Conclusion: The U.S. as a large open economy’, ‘Appendix: The large open economy’, pp. 220–232, gives a cursory initiative to this subject.

\textsuperscript{69} For the detailed shortcomings of this model see Obstfeld & Rogoff (1996), op. cit., appendix 2A, 2.A.2, ‘Some important qualifications’, pp. 119–120. The \textit{calibration} gives hardly realistic outcomes.
4.4 Summary

The preliminary and simple model deduced from the NIPA approach introduced the intertemporal character of the CA and exposed that under certain conditions an economy could run a permanent CA-deficit in a steady state characterised by a negative net foreign debt-to-GDP ratio (recall this from figure 7 on page 24). As a crucial point, the GDP growth rate and the real interest rate determine this steady state level as well as the persistent level of debt servicing. Moreover, the U.S. overall budget constraint was presented with a seigniorage option suggesting the possibility of ultimate resort in debt inflation.

In a more sophisticated approach with an infinitely living representative household, the dependence of the CA on parameters such as a consumption tilt factor, the current amount of foreign debt, real GDP growth rate, and the real interest rate was exposed and proposes that the steady state level—as in the naive assessment—is reached even in a complex setting. Moreover, the model revealed a CA decreasing in the income growth rate, suggesting high-growth countries to run a CA-deficit. Applying the model to the current situation, suggests that the U.S. residents are tilting their consumption path by cashing future consumption today. However, evidence show that a steady state is still not reached, since this debt steady state implied a declining consumption quote (recall from figure 8 on page 29 that the consumption quote is increasing persistently). The saving rate in the steady state showed up to be declining in the income growth rate, which is consistent with the observation of the smooth decline in the private saving rate of U.S. residents (recall this from figure 9 on page 30). Thus, these observations seem to contradict each other with respect to the conclusion on the existence of an adjustment path and do not match with the model. Although the raise in the income growth rate is not directly observed from the data (recall this from figure 10 on page 30), the findings of econometrical tests encourage that there has been a raise of 1% in the growth rate largely due to the improvement in applying IT. As a feasible explanation for the decline in the private saving rate, a wealth-effect deriving from U.S. residents’ saving in equities in conjunction with the surge in asset prices, as well as further gains in tangible assets have been mentioned. Thus, the seeming contradiction of empirical facts with the implication of the model is probably reasonably solved. In an overlapping-generations model, the dependence of the saving quote on population growth as well as income growth has been pointed out. Empirical facts suggest that the U.S. population is becoming younger in future whereas the rest of the world’s population is ageing which will probably enhance overall saving in the U.S. and lead to dissaving in the rest of the world (recall this from the model, if the rest of the world is in its retirement phase).
5 Monetary aspects of the current account

Assuming that purchasing power parity (PPP) does not hold in the short-term, and in contrast to the real models presented in the previous section, the exchange rate’s reaction to an adjustment in portfolios is pointed out here. Whereas the short-run model focuses on the short-term reaction of the nominal exchange rate to a CA-deficit, the long-run approach allows for adjustment in the national price level and, thus, repercussion in the real exchange rate which influences the CA via expenditure switching, i.e. the reaction in the flow of goods and services.

5.1 A short-run portfolio balance model

Suppose, the financial wealth $W$, of domestic residents is exogenously given and composed of domestic money $M$, domestic bonds $B$, and foreign bonds $F$. Domestic bonds bear a net yield of $i$, i.e. the nominal domestic interest rate, whereas foreign bonds bear a net yield of $i^* + \hat{E}(\dot{e})$, i.e. the foreign nominal interest rate $i^*$ plus expected depreciation of the domestic currency, i.e. $\hat{E}(\dot{e})$, with $\hat{E}(\cdot)$ as the expectations operator and $\dot{e}$ denoting the evolution of the exchange rate. Since foreign bonds are held in foreign currency (here, however, expressed in terms of domestic money by conversion over the exchange rate $E$) they contain additional risk via the exchange rate evolution. Thus, foreign and domestic bonds are not perfect substitutes. Suppose, domestic residents are risk averse. Total domestic financial wealth is the sum of these assets

$$W = M + B + (E \cdot F).$$

Eq. 42 shows that the domestic financial wealth is increasing in the exchange rate. That means, an initial amount of foreign bonds in the portfolio of domestic residents gains in value if the exchange rate is depreciating. The money market is in permanent equilibrium, i.e. the money supply $M$ equals the money demand $m[\cdot]$ specified as a function of the nominal interest rate $i$, the foreign interest rate plus expected depreciation and appreciation of the foreign currency.


Note that the exchange rate means the ratio of domestic currency, $x$, to foreign currency, $y$, $E \left[ \frac{x}{y} \right]$, throughout the section. This notational convention is referred to as either American notation, or price notation, both expressions derive from the Bretton Woods System. An increasing $E[\cdot]$ means depreciation of the domestic currency in the numerator and appreciation of the foreign currency in the denominator. Accordingly, a falling $E[\cdot]$ means appreciation of the domestic currency and a depreciation of the foreign currency. To avoid misunderstanding, the terms depreciation and appreciation will henceforth refer to the domestic currency denoted in the numerator. From the viewpoint of the U.S. that means an exchange rate of $E \left[ \frac{\$}{y} \right]$.

Implying that uncovered interest parity (UIP), $i = i^* + \hat{E}(\dot{e})$ (log-version), must not hold.
depreciation of the exchange rate, and total domestic financial wealth, $W$. Thus, the money market equilibrium is

$$M = m[i, i^* + \hat{E}(\hat{e}), W]. \quad (43)$$

The money demand function is assumed to depend negatively on $i$, i.e., $\frac{\partial m}{\partial i} = m_i < 0$, because a higher interest rate implies higher opportunity costs of holding cash, to depend negatively on $i^* + \hat{E}(\hat{e})$, i.e., $\frac{\partial m}{\partial (i^* + \hat{E}(\hat{e}))} = m_{i^* + \hat{E}(\hat{e})} < 0$, for the same reason, and to depend positively on $W$, i.e., $\frac{\partial m}{\partial W} = m_W > 0$, because higher financial wealth raises the demand for any financial asset. Corresponding to these assumptions, the schedule describing money market equilibria is upward sloping in a plane of domestic interest rate $i$ and the exchange rate $E$, because at a given domestic interest rate, additional demand for money results from an increasing financial wealth and this could only be brought about by a depreciating exchange rate.

The *domestic bond market* is in permanent equilibrium as well and the bond demand function $b[\cdot]$ depends on the same variables as the money demand, i.e.

$$B = b[i, i^* + \hat{E}(\hat{e}), W]. \quad (44)$$

However, a raising interest rate implies higher demand for bonds, i.e., $b_i > 0$, a raising expected yield for foreign bonds means falling demand in domestic bonds, i.e., $b_{i^* + \hat{E}(\hat{e})} < 0$, and bond demand is positive in domestic financial wealth, $b_W > 0$, as above. Accordingly, the schedule for domestic bond market equilibria is downward sloping in the $i, E$ plane—as specified above—since at a given interest rate, additional demand for domestic bonds could only be brought about by a depreciating exchange rate, since this would entail increasing financial wealth and, hence, additional demand for domestic bonds.

The equilibrium on the *foreign bond market* is also assumed to be in permanent equilibrium, hence

$$E \cdot F = f[i, i^* + \hat{E}(\hat{e}), W]. \quad (45)$$

The *foreign bond demand* function is decreasing in $i$, i.e., $f_i < 0$, because a higher domestic interest rate shifts bond demand in favour of domestic bonds, is increasing in $i^* + \hat{E}(\hat{e})$, i.e., $f_{i^* + \hat{E}(\hat{e})} > 0$, for the same reason vice versa, and is increasing in $W$, i.e., $f_W > 0$, as above. Thus, depicted in a plane of domestic interest rate and exchange rate, the foreign bonds market equilibrium schedule is downward sloping, because at a given domestic interest rate, additional demand for foreign bonds requires the exchange rate to depreciate. This would entail higher domestic financial wealth, hence, higher demand for foreign bonds.

However, it specifies not, whether the schedule is steeper than the one of the domestic bond market, since this requires the knowledge of the exact reaction of each of these schedules. At this point, assume that the equilibrium schedule for the domes-
tic bond market is steeper than the one for the foreign bond market. A depreciating exchange rate is raising wealth and, thus, the overall demand for assets. At given interest rates, domestic bonds will be acquired preferentially. This is straightforward from the initial assumption of risk-averse agents. The previously exposed equations require a unique point of intersection to bring about an overall equilibrium in the financial assets market. However, by applying Walras’ law, the intersection of two of these schedules implies an overall equilibrium since the third market is forced to be in equilibrium either. Henceforth, the money market will not be considered explicitly. Instead, the focus is on the domestic and the foreign bond market.

In this setting, a CA-deficit implies decreasing wealth because resources are flowing out of the respective economy. In other words, financial claims against the rest of the world are dwindling and this will show up in a diminishing supply of foreign bonds in the domestic market, i.e., a modification of the financial portfolio held by domestic residents. To show the effect of a declining portfolio share of foreign bonds, use partial equilibrium analysis. Domestic bonds \( B \), foreign bonds \( E \cdot F \), and domestic money \( M \) are exogenous variables, whereas the domestic interest rate \( i \), domestic financial wealth \( W \), and the exchange rate \( E \) are endogenously determined. Differentiating eq. 43 to 45 totally, defining \( dM = dB = 0 \), \( E \cdot dF \Rightarrow 0 \), generating the Jacobian matrix \( |J| \), and applying Cramer’s rule, gives

\[
\begin{align*}
\frac{di}{dB} \Big|_{dM=0} &= 0, \quad \text{(46)} \\
\frac{dW}{dB} \Big|_{dM=0} &= 0, \quad \text{(47)} \\
\frac{dE}{dF} \Big|_{dM=0} &= \frac{E \cdot [b_i \cdot (f_w - 1) - f_i \cdot b_w]}{|J|} < 0, \quad \text{(48)}
\end{align*}
\]

a zero reaction in the domestic interest rate,

a zero reaction in domestic financial wealth, what requires

\[
\frac{dE}{dF} \Big|_{dM=0} = \frac{E \cdot [b_i \cdot (f_w - 1) - f_i \cdot b_w]}{|J|} < 0
\]

a depreciation of the domestic currency, because \( dF < 0 \) assumed. Note, that the elasticity of the exchange rate with respect to foreign bonds is in this special case

\[
\frac{dE}{E} = - \frac{dF}{F}, \quad \text{(49)}
\]

Note that this is the real-world observation of the home bias, i.e. the risk-preference is usually in favour of domestic bonds and equity. Obstfeld, Maurice and Rogoff, Kenneth (2000), op. cit., section 2.1, ‘Home bias in equity holdings’, pp. 6–7, state that according to the economic weight, U.S. residents should hold 75% of their assets abroad. In 1999, however, U.S. citizens held only 11.7% of their total equity in foreign stocks. The observation of the home bias is relatively well explained by trade costs, especially if the respective goods are close substitutes, i.e. the elasticity of substitution relatively high. Lewis, Karen K. (1999), ‘Trying to Explain Home Bias in Equities and Consumption’, Journal of Economic Literature, June, vol. 37, pp. 571-608, provides a literature review.
i.e., a 1% decline in the amount of foreign bonds in the domestic market requires an equivalent +1% exchange rate depreciation.

Figure 13 depicts the formal results. Recall the justification for the slope of the lines. The money market line $M$ is upward sloping, whereas the domestic bond market line $B$ is downward sloping and steeper than the foreign bond market line $F$, since agents are supposed to be risk-averse. The initial equilibrium in all three markets together is in the unique point of intersection, $A$. The CA-deficit is here represented in the diminishing supply of foreign bonds as depicted in the vertical upward shift of the $F$-line. This entails a decreasing domestic financial wealth and, hence, the initial equilibrium point $A$ now signifying excess supply of domestic money. In order to reach the new equilibrium point $A'$, the exchange rate has to depreciate proportionally—recall this from the elasticity—from $E_0$ to $E_1$, thus compensating for the loss in wealth and raising demand for domestic money and domestic bonds. Accordingly, both, the $M$-line and the $B$-line, shift upwards until they match the higher $F$-line in the new equilibrium point $A'$ at an unchanged domestic interest rate $\bar{i}$ and unchanged wealth $W$. The explication for an unchanged interest rate is intuitive. An interest rate higher than $\bar{i}$ would raise the demand for domestic bonds, however, it would reduce the demand for money. The argument for a lower interest rate is correspondingly the other way round. Thus, there is no way out—the schedules have to match at the same equilibrium interest rate in which they matched initially.

Figure 14 depicts various interest rates for the U.S. from 1955 to 2000. The long-term
government bond yield-to-maturity (dashed) is throughout the years the highest of all government bonds, since it contains the highest risk premium. Since 1990 it is declining smoothly from 8% to 6% in 2000. The medium-term government bond yield (dotted) is in between the long-term bond and the short-term treasury bill as a typical money market bond. Obviously, the discount rate of the U.S. Fed (squared) is following the treasury bill. From the peak in the oil-crisis of the early 1980s, all rates are declining smoothly and range between 3% and 6% since 1990. In sum, this suggests that interest rates are relatively stable.

5.2 The medium and long-run extension

For the long-run presentation of the portfolio balance approach, several versions are available in the literature. The pass-through of the short-run reaction of the nominal exchange rate into the goods market is realised via the real exchange rate and this mechanisms is implemented differently in the models.\footnote{The "modern" approach to the real exchange rate is the concept of the fundamental equilibrium exchange rate (FEER), see, for instance, Driver & Wren-Lewis (1999), 'FEERS: A Sensitivity Analysis', in: MacDonald, Ronald and Stein, Jerome L., eds., 'Equilibrium exchange rates', Kluwer Academic Publishers, Massachusetts, U.S., pp. 135–162.} One of the first versions was presented by Dornbusch and Fischer\footnote{Dornbusch, Rudiger and Fischer, Stanley (1980), 'Exchange Rates and the Current Account', American Economic Review, AER, Dec., vol. 70, pp. 960–971. The author switched the labelling of several variables to accommodate for the short-run model.} in 1980 and served as a baseline model for all later modifications. Since it focuses on the essentials of the mechanism, it is presented here.
The country under consideration is small and open to international trade in goods and securities with the rest of the world. Thus, the financial asset menu consists of domestic money and foreign bonds. Domestic financial wealth is the sum of these assets. Output $y$ is given, the country is at full employment, and the price level $p$ is flexible. The short-run equilibrium is determined by the exchange rate $e$ and the domestic price level $p$ such that the market for real cash balances—i.e. the money market—as well as the market for domestic goods clear. The exchange rate in combination with the domestic and foreign price level $p^*$ forms the real exchange rate $q$ as

$$q \left[ \frac{\text{domestic goods}}{\text{foreign goods}} \right] \equiv \frac{p^*}{p} \cdot e$$  \hspace{1cm} (50)

in units of domestic goods per foreign goods. Suppose, the CA is equilibrated initially such that there is no persistent accumulation of foreign debt. The money market equilibrium is obtained by equating money supply $M$ and money demand. The latter is assumed to be a function of $\kappa$, which describes the opportunity costs of holding money, i.e. the foreign interest rate $i^*$ plus expected depreciation $\tilde{E}(\dot{e})$, and the nominal domestic output $p \cdot y$ plus domestic income from foreign real bonds measured in domestic currency as $e \cdot p^* \cdot a$, with $a$ as the number of income streams giving access to one unit of foreign output indefinitely.

$$M = \kappa [i^* + \tilde{E}(\dot{e})] \cdot [p \cdot y + e \cdot p^* \cdot a]$$  \hspace{1cm} (51)

With a balanced CA and static expectations suppose that depreciation expectations $\tilde{E}(\dot{e})$ are zero and together with a given foreign interest rate $\bar{i}^*$, the opportunity costs of holding money are constant at $\kappa$. The money market equilibrium condition in real terms is

$$m = \kappa [y + q \cdot a]$$  \hspace{1cm} (52)

with $m \equiv \frac{M}{p}$ and $q$ as specified above. Demand $D$ for domestic goods is a function depending positively on the real exchange rate and positively on real wealth $w \equiv \frac{W}{p}$, and foreign demand for domestic goods $X$ as a function depending positively on $q$.\(^{77}\)

$$y = D(q, w) + X(q)$$  \hspace{1cm} (53)

With domestic real wealth as the sum of cash balances and the real stock of foreign

---

\(^{77}\) An increasing $q$ is a real depreciation. According to eq. 50, a real depreciation could be brought about by either a rising nominal exchange rate, i.e. depreciation of the nominal exchange rate, a falling domestic price level, i.e. $p$ falling, or an increasing foreign price level, i.e. $p^*$ increasing, or by a simultaneous variation of two or three of these fundamental variables. Either case signifies that one unit of foreign goods buys more units of domestic goods than before. Hence, if there is a real depreciation, agents switch expenditure in favour of domestic goods. However, at the same time domestic financial wealth is increasing since it is a claim fixed in foreign output and this effect boosts domestic demand additionally, proceed to eq. 54.
assets, i.e.

\[ w \equiv m + \frac{q \cdot a}{r^s}, \quad (54) \]

it is at the same time a function of the real exchange rate. The second term on the r.h.s. denotes the present value of the \textit{infinite annuity} in domestic currency terms. For the goods market to clear, the CA is the excess of income over spending. Since in this simple model government, taxes, and investment are nonexistent, the excess of income over spending is equivalent to saving \( S \), which is—according to the \textit{life cycle hypotheses}—assumed to decrease in \textit{nonhuman wealth}, hence, \( S = S(w) \), and, because the CA represents the acquisition of financial claims, it is represented in

\[ \dot{a} = \frac{S(w)}{q}. \quad (55) \]

Solving eq. 52 for the equilibrium stock of foreign assets gives the equilibrium in \textit{real balances} and the corresponding equilibrium \textit{real exchange rate} for a given level of foreign assets,

\[ m = m(q \cdot a) \quad (56) \]

with \( m(.) \) increasing in both arguments. A raise in foreign assets \( a \) also raises real income, therefore real money demand, which is equilibrated over a falling domestic price level.

With respect to the real exchange rate equilibrating the goods market, a raise in the level of foreign assets affects real wealth directly and via the increase in \textit{real balances}, as specified in eq. 56, hence, a corresponding excess demand \( D \) for domestic output and upward pressure on prices results. To maintain equilibrium, a decline in the real exchange rate must compensate for the higher income, i.e. \textit{expenditure switching} towards foreign goods is absorbing higher income. However, the decline in the real exchange rate is less than the raise in assets, otherwise wealth would not be affected. Recall this effect from eq. 54. The real exchange rate is, therefore, a function decreasing in external assets, i.e.

\[ q = q(a). \quad (57) \]

Overall equilibrium is determined in the unique interception point deriving from the schedules described in eq. 55 and eq. 57.

A disturbance from increasing imports, following a reduction in saving leads to a CA-deficit and decumulation of external assets \( a \). Hence, from eq. 50, the real exchange rate subsequently raises with the decline in external assets. In figure 15,

\footnote{According to Modigliani & Brumberg (1954), ‘Utility analysis and the consumption function: An interpretation of cross-section data’, in: Kurihara, Kenneth K., ed., ‘Post Keynesian economics’, Rutgers University Press, New Brunswick, NJ, U.S., agents seek to smooth their consumption path over the life cycle. Thus, increasing income enhances the present value of lifetime wealth, and triggers a decline in saving. This is the same effect as in the \textsc{Ramsey-Cass-Koopmans} model.}
the adjustment of the real exchange rate is depicted. The $GG$-line gives the relation between external assets and the equilibrium real exchange rate. Moving down on $GG$, real wealth rises, requiring the real exchange rate to fall to compensate for the raise in income. The downward sloping curve $\dot{a} = 0$ represents the combinations of external assets and real exchange rate for which the CA is balanced. To the left of this curve, real wealth is to low and, hence, saving—specified as a function decreasing in wealth—is positive. Assets are accumulated. To the right of $\dot{a} = 0$, real wealth is too high, inducing lower saving and a CA-deficit.

The decumulation of foreign assets via a CA-deficit is visualised in the leftward shift of the $\dot{a} = 0$ curve to $\dot{a}' = 0$. Thus, compared to the old equilibrium in point $E$, wealth is too high and has to be offset by an increasing real exchange rate. This is realised by an external deficit, i.e. excessive imports. The raise in the real exchange rate comes about by an increasing nominal exchange rate, i.e. nominal depreciation, or by a reduction in the domestic price level, or both.\footnote{The speed of the price level adjustment is a matter of dispute. \cite{Obstfeld2000}, section 2.4, ‘International pricing puzzles’, pp. 13–14.} According to the amount of shocks to real exchange rates, ranging from three to five years. That is, if the yen appreciates today, the impact on relative U.S. and Japanese prices can be expected to take more than three years to dissipate by 50 per cent.\footnote{For the formal proof of stability consult the cited paper on pp. 962–963.}

\footnote{Substantial market segmentation therefore implies, in particular, that even large swings in exchange rates may not set off large and immediate equilibrating movements of prices. At the same time, in analogy to Dornbusch’s classic (1976) ‘overshooting’ theory of exchange-rate volatility, the segmentation of...}
dissaving required, a new equilibrium emerges in point $E'$ with a diminished stock of external assets and real depreciation. On the path towards the new equilibrium point $E'$, the CA is in deficit.

Figure 16 depicts the evolution of the price level in the U.S. Whereas the producer prices (solid line) indicate deflation in 1986 and 1989, they vary between zero and 5%. Much more stable are consumer prices (dotted), which are constantly ranging between 3% and 4%. The unemployment rate is smoothly declining from 7% in the first half of the 1990s to 4% in 2000.\textsuperscript{81} In sum, inflation seems to be more or less stable. This observation suggests that the model’s prediction of a diminishing price level as response to a CA-deficit is not represented in the data. Thus, real wealth is declining, since external debt is accumulated while domestic prices are constant? No, this is not the case. Figure 17 exposes that U.S. households’ financial wealth (solid line) is still significantly positive. Since 1993 household wealth has been increasing to the six-fold level of disposable income. The decomposition into financial assets (dotted line, left scale) and financial liabilities (dashed line, right scale) reveals that financial assets are still considerably higher than financial liabilities. However, the crack in 1998 indicates a reversal and liabilities seem to increase somewhat stronger from 100% to 105% of disposable income. Note, that these data probably reflect the surge in stock market prices. Notwithstanding, they suggest that the goods markets implies that large exchange rate swings may sometimes be needed to clear asset markets in response to monetary and financial market shocks.\textsuperscript{81}\textsuperscript{81} Staiger, Stock & Watson (2001), ‘Prices, wages, and the U.S. NAIRU in the 1990s’, in: ‘The Roaring Nineties’, Krueger, Alan B. and Solow, Robert M., eds., The Century Foundation Press, NY, U.S., chp. I, pp. 3–60, provide evidence of a decline in the U.S. NAIRU in the second half of the 1990s.
Figure 17: U.S. households’ wealth in per cent of disposable income (solid line) and its decomposition into financial assets (dotted line) measured on the left scale, and financial liabilities (dashed line) measured on the right scale for the U.S. from 1988–2000.

U.S. households’ net worth is still significantly positive.\(^{82}\) Thus, a persistent decline in real wealth as proposed by the long-run model and in conjunction with figure 16 is not observed.

5.3 Empirical evidence on U.S. capital flows and the U.S. dollar exchange rate

As stated by the models presented in the preceding subsection, a CA-deficit requires the nominal exchange rate to depreciate in the short-run and the real exchange rate to depreciate in the medium- and long-run. However, statistics on the evolution of the U.S. dollar exchange rate do not suggest this effect to happen persistently. On the contrary. Figure 18 tracks the evolution of the U.S. dollar’s exchange rates since 1979. The dollar-euro rate was appreciating since 1990 with some interim corrections. However, all other rates also suggest that the U.S. dollar is appreciating from 1995 to 2000 by around 20%.\(^{83}\) Today, the U.S. dollar-euro rate is varying at par, despite all publications suggesting an overvaluation. The last THE ECONOMIST’s "hamburger standard"\(^{84}\) suggested that "the dollar now looks more

---

\(^{82}\) Obviously, McKinnon (2001), op. cit., p. 2, omitted this fact.


Figure 18: U.S. dollar per euro (dashed line) and per SDR (dotted line) measured on the left scale, the nominal effective exchange rate (solid line) and the real effective exchange rate (squared) measured on the right scale for the U.S. from 1979–2000.

overvalued against the average of the other big currencies than at any time in the life of the Big Mac index. Exceptions are some high-price countries such as Britain, Denmark and Switzerland. Thus, it seems, that the CA does not determine the U.S. dollar’s exchange rates. Recall from figure 2 on page 12 and eq. 2 on page 9 that the U.S. CA is determined by the CPF. Hence, if the CA obviously does not determine the dollar’s exchange rate, and the CA is dominated by the CPF, then probably the CPF determines the dollar’s exchange rate. Figure 19 depicts the capital flow registered in the CPF. The euro per U.S. dollar exchange rate follows the CPF and reveals that the surge of capital inflow in the 1990s pushed up the dollar’s rate. Obviously, the CPF is faster than the exchange rate, the latter can hardly follow and overshoots—with the exception of 1992–1993—always downwards. The overshooting indicates the expectations in FX-markets. Obviously, participating

no. 8307, p. 94. The hamburger standard compares McDonald’s Big Mac prices around the world and reveals over- and undervaluations of the U.S. dollar against the respective currency via implicit purchasing power parity, PPP. However, various econometrical tests suggest that PPP fails even in the long-run. See Baum, Christopher F. and Barkoulas, John T. and Caglayan, Mustafa (2001), ‘Nonlinear Adjustment to Purchasing Power Parity in the post-Bretton Woods Era’, paper, Department of Economics, Boston College, MA, U.S., for an econometrical test for various U.S. trading partners. [...] Indeed, it is hard to find evidence of any goods other than precious metals for which the ‘law of one price’ holds exactly, even in relative form." Obstfeld, Maurice and Rogoff, Kenneth (2000), op. cit., section 2.4, ‘International pricing puzzles’, p. 180.

The behaviour of capital flows and foreign exchange reserves are the most obvious indicator of domestic and foreign investors’ perceptions of a country’s creditworthiness.[..] There is a danger, however, that these market-based indicators would fail to signal problems ahead of time [footnote: This may reflect the possibility that financial markets react too late or too abruptly, or that they are plagued by misperceptions and expectational errors, making them less reliable in ascertaining sustainability.; it is therefore essential to take into consideration the more general set of factors discussed earlier in this section." From Milesi-Ferretti, Gian Maria and Razin, Assaf
agents could hardly believe such a rapid appreciation and, facing the CA-deficit on
the other side of this progress, are anxiously attentive not to miss the imminent
dollar depreciation. Thus, if capital inflow moderates, agents perceive the hausse
to be over and get panicked rid of U.S. dollars, which causes a much stronger cor-
rection than required. However, in the aftermath they notice that capital inflows
did not dry up and start to buy as cheaply as possible, causing the U.S. dollar to
appreciate much stronger than the capital inflow would actually justify.

5.4 Determinants of U.S. dollar demand

The lesson from the previous section is that the U.S. CA-deficit produces deprecia-
tion pressure on the nominal and real exchange rate. Notwithstanding, the actual
depreciation of the exchange rate is finally realised in an excess supply of dollars,
because the supply and demand for U.S. dollar are the factors determining the mar-
et exchange rate. Whereas the origin of U.S. dollar is obvious—it derives from
the monetary base, the U.S. Fed produces, and from the secondary money created
over the credit-multiplying process in the banking sector—the dollar demand has

---

far more facets.

5.4.1 Conventional U.S. dollar demand

On the one hand, U.S. dollar demand derives from conventional transactions inducing liquidity demand of domestic residents. On the other hand, and besides the domestic demand for cash, the U.S. export volume gives rise to additional demand for U.S. dollars since foreign residents have to purchase U.S. dollars to pay for their imports. Hence, dollars have to float in the periphery, i.e. on bank accounts or even in cash, to satisfy the dollar demand for imports from the U.S. How could the U.S. dollar be made available abroad? Presumed, that foreigners are willing to accept U.S. dollar, it initially must float out of the U.S. This outflow is realised by U.S. residents paying their own bills abroad or by foreigners accepting U.S. dollar income on labour and capital and, finally, by transactions without compensation, i.e. unilateral transfers by U.S. residents. Thus, even the settlement of U.S. residents’ imports is proceeded in U.S. dollars if foreigners are willing to accept. Consequently, if U.S. exports and imports, income, and transfers are settled in U.S. dollars, the net position, i.e. the CA-balance, indicates additional demand for U.S. dollars from abroad. For the year 2000, for instance, the CA-balance was of U.S. dollar billions $-444.69$ indicating that at least this amount was required for settlement. Moreover, any portfolio investment in the U.S. requires the foregoing acquisition of U.S. dollars. Following the same argumentation as with merchandise, the balance on the CPF is an equivalent indicator of U.S. dollar demand. However, in reality the U.S. dollar volume needed is much higher, since each transaction is proceeded individually and not the net amount of all transactions at the end of each year. Presumed, that the most part of the U.S. CA is indeed cleared in dollars, then a persistently high CA-deficit implies that in the course of time a significant volume of U.S. dollars is flowing out of the U.S.—and this is indispensable for maintaining the "dollar standard" of international financial markets.

5.4.2 The "dollar-standard"

Besides the mentioned transactions for merchandise trade, capital investment, income, and transfer payments, there exists further demand for U.S. dollars. This additional demand has its roots in the Bretton-Woods System and is due to the unique role of the dollar as the almost exclusive clearing medium in international financial markets\(^88\), oil contracts, international transactions in goods, in black mar-

\(^88\) The dollar is on one side of nearly 90% of all FX-market transactions, see Kenen, Peter B. (2002), ‘The euro versus the dollar: Will there be a struggle for dominance?’, panel presented at the annual meeting of the American Economic Association, Jan. 4th, Atlanta, U.S. To give a quantitative impression of this—ISDA (2001), provides a regular market survey on the international volume of OTC-derivatives transactions in fixed income swaps and options (note, that the volume of OTC transactions is of minor significance in numbers). For the year 2000, the institution registered a total volume of U.S. dollar trillion 61.438, i.e. around 160 times the U.S. CA-deficit of
kets, central bank reserves, and countries in crisis adopting the dollar if their own currency broke down. Most notably, the more transactions are cleared in U.S. dollars, the smaller are the costs in organising the right clearing currency, since scale effects become effective and FX traders’ fee drops out. Thus, the U.S. dollar’s spreading as a clearing instrument, generated network effects and expanded the demand for U.S. dollars additionally. For these reasons, the dollar standard of financial markets is firmly entrenched today. This also means that the monetary policy of these markets is actually performed by the U.S. Fed. Therefore, the Fed’s monetary policy is of eminent importance. The U.S. Fed owns the natural monopoly of providing the most important world currency. For owning this monopoly and providing the dollar standard in international financial markets, it extracts a monopoly rent that consists in the seigniorage option mentioned in the subsections 4.1 and 4.2. Moreover, the mere existence of this seigniorage option enables the U.S. residents to become much higher indebted because the ultimate resort of debt inflation exists. From this point of view, U.S. residents are already cashing the monopoly rent.

2000.


90 Recall, that in a system of $N$ different currencies, \( \frac{N(N-1)}{2} \) different exchange rates have to be determined. By choosing one exchange rate as the numéraire, this system is reduced to \( N-1 \) exchange rates. Thus, the U.S. dollar numéraire is a significant cost reduction for the international financial market.


92 Mind, that HUMES’ price-specie-mechanism is still valid, i.e. suppose the quantity theory of money holds, then a c.p. excessive expansionary path in the money supply will hit on domestic prices and, hence, on the terms of trade. The change in the price level worsens the real exchange rate and provides for expenditure switching in favour of foreign goods, thus, a CA-deficit is triggered. Moreover, the Bretton-Woods System’s breakdown in 1971 was due to the erosion of the U.S. dollars value as defined in gold. The U.S. Fed did not stick to backing the dollar appropriately and following several speculative attacks, was forced to abandon the peg. Since then, the major world currencies are floating "fiat" money. The phenomenon of currency-erosion was firstly described in the Triffin-paradox following Triffin (1960), ‘Gold and the Dollar Crisis’, Yale University Press, London, U.K. Modern theory of money emphasises the intrinsic value of money from its demand. At this point, the author argues that any money must finally be backed by a real equivalent, U.S. output e.g., otherwise the agents’ trust in the money will be weak. Thus, the Triffin paradox applies to the situation.

93 "[..]an international money is both necessary and a natural monopoly[..]"", McKinnon (2002), ‘The euro versus the dollar: Resolving a historical puzzle’, ‘The Dollar as International Money’, Feb. 11th, Stanford University, CA, paper presented at the annual meeting of the American Economic Association, Jan. 4th, Atlanta, U.S.

94 To figure this out: in Germany’s banking sector exists a type of saving bank whose liability position is guaranteed in public funds, i.e. finally guaranteed by the taxes levied by the regional government. For this reason, and in contrast to all other commercial banks, saving banks would principally not be obliged to deposit collateral at the Bundesbank. Despite this fact and for reasons of fairness, they behave as if they were in competition with commercial banks and deposit the same required collateral as a commercial bank would be obliged to deposit. However, the mere existence of the publicly guaranteed "escape clause" provides these banks with an additional pricing margin in credits and, hence, makes them the most profitable banks in Germany. Thus, the profitability is partly founded in exploiting a laxer budget constraint, i.e. the possibility of running higher risk of bankruptcy. By the same token, the U.S. seigniorage option needs not be exploited directly, it is already its mere existence that allows the U.S. running a higher debt.

95 This fact has already been asserted by McKinnon (1979), ‘Money in international exchange—The convertible currency system’, Oxford University Press, section XI, ‘America’s role in stabilizing
However, the dollar demand from the dollar standard is limited. Because traditional dollar standard markets are satisfied, additional U.S. dollar demand will derive from an increasing volume, income growth, and access to countries still not entirely integrated. Finally, take account of the fact that the U.S. dollar volume flowing in the periphery are U.S. agents’ obligations. Thus, if foreigners once persistently tried to acquire real equivalents for their U.S. dollar stocks, the U.S. stock of capital and income growth must cover this value. Hence, the dollar supply must happen according to the growth in U.S. income, otherwise the Triffin paradox will hold, i.e. the value of the dollar is eroded. By the same token, the dollar outflow over the U.S. CA-deficit is limited.

In sum, if the dollar standard of financial markets continues and the more financial markets integrate, there is demand for U.S. dollars. Consequently, this will give rise to a persistently high external value of the U.S. dollar. However, at a high external value of the U.S. dollar expenditure switching towards domestic goods by U.S. residents is hardly feasible. This would be bad news for the U.S. CA because for a persistently high dollar, the CA-deficit will probably continue or even worsen. Finally, the solution to the appreciation of the U.S. dollar, as depicted in figure 18 on page 48 of the previous section, is due to the high dollar demand as argued here. However, this appreciation pressure is at the same time opposed to depreciation pressure triggered by the CA-deficit and by that way the U.S. dollar’s exchange rate is balanced. From this viewpoint, there is no evidence that the CA-deficit triggers the strong depreciation in the exchange rate as the portfolio models of the previous sections and financial market reports predict. Obviously, the appreciation pressure has been much stronger in the 1990s. Mind this from figure 19 on page 49 in the previous section. Notwithstanding, it would have been far stronger if it were not for the confrontation with the CA-deficit.

Moreover, these facts suggest that the U.S. dollar exchange rate is a function of the world’s monetary system’, pp. 256: "[..] An important consequence, however, was that the American government did not have direct control over the state of its balance of payments in the 1960s—nor should it have. As long as other countries succeeded in setting their exchange parities at desired levels vis-à-vis the dollar so as to have a payments surplus that allowed them to accumulate reserves (U.S. dollars) as they wanted, the state of the American balance of payments was residually determined. But American authorities responded with alarm to the resulting accounting deficits in American foreign payments, [...]. As a partial quid pro quo, however, the U.S. could use its own dollars to cover payments deficits as they developed, whereas other countries had to use scarce foreign exchange. This asymmetry in the dollar standard was called by Charles de Gaulle an "exorbitant privilege of the United States"—indicating that official misinterpretations of international monetary phenomena were not confined to the American side of the Atlantic[..]".

96 From this point of view, the euro may become a competing money. The more the euro spreads in financial markets, the more the U.S. dollar demand will diminish. This fact has potentially strong implications for the U.S. CA-deficit. For a discussion see Bergsten, Fred C. (2002), ‘The euro versus the dollar: Will there be a struggle for dominance?’, IIE Washington, DC, paper presented at the annual meeting of the American Economic Association, Jan. 4th, Atlanta, U.S.

97 See, for instance, Obstfeld, Maurice and Rogoff, Kenneth (2000), op. cit., section 4. ‘The current account and the dollar’, p. 22, second item: "In general, the current account and the exchange rate are simultaneously determined (in theory, at least—in practice, the exchange rate
the CA and, consequently, predictions made from a projection of the CA-deficit while imposing an *exogenous* variation of the exchange rate on the simulation are hardly constructive.98

5.5 Caveats on the models

The presented portfolio models possess some important shortcomings. First of all, the approach generally lacks of the decision making process of utility maximising agents. Therefore, the change in the saving-investment behaviour is exogenously given and, thus, the basis for an inner disequilibrium not adequately formulated (*Lucas critique*). Secondly, a certain amount of foreign bonds must initially be available in the focussed economy, otherwise they could not flow out. Such an initial stock of foreign bonds would require CA-surpluses in former periods and this has not been the case for the U.S., because the CA-deficit is enduring since the mid 1980s and there have not been substantial CA-surpluses before. Recall this from figure 1 on page 11 in section 2.4. Instead, it would be far more appropriate to model the implication of a persistent fund inflow. Thirdly, as already mentioned in conjunction with the shortcomings of the real models in section 4.3.3, the country under consideration is small, whereas the U.S. are a large country and, hence, the real interest rate should be modelled *endogenously*. As a last point note, that the dollar standard is viable because the CA-deficit enables the outflow of U.S. dollars. This fact cannot be displayed in the models since only foreign bonds flow in and out and neither domestic money, nor domestic bonds are substitutes for foreign bonds because agents are assumed to be *risk-avers*.

5.6 A curious fact

From the presented facts with respect to capital flows in the U.S., one might be inclined to forget about that capital is flowing out of the U.S. at the same time. Figure 20 shows aggregated capital flows in the U.S., capital flows out of the U.S., and the capital outflow in percent of the capital inflow. Striking evidence is that on average significantly more than 50% of all capital inflow in the U.S. is redirected and flowing out in the same accounting period. Thus it seems, that in the 1990s, often seems to have a life of its own].[.]

98 Seen in this light, the projection of the CA-deficit as performed by Mann (1996), op. cit., chp. X, ‘Is the U.S. external deficit sustainable?’, ‘Applying the analytical framework and empirical benchmarks to US data’, pp. 157–163, cannot be accepted. The same applies to the IMF’s MULTIMOD simulation as performed by Bayoumi, Terrones & Clavijo (2002), op. cit., ‘Are the imbalances viable and how might they adjust?’, pp. 76–80. The scenario of a sudden CA-reversal following an exogenous shock (a euro zone take-off, or a U.S. stock market crash) and its influence on the dollar’s exchange rate proceeded by Obstfeld, Maurice and Rogoff, Kenneth (2000), op. cit., section 4.3, ‘A simple model’, pp. 193–201, also lacks of this interdependence. However, the authors state this fact before predicting. The scenario seems unrealistic to the author of this text for the reason that the observed high external value of the U.S. dollar will have to diminish first, before U.S. residents will switch expenditure and balance the CA.
foreign investors were seeking to invest in the U.S. to profit from the positive growth perspective in conjunction with an appreciating U.S. dollar. However, at the same time, U.S. agents redirected 50% of the fund inflow. At this point, the question arises, why U.S. agents did not invest in their own country if growth perspectives have been judged however much positive by foreign investors. Seemingly, U.S. agents tried to diversify their own portfolios, but they would not have invested abroad if the returns were not at least as high, as it was in the U.S. Recall this from the home bias observed in reality and from the assumption that portfolio investment seeks for the optimal risk-return profile. From this perspective, U.S. investors obviously judged their domestic investment possibilities as more risky as foreign ones. Because realised returns from investment are registered in the income account—mind this from subsection 2.1.1—one might roughly conclude from this account on the quality of assessment of investment opportunities by U.S. agents. Figure 21 on the next page depicts the development of the income account—credit income, i.e. revenues of U.S. agents from foreign resources, and debit income, i.e. revenues of foreigners from their U.S. resources. As visualised, the schedules move nearly symmetric. Notwithstanding, the net position, i.e. the balance on the income account, is slightly positive until it becomes negative for the first time in 1996. Hence, until 1996, the income account’s contribution to the CA was positive. Notably, U.S. agents extracted about the same total return on their investments abroad, despite the fact that they invested only half as much capital as was invested by foreigners in the U.S. Recall at this point what has been stated at the beginning in subsection 2.1.3: U.S. agents prefer to invest in equity securities, whereas foreigners prefer U.S. deben-

Figure 21: Decomposition of the income account in its components credit-income (solid line), debit-income (dashed line), and the "net-income position" (bars) in billions U.S. dollar for the U.S. from 1971–2000.

tures. Obviously, the return extracted by U.S. agents’ investment in foreign equity more than compensated for the payout of interest on U.S. treasuries and corporate bonds to foreigners. However, this might be due to the higher risk-return profile of equity investment and suggests that U.S. investors are not as risk averse as their foreign counterparts. It also suggests that this is a situation of asymmetric information since U.S. investors obviously know better the profitability of foreign firms, i.e. it seems that U.S. investors have an information advantage in assessing financial markets’ performance. Moreover, if they had not, if foreigners had it, resp., they would not have invested to this extent in the U.S. As said just before, until 1996 the income account contributed positively to the CA-balance. Since 1996 the balance on income is negative, thus, enhancing the deficit in the CA? Note, that probably the most part of portfolio and direct investment by foreigners in the U.S. and by U.S. residents outside the U.S. is arranged via investment banks and brokers. The latter institutions extract significant commission which is displayed in the services account—recall this from subsection 2.1.1. A detailed breakdown of the services account reveals that the total commission extracted by investment banks and brokers is at U.S. dollar billions +12.55, i.e. 17% of the surplus on the services account, thus nearly compensating for the total loss of U.S. dollar billions −14.78 in the income account. Facing this situation one might suppose that U.S. brokers are producing

100 The fact that U.S. brokers generate a commission of equal amount to the total U.S. debt service displayed in the income account seems indeed ridiculous. However, for the U.S., one has to depart from a significantly advanced level and quality of financial services. Plus, and in contrast to the European market, the U.S. financial market is much more liberalised. A general idea of the current technology, processes and volumes gives The Economist (2003b), ‘Inter-dealer brokers—Voice squad’, Jan., vol. 366, no. 8306., p. 63.
volume in order to extract commission. This would also be consistent with the high turnover rate observed. However, U.S. brokers will not produce volume by investing into foreign securities with an inferior return. From this perspective, the high brokers’ fee gives evidence that the U.S. has a comparative advantage in providing financial services.\footnote{The detailed breakdown of the services balance also reveals that 22% of the total surplus on the account results from the net position of transportation and travel comprising especially air services. With United Airlines nearly bankrupt (see The Economist (2002f), ‘United Airlines—A special thanksgiving’, vol. 365, no. 8301, pp. 55–56, e.g.) and all others struggling with them and 17% of the surplus consisting of brokers’ commissions, the services account will probably not improve the CA-deficit significantly. From this viewpoint, MANN’s argumentation and political recommendation of the prospects of the GATS for the U.S. services industry (see Mann (1996), op. cit., ‘Rising services trade and implications for sustainability’, pp. 37–39 ff.), cannot be followed.} Additionally to this observation, mind that the U.S. supply of financial products is much more diversified with respect to the risk-return profile, yield curves, and access to markets.

In sum, evidence suggest that the U.S. financial intermediaries possess a comparative advantage in providing financial services and assessing the prospects of financial markets.\footnote{Milesi-Ferretti, Gian Maria and Razin, Assaf (1996b), op. cit., section VI, ‘Country episodes and policy lessons’, p. 19, state: "]...\] Finally, an eighth factor is the quality of financial intermediation and especially the fragility of the banking system. This factor played an important role in all the crises we have considered, and made the adjustment process more painful. Weaknesses in banking systems supervision, distortions in the incentive structure of banks, and lack of competition within the banking sector and from nonbank financial institutions imply inefficiencies in the intermediation of external funds associated with large current account deficits. For a given size of current account imbalances, these inefficiencies make the economy more vulnerable to changes in foreign investors’ sentiment or other shocks."} This is probably based on an asymmetric information setting. Moreover, the fact that debt servicing due to the negative NIIP draws heavily on the income account, and in that way worsening the CA-deficit dramatically, is not observed. However, the income account falls into negative area at the same time, the NIIP—as depicted in figure 4 on page 13—worsens.

### 5.7 Summary

In a short-run portfolio balance model with exogenously given financial wealth, the reactions of the exchange rate and the interest rate to a CA-deficit has been pointed out. Whereas the exchange rate depreciates proportionally to the decline in foreign bonds representing the CA-deficit, there is no effect in the domestic interest rate, nor in financial wealth. The medium- and long-run extension of the model suggests that the short-run depreciation of the nominal exchange rate is also featured in a depreciation of the real exchange rate and that a decreasing domestic price level additionally supports this effect. The CA-deficit here implies a decline in domestic financial wealth. As a reaction to a slump in saving, i.e. excessive imports, a new long-run equilibrium real exchange rate emerges from a diminished stock of foreign assets. For the worsening of the U.S. IIP this implies an adjustment via a depreciation in the equilibrium real exchange rate.

However, empirical evidence suggests that neither of these effects has been happen-
ing persistently in the last decade. From figure 14 on page 42 keep in mind, that long and short-run nominal interest rates are stable—the same applies to the real interest rate as depicted in figure 10 on page 30. Review from figure 16 on page 46 that various price levels are stable and from figure 17 on page 47 that nominal and real wealth is still significantly positive. Moreover, recall from figure 18 on page 48 that a variety of exchange rate measures indicates an appreciating U.S. dollar. Since the exchange rate is determined by the CPF—mind this from figure 19 on page 49— the appreciation is brought about by the surge in fund inflow. Notwithstanding, the downward-overshooting of the exchange rate indicates alertness of the agents participating in financial markets in the presence of a CA-deficit with its downward pressure on the exchange rate.

Closer scrutiny of the determinants of U.S. dollar demand revealed that the CA-deficit is a proxy for the net dollar outflow from the U.S. into the rest of the world. This outflow of U.S. dollars makes the dollar standard of financial markets viable and suggests that the dollar numéraire and its network effects provide for a persistent dollar demand and, in that way, exerts appreciation pressure on the U.S. dollar rate. However, this appreciation pressure from U.S. dollar demand is opposed to the depreciation pressure from the CA-deficit, otherwise the appreciation of the last decade would have been far stronger. A high external value of the U.S. dollar, however, will not trigger expenditure switching by U.S. residents, thus, a CA reversal is unlikely.

Because U.S. dollar demand and U.S. dollar supply ultimately determine the U.S. dollar’s exchange rate, the eminent importance of the monetary policy stance of the U.S. Fed has been pointed out. The fact that the world is on a dollar standard and the conjunction with the high U.S. CA-deficit suggests that the U.S. are already cashing its monopoly rent from providing the world currency no. one by making use of the seigniorage option—though not by producing inflation, mind this from the stable price level.

A detailed decomposition of the income account revealed that more than 50% of all capital inflows flow out in the same accounting period. In combination with the empirically observed income asymmetry—U.S. agents generate the same total return while investing the half amount preferably in foreign equity—suggests that U.S. agents are less risk averse and possess a comparative advantage in providing financial services. The comparative advantage was assumed to be basing on asymmetric information and an advanced level of technology in serving and assessing financial markets.
6 Final assessment

In the late 1980s and the first half of the 1990s the world was facing the prospect of a high-growth scenario in the U.S. This was probably initiated by the IT-progress spreading especially in the U.S. and going hand in hand with a surge in asset prices. Recall the explosive evolution of the DowJones depicted in figure 3 on page 13.

The U.S. provided a mature financial market with a broad range of investment possibilities and U.S. enterprises were seeking for capital to invest in IT. Additionally, the U.S. government performed a stable economic policy and a strongly improving fiscal balance. Mind this fact from figure 5 on page 19.

By accident, the Asian financial crisis, Russian default on its treasuries, economic slowdown in Latin America as well as the prospects of the euro launching provided for high uncertainty of investment in the rest of the world. The sum of these determinants suggested the U.S. as an attractive investment location and caused an excessive fund inflow. Review the surge of capital inflow from figure 2 on page 12.

Coincidentally, U.S. agents were willing to tilt their consumption path. Recall from figure 8 on page 29 that the private consumption quote was smoothly lifted to 68% of GDP in 2000. The push in consumption is mirrored in a corresponding decline in the saving rate. Recall this from figure 9 on page 30. The RAMSEY-CASS-KOOPMANS model of section 4.3.1 suggested a steady state saving rate to be a decreasing function of income growth such that high-growth economies are potential candidates for CA-deficits. This was found probably true for the evidence of a 1% increase in the productivity of U.S. agents. However, the steady state of this model implied a decreasing consumption quote, mind this from eq. 29 on page 28, and, hence, from the empirical observation of increasing consumption followed, that a steady state is still not reached. Contrarily, in the overlapping generations model of section 4.3.2, the steady state saving rate showed up to be increasing in productivity and the population growth rate over a modification of the age-earnings-profile. This contradiction was solved by pragmatically motivating the dropping saving rate with a wealth effect resulting from the surge in asset prices. U.S. residents were supposed to save preferably in equity and, hence, to be less risk averse than their foreign counterparts.

The coincidence of high fund inflow with the willingness of U.S. residents to tilt their consumption path was found as the reason for the extreme worsening of the already existing CA-deficit. Mind the development of the CA-deficit from figure 1 on page 11 and that the CA is determined by the CPF from figure 2 on page 12. With its absolute height of U.S. dollar billions \(-444.69\) in 2000 (mind this number from table 1 on page 15) the CA-deficit was absorbing an estimated 7.5% of world savings.

In this sense, foreign investors were supposed to be willing to finance the CA-deficit. The capital inflow triggered an appreciation of the dollar’s nominal exchange rate and, while appreciating the real exchange rate, fed U.S. residents consumption
tilting and worsening of the CA additionally. However, the increasing CA-deficits of the 1990s inevitably dragged an increasing indebtedness of U.S. agents, which is displayed in an NIIP of U.S. dollar billions 2,187.5 net foreign debt in 2000, making the U.S. the world’s largest debtor country. Think back to figure 4 on page 13 and to table 2 on page 16. The proposition that highly indebted economies face an accordingly high debt service additionally dragging the CA into deficit was dismantled by the observation of income asymmetry in the income account suggesting U.S. agents to have a comparative advantage in providing financial services and assessing financial markets’ prospects. Recollect this fact from subsection 5.6 on page 53 and figure 21 on page 55.

Hence, the RAMSEY-CASS-KOOPMANS-model suggests that the U.S. is on the trajectory towards a long-run debt-to-GDP steady state as depicted in figure 7 on page 24 which is implying a perpetual CA-deficit. The conclusion on a movement on the adjustment path resulted from the implication of a declining consumption-to-GDP ratio which is simply not observed. However, the absolute value of this steady state is determined from the constellation of the real interest rate and the GDP growth rate. The constellation displayed in figure 10 on page 30 suggests the real interest rates to be higher than the real GDP growth rate since 1980. Thus the debt-to-GDP steady state might be feasible. As a crucial shortcoming of the presented models, the small country assumption has been pointed out. A setting with an endogenously determined real interest rate would have been far more appropriate for a large open economy such as the U.S. Thus, the conclusion on the steady state determined from the constellation of the real interest rate and the GDP growth rate must finally be interpreted with considerable caution.

Taking into account the non-neutrality of money, the short and long-run portfolio balance models of sections 5.1 and 5.2 presented the monetary perspective. In a short-run model the CA-deficit was expressed in a vanishing amount of foreign bonds, implying a proportional depreciation of the nominal exchange rate. The long-run perspective proposed a depreciation of the equilibrium real exchange rate corresponding to the declining stock of external assets. However, statistics do not display these predictions, i.e. the depreciation of exchange rates is not observed. On the contrary. Prices and interest rates were found stable as well as U.S. households’ wealth still significantly positive. Recollect these facts from figures 14 to 17 on pages 42-47. The surge in demand for U.S. assets triggered high demand for U.S. dollars, causing the dollar rate to appreciate throughout the 1990s. Recall the appreciation of the variety of exchange rate measures from figure 18 on page 48 and that the dollars appreciation is following the course of the CPF from figure 19 on page 49.

This effect was founded in the much stronger appreciation pressure from U.S. dollar demand due to the flourishing capital inflow of the 1990s. However, the deprecia-
tion pressure from the CA position was figured out by the observation of downward overshooting in the U.S. dollar’s exchange rate. Mind this fact from figure 19 on page 49 and the deduction on expectations of FX-market agents.

As an additional U.S. dollar demand factor, the dollar standard of international financial markets has been identified. Its origin reaches back to the Bretton-Woods System and the dollar numéraire can be assumed as firmly established in financial markets and to expand further with increasing integration of still not accessed countries as well as an extended turnover volume and raising financial wealth in the periphery. The U.S. CA-deficit is feeding the additional dollar demand from financial markets.

As a crucial point in conjunction with the dollar standard, the performance of the monetary policy stance of the U.S. Fed was figured out to be of eminent importance for international financial markets as well as for the U.S. CA-deficit with the latter ultimately maintaining the dollar standard’s viability. This historical perspective of U.S. dollar demand suggests that the roots of persistent U.S. CA-deficits reaches already far back in the Bretton-Woods System and before. If it had not been for the U.S. CA-deficits, the dollar standard would not have been possible since the CA-deficit is the exclusive vehicle for the outflow of U.S. dollars into the periphery. Moreover, from this viewpoint derives the U.S. Fed’s seigniorage option establishing ultimate resort for U.S. treasury redemption in debt inflation. As a result from the dollar standard, the U.S. Fed is holding a monopoly in providing the world currency no. one, and by that way it is extracting a monopoly rent from the seigniorage option. Furthermore, the conclusion on a softer budget constraint of the overall U.S. is resulting from this seigniorage option. Recall this from the author’s naïve assessment in section 4.2 on page 22 and from the argumentation in section 5.4 on page 49. Hence, including the dollar standard as secondary effect on the U.S. CA-deficit reveals that the U.S. budget constraint is not constituted in the present value of its future income exclusively, but additionally enhanced by a persistent peripheral demand of its currency. As long as this demand is sustained, the U.S. will be able to run a much higher CA-deficit than a small country which is implying a much higher level of external debt. This fact is already displayed in the NIIP.

However, this negative level is far from being unlimited from the dollar standard because there will be a point at which either financial markets are fully satisfied, or the U.S. is no longer attractive for fund investment, or a persistent lower level of income growth is eroding the currency’s value. At this point, fund inflow will moderate and the U.S. dollar’s external value will depreciate and by that way enforcing a reversal of the CA-deficit into a CA-surplus. Notwithstanding, the extension of the additional relaxation of the budget constraint has not been assessed quantitatively in this text. Judging from the enduring CA-deficits and the highly negative NIIP, the relaxation is significant, otherwise the depreciation pressure on the exchange
rate would have been more obvious. Finally, the quantitative assessment of this relaxation is not easily to proceed because volume and income growth of the dollar standard as a whole must be quantified, projected into the future, and set in relation to the dollar supply via the CA-deficit. Nonetheless, this limit might be reached surprisingly and at this turning point trigger a rapid depreciation of the U.S. dollar. The U.S. dollar rate, thus, functions as an indicator for sustainability. It is the key to the U.S. overall budgetary limit as well as the balancing mechanism in U.S. residents' consumption tilting and the willingness of foreign investors to finance the CA-deficits, hence, ultimately determining how much of Americas capital stock will be handed over to foreigners in future.

7 Conclusion

With respect to the central questions of this text as presented in the introduction on page 3, the conclusion is drawn by applying the findings from the models in conjunction with empirical evidence from the course of investigation. Review the final assessment of the previous section 6 on page 58.

Concerning the question one (first item), the primary budget constraint of the U.S. consists of the discounted value of all future income net of domestic absorption. Moreover, this constraint is enhanced by a seigniorage option, due to the fact that financial markets are on a dollar-standard. This seigniorage option has not been quantified in the text, however, judging from the CA-deficit and the NIIP, the additional relaxation is significant. Otherwise adjustment processes would have been more obvious.

With respect to the second question (second item), models predict a short-run depreciation of the nominal exchange rate as well as a long-run depreciation of the real exchange rate induced by a declining domestic price level in conjunction with the short-run depreciation. Supposing a medium-term as a time span of ten years and more, there are no adjustment processes observable in fundamentals indicating an overleveraged financing of the overall external debt position. The U.S. CA is determined from the CPF and the latter determines the U.S. dollar’s exchange rate. For the surge in U.S. asset demand, the U.S. dollar’s exchange rate is appreciating throughout the 1990s. Since prices are stable, the appreciation also applies to the real exchange rate. Short- as well as long-term interest rates are unaffected and, since prices are stable, this also applies to the real interest rate. Thus, the creditworthiness of the U.S. is still valid.

With respect to the definition of the term "sustainability", the U.S. CA is sustainable because U.S. agents stick to their budget constraint and the position of the CA does not trigger adjustment processes in fundamental variables in the medium-term. McKINNON’s assertion as cited at the beginning has been limited in a sense that
there will be a point in which the dollar demand from the dollar standard of international financial markets is satisfied. At this point, the U.S.’s external debt reaches its absolute limit.

As a final remark note, that the term sustainability is decisively different from acceptability or related terms. If the external debt of the U.S. is acceptable or can be tolerated is an entirely different question and was not in the scope of the analysis. The U.S. external debt will probably become dangerous to the world economy as a whole the more the U.S. approaches its debt limits. Notably, a collapse of financial markets from a financial contagion effect would especially hit the periphery. For this reason, McKinnon states:

"[..] the world and U.S. economies would be better off if the American current-account deficit was smaller or non-existent.[..]"\textsuperscript{103}.

\textsuperscript{103} McKinnon (2001), op. cit., ‘Is the dollar standard’s survival at stake?’, p. 9, third paragraph.
References

Baum, Christopher F. and Barkoulas, John T. and Caglayan, Mustafa (2001), Nonlinear Adjustment to Purchasing Power Parity in the post-Bretton Woods Era, paper, Boston College, Louisiana Tech University, University of Durham (U.K.), Boston College, MA, U.S. 48


IMF (1999), World Economic Outlook, May, report, International Monetary Fund, Washington, DC, U.S. 31


IMF (2001c), World Economic Outlook, May, report, International Monetary Fund, Washington, DC, U.S. 18


Kenen, Peter B. (2002), The euro versus the dollar: Will there be a struggle for dominance?, panel presented at the annual meeting of the American Economic Association in Atlanta, Jan. 4th, Princeton University, Department of Economics, International Finance Section, Princeton, NJ, U.S. 50


Lewis, Karen K. (1999), ‘Trying to explain the home bias in equity and consumption’, Journal of Economic Literature, June, 37, 571–608. 40


McKinnon, R. I. (2002), The euro versus the dollar: Resolving a historical puzzle, paper, Stanford University, Department of Economics, Stanford, CA, U.S. 51


Obstfeld, Maurice and Rogoff, Kenneth (2000), Perspectives on OECD Economic Integration: Implications for U.S. Current Account Adjustment, paper C00-116, Institute for Business and Economic Research—Center for International Development Economics Research, University of California at Berkeley, U.S. 18, 26, 40, 45, 47, 48, 52, 53

OECD (2002), Economic Outlook, June, report 71, Organisation for Economic Co-operation and Development, Paris, France. 10


The Economist (2002a), ‘Economic focus—Big Mac Currencies’, The Economist 363(8270), 80. 47

The Economist (2002b), ‘Economic focus—Productivity promises: How much of America’s surge in productivity growth can be sustained?’, The Economist 365(8297), 82. 29

The Economist (2002c), ‘Economic focus—The dollar and the deficit’, The Economist 364(8290), 78. 1

The Economist (2002d), ‘Special report—Demography and the West: Half a billion Americans?’, The Economist 364(8287), 20–22. 34

The Economist (2002e), ‘The dollar: A cliff-hanger—How might a weak dollar affect the global economy?’, The Economist 363(8276), 67–68. 49


The Economist (2003a), ‘Emerging-market indicators—The Big Mac index’, The Economist 366(8307), 94. 47

The Economist (2003b), ‘Inter-dealer brokers—Voice squad’, The Economist 366(8306), 63. 55

Erklärung

1. Ich versichere hiermit, daß ich die vorliegende Arbeit mit dem Thema:

   Is the USA’s Current Account Sustainable?

selbständig verfaßt und keine anderen Hilfsmittel als die angegebenen benutzt habe. Die Stellen, die anderen Werken dem Wortlaut oder dem Sinne nach entnommen sind, habe ich in jedem einzelnen Falle durch Angaben der Quellen, auch der benutzten Sekundärliteratur, als Entlehnung kenntlich gemacht.

Die Arbeit wurde bisher keiner anderen Prüfungsbehörde vorgelegt und auch noch nicht veröffentlicht.


Florian Bubla