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**Bio-physical North-South Trade as an Unequal
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The Case of Latin-America facing Structural Adjustment Programs.

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Abstract

In order to sustain and grow economies rely on material and energy inputs. Industrialised nations are characterized by high mass consumption and thus by a larger material and energy throughput as compared to less affluent societies. International trade becomes increasingly important for industrialised economies to meet their physical needs. Developing countries, in particular those with low population density such as Latin America, provide large parts of the natural resources required by the industrialized countries. This thesis aims at exploring bio-physical features of international development. It is concerned with bio-physical exchange relationships between the global North and the global South. Three countries from Latin America have been chosen to represent the latter: Argentina, Bolivia and Brazil. The research objective is to examine the influence of structural adjustment programs (SAPs) on the countries' physical trade balances (PTBs). This should illustrate the bio-physical consequences of international trade relations. The concept of unequal ecological exchange serves and the world-system theory provide the theoretical framework of this contribution. Both argue that trade shows significant imbalances particularly between core and periphery. In order to investigate the bio-physical side of this relation, the PTB was calculated to quantify and operationalise the bio-physical aspects of unequal ecological exchange that might be intensified or induced by SAPs.

The Physical Trade Balance (PTB) is one indicator derived from Material Flow Accounts (MFA). In this thesis, the PTB is calculated both for total trade of the selected Latin American countries as well as for trade only with core countries. The size as well as the type of material of world-related and core-related trade is analysed. The results indicate that the three examined countries are net-exporters of physical quantities. However, their physical involvement in world- and core-related international trade differs greatly, both in total and per capita terms. Taking the stage of processing of exported commodities and the monetary trade balance (MTB) into account, many characteristics of an unequal ecological exchange can be confirmed. A relevant finding is that exactly during the time of neoliberal adjustment, the MTB as well as the PTB deteriorated substantially, even though it was the goal and promise of SAPs that a liberalisation of trade would result in foreign exchange earnings. In general, the period of new extractivism brought about much larger quantities of exports than the whole era of structural adjustment did. Furthermore, the relative importance of the core as trading partner decreased steadily although core-related trade still implicates the highest trade deficits –both in physical and monetary terms. Due to its lower economic performance and limited involvement in international trade Bolivia represents an exception to some extent. For instance, there was no export boom after the implementation of neoliberal policies.

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Acronyms

ARG	Argentina
BOL	Bolivia
BRA	Brazil
CEPAL/ECLAC	Comisión Económica para América Latina y el Caribe/Economic Commission for Latin America and the Caribbean
CEPALSTAT	Databases and Statistical Publications of ECLAC
DE	Domestic Extraction
DMC	Domestic Material Consumption
FAO	Food and Agriculture Organisation of the United Nations
FAOSTAT	Statistics Division of the FAO
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Production
IEA	International Energy Agency
IMF	International Monetary Fund
ISI	Import Substituting Industrialisation
MERCOSUR	Mercado Común del Sur
MFA	Material Flow Accounting
MTB	Monetary Trade Balance
NEP	New Economic Policy
OECD	Organisation for Economic Co-operation and Development
PTB	Physical Trade Balance
RMC	Raw Material Consumption
SAP	Structural Adjustment Program
SERI	Sustainable Europe Research Institute
UN-Comtrade	United Nations Commodity Trade Statistics Database
UNO	United Nations Organisation
WTO	World Trade Organisation

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1 Introduction

In the area of sustainable development a controversial debate is ongoing whether free trade implies mainly positive effects, promotes growth and prosperity or if it forces the nation states to exploit their country with negative impacts on the environment and society. Of course, both positions are not mutually exclusive. For instance, neo-classical economists emphasise the positive relationship between trade and environmental quality. It is stressed that the main problem are policy inadequacies on a national level. Every country should focus on its comparative advantage and benefit from trade through the export of goods that can be produced at a lower relative cost than other goods (Muradian; Martinez-Alier 2001). “Trade is assumed to generate welfare increases, since every country produces and exports the commodities it can produce more efficiently” (ibid.: 282). The neo-classical theory assumes that free trade strategies lead to win-win-situations. Governments can benefit from export revenues and taxes, and invest in policies that promote a more equal society and a cleaner environment. “If policies necessary for sustainable development are in place, trade promotes development that is sustainable” (ibid.: 283).

The contrary position is represented by ecological economists. They criticise the ability of the trade system to promote ecological sustainability. In particular, the positive relationship between international trade and economic growth and between economic growth and environmental protection is seriously questioned. Muradian and Martinez-Alier argue that if economic growth rests on the depletion of natural capital due to the export of primary products, GDP is a misleading indicator for welfare, since much of environmental damages are irreversible losses (ibid.: 284). Joan Martinez-Alier argues that the periphery seems at first to be “too poor to be green” (Martinez-Alier 2002) but after obeying to the neo-classical suggested pathway to get wealthy enough, it would probably be “too late to be green” (Muradian; Martinez-Alier 2001).

In short, to comply with the neo-classical advice of focussing on comparative advantages may have fallacious consequences for peripheral-extractive economies. For instance, if the “comparative advantage” is based on the exploitation of natural resources and space for export reasons, this “advantage” becomes somewhat relative. In this regard, Muradian and Martinez-Alier (2001) speak about a “specialisation trap” of the periphery. The “clear flow of primary commodities from poor to rich countries” entails “environmental improvement and economic growth in the North and environmental deterioration and economic stagnation in the South” (ibid.: 286). Furthermore, the “specialisation trap” would deprive

peripheral regions of improving the degree of processing and generating higher revenues. Muradian and Martinez-Alier conclude that the periphery needs to change the current comparative advantage, since not every comparative advantage promotes development in the same way and “by following the neo-classical advice the South would stay specialised in natural-resources-intensive products, and it would be condemned to stay economically behind” (ibid.: 294).

This thesis explores bio-physical features of international development. It is concerned with bio-physical exchange relationships between the global North and the global South. The contribution relies on a world-system theoretical framework and, therefore, the industrialised nations located in the global North will subsequently be referred to as the core, and the developing nations of the global South as the periphery. Three countries from Latin America have been chosen to represent the latter: Argentina, Bolivia and Brazil. The research objective is to examine the influence of structural adjustment programs (SAPs) on the countries’ physical trade balances (PTBs). Exact definitions of these terms will follow in the theory-chapters (2.1; 2.2). Substantial research about the impacts of SAPs on growth, poverty, employment, etc. has been carried out, but the following investigation is engaged with the bio-physical consequences expressed in international trade relations. Hence, the concept of unequal ecological exchange (cp. chapter 2.3) serves, next to the world-system theory, as the second theoretical pillar of this contribution. The PTBs will be applied as the necessary tools to quantify and to realise the unequal ecological exchange that might be intensified or induced by SAPs.

The following sections provide a brief overview of the broader problem area in which the thesis is engaged; the concrete problem formulation and research questions; and how this issue will be explored.

1.1 Problem Area

In order to sustain and grow, economies rely on material and energy inputs. Industrialised nations with a high mass consumption have a larger material and energy throughput than less affluent societies. International trade becomes increasingly important to meet the physical needs of industrialised economies. In this regard, scientists document a significant imbalance in international physical trade flows between North (core) and South (periphery) (Adriaanse et al. 1997; Matthews et al. 2000; Giljum; Eisenmenger 2004;

Schütz; Moll; Bringezu 2004; Martinez-Alier 2007; Dittrich; Bringezu 2010; Hornborg 2010; 2012; Wiedmann et al. 2013).

Indeed, economies of the core increasingly rely on material inputs from peripheral regions: “[Europe] is the region which most depends on resources from other countries in absolute terms. The increasing net imports of North America since 1990 reflect the increasing net imports of the United States. [...] Looking at the net exporter side, it can be observed that Africa, the Middle East, Australia and Latin America are the regions which supply the world market with resources” (Dittrich; Bringezu 2010: 1842). Though, the provision of resources on the world market does not sufficiently indicate a peripheral position, as proven by the famous examples of Australia and Canada. However, these are extreme large countries with a low population density, a sound industrial base and a high gross domestic product. Net-exports of physical quantities are a common feature of peripheral countries, but by far not the only one, and accordingly not all countries with large net-exports belong to the periphery. But when “countries are grouped in the formerly so-called first, second and third world, respectively industrialized, transition and developing countries, it can be observed that industrialized countries as a group are net importers while developing countries as a group are net exporters” (ibid.: 1844). To measure these phenomena the scientific community created a set of physical accounting tools and indicators (Schandl et al. 2002; Bringezu et al. 2004; Dittrich; Bringezu 2010; Fischer-Kowalski et al. 2011; EUROSTAT 2012). The tool used in this study is the PTB, which measures all direct material flows exchanged between nations via international trade. An exact description of the method will follow in chapter 2.2.

An unequal appropriation of natural space and resources implies an international division of labour in which peripheral countries were compelled to export raw materials in exchange for goods manufactured by the core. Thus, Latin American Structuralist theorists agree that resource extraction provides a rather difficult path to development. On the contrary, stakeholders representing the orthodoxy claim that the extraction and exploitation of natural resources has positive effects for many developing countries, since strong global demand for resources allow them to profit from export earnings. Indeed, the global primary commodity boom in the world market ushered in the phase of New Extractivism, meaning a reinforced export boom of natural resources in primary commodity form since 2000. But this entailed inevitable domestic socio-environmental conflicts. The communities most directly affected by resources extraction activities receive few of the generated benefits – benefits that were largely exported (Veltmeyer 2013). The concept of unequal ecological

exchange tries to capture this highly complex issue. Joan Martinez-Alier (2002) defines it in the following way:

By ecologically unequal exchange we mean, then, the fact of exporting products from poor regions and countries, at prices which do not take into account the local externalities caused by these exports or the exhaustion of natural resources, in exchange for goods and services from richer regions. The concept focuses *on the poverty and the lack of political power of the exporting region* [original emphasis], to emphasize the idea of lack of alternatives options, in terms of exporting other renewable goods with lower local impacts [...] (Martinez-Alier 2002: 214).

Unequal ecological exchange is the broader frame of the problem area upon which the thesis is focused. However, it is not possible to cover the whole range of the issues mentioned. This study has a focus on the international exchange procedures. Local externalities and the exhaustion of resources and domestic distribution conflicts are not part of this investigation.

1.2 Problem Formulation

The PTBs illustrate the bio-physical relationship of Argentina, Bolivia and Brazil to the rest of the world and the core in particular. The study has a special focus on the possible influences of structural adjustment programs (SAPs) on the course of the PTBs. These programs were implemented mainly during the 1980s and 1990s to restore national solvency and to reduce the excessive foreign debt loads, and often followed the neoliberal paradigm – known as the Washington Consensus. As the world-system theory and the unequal ecological exchange concept claim that physical trade shows significant imbalances particularly between core and periphery an additional PTB per country was calculated that shows solely the physical exchanges with core countries. This measure enables to prove the theoretical suggestions and to draw comparisons between world-related and core-related trade regarding their magnitude and quality. Moreover, the distinct impact of SAPs on the respective PTB can be examined.

The study is, therefore, basically concerned with the following questions:

- How are different phases of national development orientation (inward-looking, outward-looking, neoliberal adjustment, new extractivism) reflected in the PTB?
- What differences exist between world- and core-related PTBs?
- What impacts had SAPs on the PTBs and how far are shifts attributable to the successions of their implementation?

- To what extent can the SAPs be considered as system-maintaining measures of an unequal ecological exchange?
- Do the findings support the concept of an unequal ecological exchange?

1.3 Research Strategy

The research strategy describes the analytical approach developed to deal with the above raised questions. It contains the project design, the empirical material and database, and some important methodological considerations regarding the chosen procedures. The intent is twofold: it shall be pointed out with which method the raised questions can be asked and why the chosen questions are applicable.

1.3.1 Project Design

The project design follows the structure of the thesis. The theoretical background of the study will be introduced in the second chapter. The application of theories enables a sound interpretation and classification of gathered data and results, and avoids empiricism. It is not the goal to generate bare figures of physical exchange, but to prove theoretical claims and assumptions. Consequently, the results become valuable for drawing conclusions and making statements about perceived problems of reality.

The theory chapter (cp. chapter 2) consists of three basic pillars: The concept of unequal ecological exchange is theoretically based on the world-system theory approach. For this reason, the world-system theory will be introduced and described with the focus on the evolution of the world-system, the perception of “development”, and the ecological implications of a modern world-system perspective. Subsequently, the methodological foundations of the PTB will be explained, since it serves to operationalise the unequal ecological exchange.

It is also relevant for this study to provide the historical context of the investigated area (cp. chapter 3). It starts with the colonisation of Latin America by European forces, what marks the beginning of the incorporation into the emerging capitalist world-system. This will be examined in order to realise the deep-rooted relationship of dependence and the long-standing peripheral position of Latin America in the world-system. The second historical focus is laid on the post-world war II period to document the modern development

of the independent republics and to retrace the development of how they slipped into the common debt crisis of the 1980s. The broad economical re-opening of Latin America was ensured by the conditionality of IMF-managed loans. Post-neoliberalism and new extractivism form together the most recent period in the development of foreign physical exchange. It is rather important to determine periods of macroeconomic adjustment to establish a framework that allows interpretation of trends and shifts in the PTB.

Chapter 4 presents country-specific analysis of macroeconomic development, structural adjustment and finally the PTB (world- and core-related). Focus is laid on economic policies (affected by structural adjustment) which are considered to have significant impact on the course of the PTB, e.g. trade related policies, privatisation, deregulation, liberalisation, inflation, etc. Other issues, like impacts of austerity programs on society, are not part of the analysis. A special focus of the analysis is laid on the core-related trade and its share of total trade. The last chapter of the analysis, chapter 4.4, draws special attention to the imbalances of exchanges, in particular with the core countries. Therefore, additional analyses will be reported that take the stage of processing of exported commodities as well as their monetary values into account.

Finally, the concluding chapter 5.1 aims at recapitalising the findings and relates them to the theory and to the above mentioned questions. Moreover, some further perspectives on this critical issue, which were not part of the analysis, shall be mentioned and briefly discussed.

1.3.2 Empirical Material and Database

The main database for calculating the PTBs is the United Nations Commodity Trade Statistics Database (<http://comtrade.un.org/db/>). The UN-Comtrade database provides the internationally traded physical quantities (annual imports and exports) in metric tons and their corresponding monetary value in USD as reported by national statistical authorities. It is the most comprehensive collection of international trade flows and covers trade statistics from 1962 onwards. Fischer-Kowalski et al. (2011) mention the UN-Comtrade as the most prominent source providing multinational data on physical trade flows. Supplementary data were provided by the FAOSTAT (<http://faostat.fao.org/>) and the IEA-statistics (<http://www.iea.org/statistics/>). Chapter 2.2.3 explains how these physical data were classified and tabulated.

„Most European and South American countries report their physical trade flows relatively completely, so that less than 1% of the physical trade flow would be missed. African, Asian and North American countries often very incompletely report their trade flows to UN Comtrade” (Dittrich; Bringezu 2010: 1839). Though, some data had to be completed by supplementary sources or estimated by the reported monetary values (cp. chapter 2.2.3). The appendix provides a detailed record on how and which data had to be recalculated (A1). However, data errors cannot be entirely excluded.

1.3.3 Methodological Considerations

This chapter shall answer basically two questions: Why have Argentina, Bolivia and Brazil been chosen; and which countries belong to the core (in this study)? At first, data availability was one factor. As mentioned above, Latin American countries report relatively complete trade data to the UN-Comtrade database, whereas countries of other developing regions like Africa or Asia report their data insufficiently and undifferentiated. Missing trade flows could reach up to 50 % (ibid.). Consequently, substantial additional research efforts would have been necessary to calculate relative complete and consistent statistics. Such an undertaking would have gone far beyond the scope of this study. Moreover, Latin American countries share, to large extents, a common history. The specific historical backgrounds of an inward-looking orientation (ISI, cp. chapter 3.2.1), the Latin American debt crisis, the phase of neoliberal structural adjustment, and new extractivism (cp. chapter 3) are shared features that are applicable for most of the republics. Virtually all Latin American republics were forced to implement SAPs, which was another main selection criterion. This common and simultaneously diversified development enables an interpretation with some degree of abstraction and medium- to long-range conclusions. Therefore, Latin America is highly applicable for the specific research questions.

Of course, every single country of Latin America has its own specific history, resource endowment, etc. The choice of Argentina, Bolivia and Brazil represents three contiguous countries that together account for the major part of South America’s geographical area. Furthermore, these three countries differ by resource endowment, population density, affluence, and policy orientation. The results are, therefore, not representative for all countries of Latin America, but cover major areas.

The “core”, as it used as a conglomerate of trading partner countries, consists mainly of the current OECD-members, with some exceptions. The OECD has currently 34 member

states (www.oecd.org). In this study, four member countries were perceived as not belonging to the core, these are: Chile, Israel, Mexico and Turkey. The reasons for exclusion were geo-political and economic ones. Chile, Israel and Mexico joined the OECD rather late, in 1994 and 2010 respectively. Regarding the period considered in this study (1962-2011/12), these countries were most of the time not part of the OECD. Moreover, Chile and Mexico are themselves Latin American countries and witnessed largely similar historical developments. Turkey is an OECD-member since its establishment in 1961. But its GDP per capita was by far the lowest of the OECD community in 2012 (www.imf.org). Furthermore, these four countries do not belong to the geo-political “North”. The “core”, therefore, consists of 30 countries: the majority of them are to be found within the EU, plus the USA, Canada, Japan, South Korea, Australia and New Zealand. A complete list of countries can be found in the appendix (A1.1).

1.4 Limitations

In the end of the introduction, some methodological limitations of the study shall be mentioned. First, the PTB is used to quantify and operationalise unequal ecological exchange. But the PTB has to some extent a reductionist character, since all materials, independent of their quality, production or value, are categorised in four main material categories. As the PTB provides solely direct trade flows, no so-called hidden or indirect flows are accounted for. For example, “[t]he differences between the mass of the primary raw materials and that of the final products are particularly high for ores and animal products” (Weisz 2007: 294). This implies also that environmental burden shifting cannot be deduced directly from the PTB. Furthermore, the PTB provides no information about the stage of processing of the traded commodities, nor about the monetary value of the traded product: “Considering that physical trade balances measure imports and exports with their weight as they cross the border, which means that the traded goods are in different stages of processing, we face a bias when simply comparing imports and exports in metric tonnes” (ibid.: 294). An important issue in this context is that the monetary value and physical mass of a product are opposed and inverse related. Considering a basic commodity or a final good, value is always added along the production process, whereas mass is reduced and left behind (Fischer-Kowalski; Amann 2001). To counteract these weaknesses, some additional analyses were undertaken, particularly in chapter 4.4. In order to account for unequal

ecological exchange, information about the stage of processing of products is rather important:

The fundamental values in timber, minerals, oil, fish, and so forth are predominantly in the good itself, rather than in the incorporated labor. Additional value is created when these materials are transformed by labor. The important point, however, is that this additional value is generally realized in the industrial center, rather than in the extractive periphery. Thus, there are multiple inequalities in international exchange. One results from the differential wages of labor. Another emerges from the transfer of the natural value in the raw, unlabored resources from periphery to center (Bunker 2007: 251).

A completely different, but not less relevant, challenge is to estimate the impacts of SAPs on the PTBs. For instance, conditionality required by SAPs was not always fully implemented. Furthermore, other national policy goals and foreign political and economic developments affect the PTB as well. To counteract this problem SAPs are set in a broader phase of development and policy orientation. The focus of interpretation lays, therefore, not on single SAPs, but rather on their broader consequences reflected in enacted laws. Single laws or different policy plans were often the legal result of structural adjustment. Therefore, interpretation refers to actual implemented policy plans and changing policy orientation rather than on direct requirements of SAPs.

2 Theories and Concepts

As mentioned in the introduction, underlying theories shall be examined according to their applicability on this special issue. Theoretically spoken the thesis rests on three foundational pillars: the World System Theory, the concept of Unequal Ecological Exchange and the PTB as part of the MFA approach. It is no coincidence that these different approaches were considered to enable a theoretically sound realisation of the presented project. One major unifying element is the nation state as the unit of analysis. Taken together it is possible to create a theory synthesis that is capable of realising and analysing systematically complex phenomena of the global acquisition processes of natural goods (Singh; Köhler 2010).

2.1 *The World-System Theory*

This chapter serves to introduce the world-system theory: the historical evolution of the system, the main constituting elements and the perception of “development” in the theory as well as ecological implications of the modern-world system. A complete description and discussion of the world-system theory is not possible within this thesis; I will therefore focus on those elements that are most important. However, the world-system theory traces back to the writings of Immanuel Wallerstein (1974; 1980b; 1989). According to Wallerstein, the modern world-system consists of nation-states which belong either to the core, the periphery or the semi-periphery. It is a social and economic-capitalistic, but not a political system (Wallerstein 1974: 15). Therefore, the inherent need for expansion of capitalism is a pre-condition for the evolution of a world-system: “Capitalism and a world-economy [...] are obverse sides of the same coin” (Wallerstein 1979: 6). The following subchapters will give further insights into this relation and other important components of the theory.

2.1.1 Roots and Evolution of the Modern World-System

Wallerstein follows in his theory a rather long-term approach (e.g.: Goldfrank 2000: 173). Accordingly, the capitalist world-economy came into existence in the 15th century (Wallerstein 2000: 249). The geographical point of departure was Northwest Europe. This region became the economic “heartland” of the European world-economy (Wallerstein 1974: 225). Though, “[i]t is vital to remember, however, that Europe was not the only world-economy at the time. There were others. But Europe alone embarked on the path of capitalist development which enabled it to outstrip these others” (Wallerstein 1974: 17). As a result, Wallerstein considers the time from 1450-1640 as the implementation of the European capitalist world-economy. The world-system includes regions of the Americas that have been under control of the Spanish or Portuguese, like Brazil, Peru or Chile (ibid.: 68). The three structural positions – core, periphery, and semiperiphery – had stabilized by about 1640 (Wallerstein 1979: 18). Within the geographic expansion, colonies “have been incorporated as peripheries with specialized productive roles” (Goldfrank 2000: 174).

However, there are some distinctive features of the new capitalist system that distinguish it from other and earlier systems. Essential elements for the upcoming expansion have been, for example, the creation of nation-states and the spreading commodification of wage

labour and goods. Wallerstein asserts: “The states do not develop and cannot be understood except within the context of the development of the world-system” (ibid.: 66). Furthermore, “capital came to be used (invested) in a very special way. It came to be used with the primary objective or intent of self-expansion” (Wallerstein 1980a: 13 f.). Capitalism offered a more lucrative source of surplus appropriation. The operation of the market enabled increased productivity and consequently a modern economic development (Wallerstein 1974: 16).

Though, after an age of growth and expansion the period from 1600-1750 is seen as a cycle of economic stagnation and contraction – also described as a phase of consolidation of the European World-Economy (Wallerstein 1980b: 245; Goldfrank 2000: 173). Nevertheless, the next stage of vast economic expansion took place in the course of the Industrial Revolution (Wallerstein 1989: 3). This phase covered the time period from 1750-1917 and contained the globalisation of the capitalist world-economy (Goldfrank 2000: 173), indicating that previous so called “external arenas”, like India, West Africa or the Russian and Ottoman Empire, have been incorporated and enlarged the division of labour on a global scale. The beginning of the 20th century marked the incorporation of the entire globe in the capitalist world-economy (Wallerstein 1989: 129). However, these enlargement stimuli have all been one-sided: “Incorporation in the capitalist world-economy was never at the initiative of those being incorporated. The process derived rather from the need of the world-economy to expand its boundaries, a need which was itself the outcome of pressures internal to the world-economy” (ibid.: 129).

What can be noted from this section is that the region of particular interest, namely Latin-America, has been incorporated into the emerging world-system at a rather early stage and was one of the first outside the European core. Friedmann (2000) claims that the incorporation for colonies in Hispanic America often implied an agricultural alteration to monocultures for export, notably sugar, to the European core (cp.: 484 f.). The “larger-than-local pattern” of specialised production and interdependence are defining features of the modern world-system; and the endpoint of regional specialisation in agriculture is monoculture (ibid.: 501). The following chapter serves to gain a better understanding of the world-system-perspective.

2.1.2 Elements of the Modern World-System-Perspective

Referring to the section above, some elements of a world-system perspective have already been mentioned. Yet, the focus is describing the major systemic perceptions of the world economy.

First, according to the theory the interstate system forming the world system divides the incorporated countries into three economic zones: either into the core, the periphery or the semiperiphery. Core countries are in general characterised by the most efficient and complex production, the highest capital accumulation, a high grade of mechanisation, a capital-intensive production, secured domestic markets from competition and intense trade relations with all others. On the contrary, peripheral states typically show a less technology but more labour intensive production, a high international competition pressure, low price margins, profits and wages, a production of raw materials, cash crops, agrarian products or textiles for export reasons, plus international trade happens mostly with the core countries (e.g.: Goldfrank 2000; Wallerstein 1979; Wallerstein 1980a). Moreover, Wallerstein invented a third category: the semi-periphery (Goldfrank 2000: 169). The semi-periphery is generally characterised by a production mix of core-like and periphery-like activities. They find themselves in an in-between stadium regarding technology use and capital-intense production (e.g.: Goldfrank 2000: 169). Wallerstein attributes the semi-periphery an important intermediary role for political stabilisation: “The semiperiphery is needed to make a capitalist world-economy run smoothly. [...] The existence of the third category means precisely that the upper stratum is not faced with the unified opposition of all the others because the middle stratum is both exploited and exploiter” (Wallerstein 1979: 21 ff.). Consequently, through the concentration of capital in the core relatively strong “state-machineries” could be created, “among whose many capacities was that of ensuring that the state machineries of peripheral zones became or remained relatively weaker” (Wallerstein 1980a: 32) – and states are a crucial element for capitalists to accumulate capital (Wallerstein 2000: 262).

Second, the process of incorporation into the world-system happens through a transformation of the production processes. “As the capitalist world-economy expanded over the past four centuries, new areas, formerly external, have been incorporated into the system, almost all as peripheries” (Goldfrank 2000: 169). Typically, cash crops or minerals – raw materials – were exported from the periphery to the core. The periphery has been incorporated in the global commodity chain at the lowest stage, where unfavourable terms

of trade are reigning. Furthermore, the integration in the world system takes place through a global division of labour. The position of a country is defined by its position in the international division of labour. According to Wallerstein (1980b: 179), the hierarchical and spatially distributed division of labour is a constant element of the capitalist world-economy. But this division and the position in commodity chains are not unalterable. Changes in the relative economic strength of a state or a region can lead to an upward “mobility” in the interstate system. The capital-intensity and the skill level of the production processes are crucial elements for the position in the global commodity chain (Goldfrank 2000: 169). For this reason, a so-called “unequal exchange” is another constitutive factor of the functionality within the world system.

Third, the world system theory delivers the theoretical basis of what is the central concern of this thesis – the unequal ecological exchange. Wallerstein (1980a: 31) suggests that unequal exchange itself is an ancient practice. What is exceptional about capitalism is the way this mechanism is hidden: “The key to hiding this central mechanism lay in the very structure of the capitalist world-economy, the seeming separation in the capitalist world-system of the economic arena [...] and the political arena” (ibid.: 31). Wallerstein further argues that prices are *not* negotiated on a world market on the basis of impersonal economic forces: “The enormous apparatus of latent force (openly used sporadically in wars and Colonization) has not to be invoked in each separate transaction to ensure that the exchange was unequal” (ibid.: 32 f.). The key to bring unequal exchange to light lies in the examination of history. In doing so, it has to be acknowledged “how the world-economy had historically arrived at a particular point of supply and demand” (ibid.: 33). Furthermore, Wallerstein comprehends the core-periphery relation from a Marxist point of view. The surplus being produced in one zone is transferred to another and the losing zone is called periphery whereas the gaining zone core (cp Wallerstein 1980a: 31 f.). Goldfrank describes it as a “systemic transfer of surplus” from the periphery to the core (Goldfrank 2000: 170). Finally, this mechanisms lead to an ever-increasing differentiation between core and periphery. Correspondingly, the world system theory promotes a rather critical approach of “development”.

2.1.3 “Development” in the World-System Theory

This chapter will look at the perception of “development” in the world system theory. The common neoliberal-orthodox understanding of a “catch-up” is not in line with the perception represented in the world-system theory.

The simplified but still widespread understanding of “development” in the neoliberal economy is often defined and summarised by the writings of Walt Whitman Rostow (1960). Rostow decided to break down the development of each national economy according to his stated set of stages: “It is possible to identify all societies, in their economic dimensions, as lying within one of five categories: the traditional society, the preconditions for take-off, the take-off, the drive to maturity, and the age of high mass-consumption” (ibid.: 4). The “traditional society” is characterised by a ceiling on the output per head. This is simply because modern technology and scientific knowledge are not available or are not adequately applied. Only external intrusion and invasions can lead to a shock in the “traditional society” and set in new ideas and processes – the so called “preconditions for take-off” (ibid. 4 ff.). At the stage of “take-off”, growth becomes the normal condition. Investment increases, for example, in raw materials in which other nations may have an economic interest (ibid.: 7). “The economy exploits hitherto unused natural resources and methods of production. [...] New techniques spread in agriculture as well as industry, as agriculture is commercialized, and increasing numbers of farmers are prepared to accept the new methods and the deep changes they bring to ways of life” (ibid.: 8). The next stage, the “drive to maturity”, assures a more diversified mix in the composition of imports and exports (ibid.: 9). And finally, “a large number of persons gained a command over consumption which transcended basic food, shelter, and clothing” (ibid.: 10) at “the age of high mass-consumption”. Basically, in this perception of development, all countries are able to reach the highest stage through crossing the foregoing ones. The most important link, which obviously guarantees the wished development, seems to be the broad economic opening and liberalisation.

However, the world-system theory provides a less linear and thus more complex perception of national development. It is built up on Andre Gunder Frank’s (1966) more or less direct reaction to Rostow’s explanation. In doing so, Frank insists to bear the economic and social history of a country or region in mind: “[O]ur ignorance of the underdeveloped countries’ history leads us to assume that their past and indeed their present resemble earlier stages of the history of the now developed countries. This ignorance and this assumption

lead us into serious misconceptions about contemporary underdevelopment and development” (ibid.: 17). Furthermore, it is essential to keep the different frame conditions of national development in mind. Since nowadays developing countries are incorporated in the global division of labour, thus they were assigned a specific role in the world-economy (Eisenmenger; Martin; Schandl 2007: 179). On the other hand: “The now developed countries were never underdeveloped, though they may have been undeveloped” (Frank 1966: 18). In terms of the world-system approach: today underdeveloped nations find themselves incorporated in a system as peripheries, whereas the now developed countries never had to take the pretended stages from periphery to the core.

Indeed, Wallerstein refuses Rostow’s suggestion as well and describes his conception as “a misreading of British history into a set of universal ‘stages’” (Wallerstein 1979: 4). Since the geographical system cannot be expanded any more, development is considered as a zero-sum game. A catch-up can only happen via competition; and competition means development at someone else’s expense. What really developed was the world-system and “because the world-system has remained a capitalist world-economy, the regimes outside the core zone have been structurally unable to ‘catch up’ with the wealthy countries” (Wallerstein 2000: 263). National development understood as a “catch-up” in the world-system is nothing more than an illusion. The core grows like the periphery at the same time. “Thus twentieth century ‘backwardness’ is seen not as the result of a late start in the race to develop but as the continued deepening of a long-standing structural relation” (Goldfrank 2000: 169).

The perceived goal of national development is clearly industrialisation. The pursuit of industrialisation bears immense challenges for the future global distribution and acquisition of the required material inputs, as the next section shows.

2.1.4 Ecological Implications of the Modern World-System

In order to conclude this part of world-system theory and to create a link to the following chapters the bio-physical perspective of the theory shall be elaborated concisely. In examining the global unequal ecological exchange the society-nature relationship is set in an international context. The world-system theory delivers the theoretical tools to grasp this society-nature relationship enabled and enhanced through international trade.

For instance, breaking down the ecological aspects of the world-system economy into terms of the world-system theory, Wallerstein (2000: 260) describes the rising costs of

material inputs as a secular trend of the world-system. Since the pressure on profits increases constantly over time, the utilisation of raw materials, but not ensuring their renewal (especially organic matter), poses a way of externalising the costs significantly. As we know, the global division of labour is one major aspect of the world-system economy. This global division is accompanied by a local specialisation – for industrial manufacturing but also for agriculture and ecosystems in general. The global division of labour and production leads to reshaped and in fact simplified local ecosystems. According to Wallerstein, three major elements allow for this kind of reshaping: “Via the market, territorial states, and specialized productions, then, the modern world-system inattentively reshaped local ecosystems” (ibid.: 502). The most simplified, specialised, vulnerable and dependent (though some would call it efficient) known way of agricultural production is the monoculture (e.g.: Friedmann 2000: 508 ff.). The circulation of money has a higher influence on farming than the interdependent cycles of species and material cycles: “Interdependence of species with local configurations of soil and water was, in part, substituted by interdependence of specialized regions linked by trade” (ibid.: 487). This is especially true for industrial agriculture that ignores and disrupts natural cycles (ibid.: 488). The self-renewing cycles of ecosystems are ignored: “Industrial agriculture not only displaced and obscured earthly cycles, but ignored them” (Wallerstein 2000: 502). Material and biological cycles are displaced by commodities and money: “By linking and displacing local ecosystems, the modern world system obscured humans’ relations to the rest of nature. It created the first basis for human illusions about markets and money as the apparent basis of life” (ibid.: 502).

In summation, according to the world-system theory approach countries are, correspondingly to their relative position in the interstate system (core – periphery – semiperiphery), designated to be either provider or receptor of natural resources and in particular raw materials. Consequently, environmental costs related to extractive processes (cp. chapter 2.3.2) are externalised across the globe. The physical trade balance displays the physical involvement of a nation state in the international trading system. The necessary methodological and theoretical background for this tool is described in the following chapter.

2.2 The Physical Trade Balance

The physical trade balance (PTB) is one indicator of the economy-wide material flow analysis (MFA) that accounts for the physical interrelations between nation states. All materials entering and leaving the national economy's boundaries via trade are included and balanced in this indicator. In order to understand the PTB and its implications, the following sections will describe the theoretical foundation of MFA and the PTB.

2.2.1 The Concept of Social Metabolism

The concept of Material Flow Accounts and Analysis (MFA) is a method to quantify the metabolism of societies – mostly aggregated on a national level (Haberl et al. 2004: 205). The concept of social metabolism was developed by Marina Fischer-Kowalski, Helmut Haberl and colleagues from the Department of Social Ecology at the Institute for Interdisciplinary Studies of Austrian Universities (Fischer-Kowalski; Haberl 1998; Fischer-Kowalski 1998; Fischer-Kowalski; Haberl 2007), based on earlier work of Ayres and Kneese (1969). It combines basic elements from the humanities and natural sciences: „Essentially, metabolism is a biological concept which refers to the internal processes of a living organism. Organisms maintain a continuous flow of materials and energy with their environment to provide for their functioning, growth and reproduction. In an analogous way, social systems convert raw materials into manufactured products, services, and, finally, into wastes” (Fischer-Kowalski; Haberl 1998: 573 f.). The MFA is a tool to realise the physical interaction between society and nature. It is necessary understand society in the context of its material components. Society does not merely consist of cultural values, norms and beliefs. “The basic idea is that the economy is physically embedded into the environment, i.e. the economy is an open system with regard to matter and energy. [...] The aim [...] is to give an overall picture of the physical dimension of socio-economic systems” (Schandl 2002: 5). The economy-wide MFA accounts for the physical inputs and outputs of a society, expressed in metric tons.

The MFA considers all materials ranging from biomass, to fossil energy carriers, metals and non-metallic minerals, excluding water or air (Fischer-Kowalski et al. 2011: 859 f.), with the goal of creating a characteristic metabolic profile of a society. On one side, this metabolic profile contains all material inputs, either from domestic material extraction or from imports, to maintain the societal functions and to build up socio-economic stocks. On

the other side, physical outputs are accounted for, which appear in the form of exports as well as wastes and emissions. Both, inputs and outputs are flows crossing the system boundaries within one year. Within the societal system, materials are not only transformed to wastes and emissions but also put on (or released from) stocks. Following the mass balance principle, the physical inputs have to be equal to the physical outputs corrected by stock changes (Fischer-Kowalski; Haberl 1998: 574; Fischer-Kowalski et al. 2011: 859). “This idea of a mass balance is one of the most powerful features of the MFA approach” (Schandl et al. 2002: 11). Indirect flows from imports and exports are *not* included in a conventional economy-wide MFA. Though, the consideration of embodied flows would make a significant difference, as the comparison of domestic material consumption (DMC) and raw material consumption (RMC) shows (Bruckner et al. 2012).

But, while the highly aggregated form of material flows provides clear benefits for drawing comparisons and deriving indicators, the aggregation represents a loss in detailed information at the same time. Consequently, to interpret a characteristic metabolic profile concerning the caused environmental pressure it is not sufficient to mention solely the converted total mass quantity but also the quality of mass flows, like fossil energy carriers, materials from biomass etc. (Fischer-Kowalski et al. 2011: 856; Fischer-Kowalski; Haberl 1998: 574). Sustainability problems may occur at each stage of processing (Schandl 2002: 3): the material extraction from nature, the usage and conversion of materials within the societal system as well as the emission and production of wastes put pressure on the ecological systems. Therefore, it is of vital importance to distinguish between material flow qualities. For example, the use of so-called “renewable” resources involves quite different implications as compared to emissions and exhaustion as fossil energy carriers (Haberl et al. 2004: 205). Two main sustainability problems arise from social metabolism: On the input side resource scarcity may affect the execution of functions of societies as well as of ecosystems, and on the output side emissions might overuse ecosystem’s absorbing capacities and cause pollution etc. (Schandl 2002: 7; Fischer-Kowalski; Haberl 1998: 574).

2.2.2 The Physical Trade Balance in the MFA-framework

One highly important feature within MFA is the clear definition of system boundaries. There are two kinds of system boundaries: “The first is the boundary between the socioeconomic system – for example, a national economy – and the natural environment [...]. The second is the (political) frontier to other economies, with imports and exports as

input and output flows. Only flows that cross these system boundaries on the input side or the output side are accounted for” (Fischer-Kowalski et al. 2011: 859). The system boundary to the natural system is defined by the extraction of materials and the emission of wastes. The focus of this thesis is on the political system boundary. The physical trade balance (PTB) (cp. Figure 1 and chapter 2.2.3) is calculated as the subtraction of exports from imports. It is able to show the physical interstate relationships that add to materials domestically extracted and thus contribute, to partly very high degrees, to the overall material consumption. The following graph (Figure 1) exemplifies the main material flows of a nation state with a particular focus on the different system boundaries. The Physical Trade Balance is an indicator derived from MFA, calculated by subtracting exports from imports. It aims at accounting for the international physical exchange relationships and thus characterising whether a country is requiring physical inputs from other economies or whether it is providing resources to others. Consequently, imports were added to the domestic material consumption (DMC) and exports were subtracted.

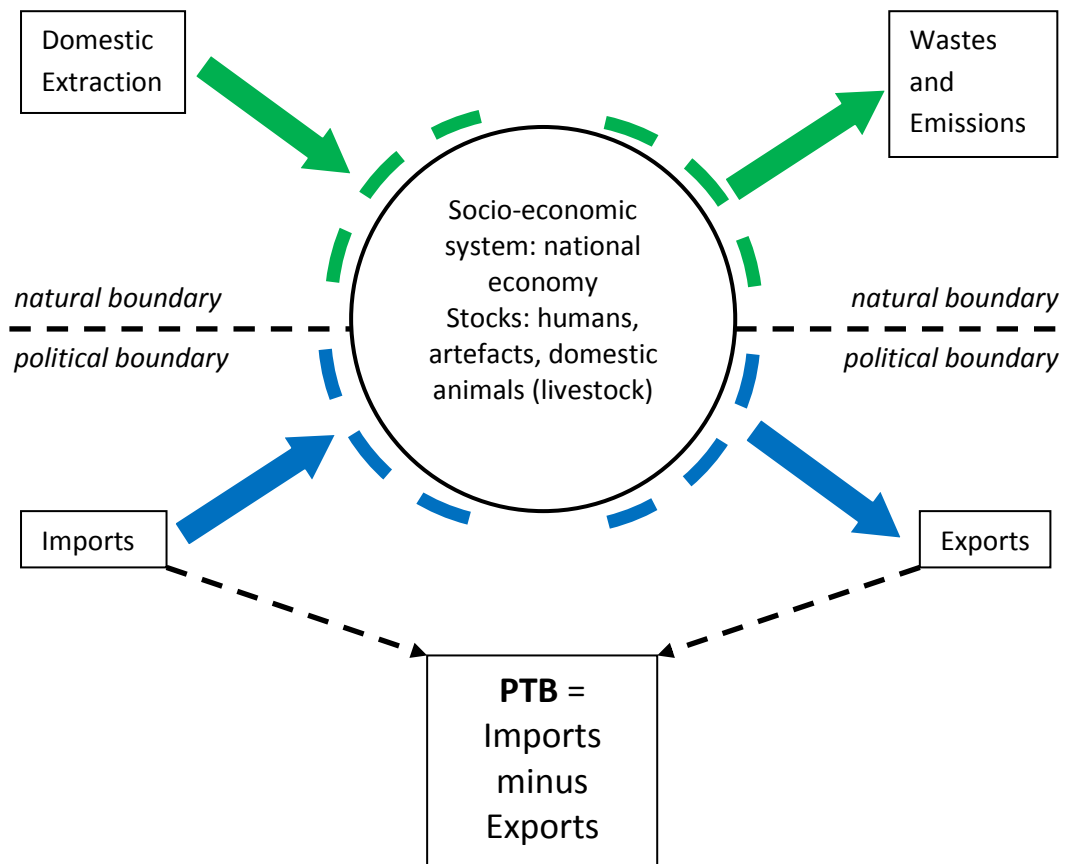


Figure 1_Socio-economic material flows and system boundaries.

Source: Own diagram; based on Schandl et al. 2002; Fischer-Kowalski et al. 2011.

Note: No indirect flows, unused extraction, nor air or water are included in this diagram.

As we have seen in the introducing chapters, many countries rely on international trade in order to meet their socio-economic needs for physical goods. Physical exchange relations across national boundaries are still on the rise and more relevant than ever (Dittrich; Bringezu 2010: 1840). “Adding the physical dimension of trade delivers information on world resource supply and demand, the scale of resource flows between country groups, and resource dependencies” (Fischer-Kowalski et al. 2011: 856). The PTB is able to indicate to what extent a country is either a net supplier or a net consumer of materials. Thereby, a negative PTB is often a sign for “underdevelopment”, respectively for peripheral countries. But this is not always true: the country’s surface area and population density as well as the availability of natural resources are further important indicators (Steinberger; Krausmann; Eisenmenger 2010; Dittrich; Bringezu 2010).

Hidden, indirect or embodied flows are another related hot topic in the debate. According to Fischer-Kowalski (2011: 861) “[d]irect flows refer to the actual mass of the material or product and thus do not consider accumulative material requirements along production chains. Indirect flows indicate all materials required along a production chain to manufacture a product.” This differentiation is important since “economically used flows don’t tell the whole story when it comes to evaluating society’s natural performance” (Schandl et al. 2002: 13). But in the case of trade related hidden flows methodological difficulties arise. The consistent estimation of all upstream material requirements of traded goods is a highly complex endeavour. Traded goods usually have long production chains that often are spread over several countries and trade between them: “The necessary raw material might have been extracted in a third country, and even the country that imports the final product might have been the domestic extractor of the preceding raw material” (Schandl et al. 2002: 13). Particularly for a finished product the accounting for all upstream material requirements is highly complicated. Considering the complex and still developing methods of upstream material requirements, the indicator PTB still provides a good approximation of the environmental pressure shifted between countries and for discussing unequal ecological exchange.

2.2.3 The Methodology of the PTB

As mentioned in chapter 1.3.2, the main data source was the United Nations’ UN-Comtrade database (United Nations Commodity Trade Statistics Database: <http://comtrade.un.org/db/>). Latin-American countries report their foreign trade data to the

UN-Comtrade rather regularly and consistently since 1962. Additional efforts to compile physical trade data were therefore manageable and full data sets could be derived. In case of missing or questionable data, supplementary information was achieved by cross-checking alternative databases such as the FAOSTAT or the IEA. The UN's Food and Agriculture Organization (FAO) (<http://faostat.fao.org/>) provides data for biomass. The database of the International Energy Agency (<http://www.iea.org/statistics/>) provides data for fossil energy carriers (Fischer-Kowalski et al. 2011: 867). In the case of missing or doubtful data where no supplementary data from other sources exist, two methods were used to estimate single missing data: first, missing data could be extrapolated when there is a linear trend by averaging the data of the adjacent years; second, physical data could be calculated by using the corresponding monetary value (USD) and an average price of the product group (Dittrich; Bringezu 2010). Finally, data sets could be compiled in time series for the years 1962 to 2011; for trade with core-countries also the year 2012 could be included.

The UN-Comtrade classification system used was SITC – Revision 1. The level of aggregation chosen was the AG3 (3 digit level). The allocation of traded product groups to the material categories was carried out according to the guidelines of the EUROSTAT (2012) MFA Compilation Guide. The reported material flows were classified in six material categories:

- (1) Biomass and biomass products;
- (2) Metal ores and concentrates, processed metals;
- (3) Non-metallic minerals primary and processed;
- (4) Fossil energy carriers, primary and processed;
- (5) Other products and
- (6) Waste im-/exported for final treatment and disposal.

Each material group (except category 5 and 6) consists of a number of subcategories. Additionally, each of these four categories includes one sub-category which subsumes products mainly from the respective material type that could not be allocated to one of the other specific sub-categories; e.g.: “Products mainly from non-metallic minerals” or “Products mainly from fossil energy carriers”. The remaining goods which could not be clearly allocated to one of the four major categories were summarised in (5) “Other products”. Imports were tabulated in Table B, exports in Table D (ibid.: 56 ff.). The PTB was derived by subtracting the main material groups of exports from imports. Accordingly, negative results indicate a country as a net-exporter of the particular material, and positive results as a net-importer.

Some important features should be noted: So called “transit goods” are not included in the PTB. “Transit goods are imports that are exported again without any processing occurring within the country and thus to which no value is added between import and re-export” (ibid.: 56). Furthermore, packaging is generally not included in the reported weight. First, trade statistics mostly report net weight; second, the weight of packaging material would be of negligible importance; and third, huge efforts would be required if packaging material would be estimated (ibid.: 60). Consequently, the EUROSTAT Task Force on MFA recommends “that no additional estimation of packaging material needs to be performed” (ibid.: 60).

2.3 Unequal Ecological Exchange

The following section introduces the basic ideas and assumptions of an unequal ecological exchange. The main author of reference is Alf Hornborg (1998; 2007; 2010; 2012), who is working, like others, on the precise definition and implementation of the concept for decades. In trying to identify unequal exchange apart from using normative-moral values, Hornborg assures that solely transdisciplinary approaches are able to cope with this issue (Hornborg 2012: 7, 103). These shall enable that physical properties like the flow of matter and energy, waste disposal or loss of biodiversity are taken into account. In this regard, Hornborg criticises the conventional economic studies of exchange which are not concerned with the biophysical aspects of production, transport or consumption (Hornborg 1998: 128; Hornborg 2007: 2).

Another founding father of unequal ecological exchange is Joan Martinez-Alier (1987; 2002; 2007). In accordance with Hornborg, he stresses the importance to complement the money-focused view with an ecological view on the economy: “It has produced the schools of ecological economics and industrial ecology, which look at the economy in terms of ‘social metabolism’” (Martinez-Alier 2007: 221). Both authors consider the second law of thermodynamics at the heart of the concept. This assertion becomes evident through the comparison of price and mass development in the value chain of a product. According to Joan Martinez-Alier “[t]he quantity of the final product [...] seems small in proportion to the gross quantity of potential product, but the losses at each stage are not accounted for in economic terms. The final product, in this perspective, is not ‘added value’ at all, but the value remaining from the energy and materials that were available at the beginning” (ibid.: 231). Applying the second law of thermodynamics indicates that in a production chain

entropy irreversibly augments whereas exergy decreases at the same time. Alf Hornborg identifies an inverse relation between productive potential and price, meaning that the loss of initial mass is accompanied by an increase in prices (Hornborg 1998: 129 ff.; Hornborg 2010: 40; Hornborg 2012: 105 f.): “Finished products must represent an increase in entropy compared to the resources from which they were produced, yet they must be priced higher” (Hornborg 2010: 40). Stephen G. Bunker put it in the following way: “Production involves the transformation of matter and energy, which can neither be created nor destroyed and whose transformation always creates entropy, or the loss of potential energy to kinetic energy or heat” (Bunker 2007: 239). This leads Hornborg to the conclusion that industrial centres (like industrialised countries or cities) gain ever more access to available energy from peripheries, since they sell less exergy at a higher price. “The more energy they have dissipated today, the more ‘new’ energy they will be able to buy – and dissipate – tomorrow” (ibid.: 40; Hornborg 2012: 106). On the contrary, the intensification of natural resource extraction will lead elsewhere to local resource exhaustion and ecological degradation (Hornborg 2010: 41). In this respect, Hornborg attributes modern technology a redistributive function of time and space in the world-system thus enabling unequal exchange (ibid.: 42). Dominant ways of representing development, growth or technological progress obscure asymmetric flows of resources (Hornborg 2012: 102).

However, monetary valuation seems to fail in documenting unequal ecological exchange. Hornborg suggests material flow accounting tools and explicitly biophysical trade balances as suitable indicators (Hornborg 2010: 41; Hornborg 2012: 107). Furthermore, he argues for a synthesis of world-system theory and ecological economics. This combination could form a sound theoretical basis being aware of thermodynamics as well as of imperialistic character traits of global physical exchanges (Hornborg 1998: 129).

2.3.1 Ecologising the World-System

Combining the world-system theory with findings of ecological economics is a useful and necessary step in order to grasp the complex issue of global unequal ecological exchange. Stephen G. Bunker claims (2007: 247) that in order to explain uneven development of extractive economies, it is not sufficient to mention labour costs or labour productivity, “because the exploitation of natural resources uses and destroys values that cannot be calculated merely in terms of labor or capital.” However, different myths and illusions, like national dematerialisation or ecological modernisation, could be contradicted

and revealed. According to Hornborg (2007: 9) in “the age of globalization, it should no longer be possible to imagine that a nation’s geographical extent, its economic activities, and its environmental impacts coincide.” In the evolution of the world-system core states are increasingly interested in exporting their environmental risks to other regions. As elaborated in chapter 2.1.3, the world-system theory approach has a rather critical view on “development”. Consequently, one nation’s affluence built on industry and technology may be the flip side of another nation’s environmental problems. Furthermore, people engaged in extractive sectors of affluent economies tend to be socially more protected than their counterparts in poorer regions (ibid.: 9 f.). Martinez-Alier (2007: 233) points out: “The center-periphery division does not only have monetary implications for the terms of trade, but also physical implications: southern regions typically provide material and energy so that the north can maintain and develop its socioeconomic metabolism.” The metabolic rates of industrialised core states are correspondingly “guaranteed by ecologically unequal exchange, deteriorating terms of trade for natural resources, and sometimes by military power. The deterioration of terms of trade means that an increasing quantity of primary exports is needed to obtain a given amount of imported goods” (ibid.: 233). It should be reviewed, if executions of structural adjustment programs sustain these terms of trade which enable unequal ecological exchange. Furthermore, Rice (2007: 1369 f.) suggests, that the hierarchical position in the world-system predicts the environmental space which is available for extracting resources, absorb wastes and emissions (sink capacity) – and this space does not need to be own sovereign territory. In that sense, acclaimed ecological modernisation achievements and ‘sustainable’ environmental policies in core states are often tempered by the theory and practice of unequal ecological exchange (cp. chapter 2.3).

Finally, to grasp the phenomenon of unequal ecological exchange fully and to treat emerging issues adequately, a transdisciplinary approach is indispensable. The idea of an ecological world-system theory may contribute to identify systematically unequal distributed patterns of appropriation of nature. In this regard, the recognition that national geographic extents, economic activities and environmental impacts do not coincide seems to be of vital importance.

2.3.2 Extractive and Productive Economies

Basically, the classification of nation states in an ecologically adjusted world-system theory approach happens according to their general mode of economic activities. One major

feature that separates countries into extractive or productive economies (Bunker 2003) is technology. The subsequent section aims to enlighten technology's self-inducing cycle of matter and energy flows across countries.

Hornborg (1998; 2012) and Bunker (2007) argue that technology has the power to induce unequal exchange across world regions. As technologies are designed to be most efficient on a large production scale, it has to be recognised that economies of scale are contributing significantly to the efficiency in industrial economies. Consequently, "new technologies can only achieve their intended results, though, by transforming more matter and energy into more commodities" (Bunker 2007: 240). This self-renewing cycle depends on and forms unequal ecological exchange at the same time. Hornborg expresses it in the following way: "Unequal exchange in the world system is what reproduces machines, and machines are what reproduce unequal exchange" (Hornborg 1998: 132). In this context Hornborg generally speaks of what he calls "machine fetishism" (Hornborg 2012). He considers modern technology as inherently exploitative. Through the exchange on world markets, technology is provided with ever increasing amounts of energy and material (Hornborg 1998: 133). More raw materials are needed, but additionally these materials are required to have specified physical or chemical characteristics.

The dynamics of scale function inversely in extractive and productive economies. The unit costs of production tend to fall at higher rates – whereas the unit costs of extraction increase at higher rates of extraction: "Extraction usually starts by appropriating the most accessible sources. Greater amounts of any extractive commodity can be obtained only by exploiting increasingly distant or difficult sources" (Bunker 2007: 241). A distinction between extractive and productive economies emerged. But, extractive and productive economies are (physically) mutually dependent: "Productive expansion can only occur, therefore, through the proliferation of extractive economies in geologically and climatologically distinct ecosystems dispersed at greater distances across broader space. In this sense the expansion of industrial production entails, as a physical necessity, the widening spatial and temporal separation of extraction and production" (ibid.: 240). Economies of scale make extractive economies highly unstable, since increasing extraction requires ever more input and stresses the environment and society likewise (ibid.: 242).

James Rice (2007) tries to summarise the differences among extractive and productive economies. According to Rice it "is not the extraction of natural resources and energy, per se, that promotes ecological unequal exchange but the social-organizational consequences this tends to produce between exporting and importing regions" (ibid.: 1371). For extractive

economies these social-organisational consequences mean an orientation towards the export of natural resources with the highest “comparative advantage”. Exports of those represent a loss of value that cannot be simply measured in terms of money or appropriation of surplus labour. In contrast, productive economies are characterized by an orientation towards a multitude of diverse production processes (ibid.: 1371 f.). “In tandem, productive economies gain flexibility and adaptability while extractive economies become increasingly rigid, inflexible and vulnerable to the shifting demands of global capital accumulation” (ibid.: 1372).

Extractive economies face different kinds of problems emerging from unequal exchange. For instance, a rigid and inflexible society is much more vulnerable and exposed to environmental burdens. Vice versa, a damaged environment makes a society more vulnerable and rigid (Martinez-Alier 2007: 234).

2.3.3 Unequal Distribution of Environmental Goods and Burdens

It seems more than evident that with unequal ecological exchange an unequal appropriation of natural resources would exist as well (Hornborg 2007: 1). There are two main problems which arise from unequal exchange and the distribution of environmental burdens: first, the distribution of environmental burdens are shifted through unequal exchange to peripheral regions; second, those peripheral regions find themselves, due to their socio-economic organisation as an extractive economy, in an ever more vulnerable position exposed to environmental burdens. This means that the most vulnerable regions and societies were exposed to the most severe environmental threats.

Stephen G. Bunker (2007: 239 f.) identifies the different time horizons of natural and social production as one major reason for increasing vulnerability: “Natural production, however, does not increase or diversify at the same rate as social production. Indeed, many particular material forms are naturally produced only within particular ecosystems in specific locations, and extraction usually leads to a depletion or reduction of natural products in these specific locations.” A depletion of natural stocks challenges the extractive economy (Dutch disease) as well as the maintenance of ecosystem services (carrying and absorbing capacities). Thereby it is useful to draw a distinction between local and global environmental risks (UNEP 2011). Local air or water pollution, habitat loss, land degradation are examples of local environmental burdens. The emission of greenhouse

gases has global effects, though adaptation possibilities and vulnerabilities are again uneven distributed.

In accordance, James Rice (2007) points out how this system of unequal appropriation and distribution is shaped by international terms of trade. In particular, he stresses the deepened continuum of asymmetrical power relations in the world-system: “International trade shapes the ability of dominant industrialized countries to obtain the carrying capacity of countries disadvantageously integrated into the global economy. [...] Such zero-sum dynamics complicate the pursuit of intra-generational equity underlying the concept of sustainable development” (ibid.: 1383). The displacement of environmental burdens will be part of the discussion in the final chapter 5.2.2 again.

3 Socio-Economic Development of Latin America

Considering the historical framework of Latin America is important to understand the region’s development and position in the world system. Furthermore, special historical features and backgrounds are of outstanding relevance to grasp the course of a PTB. The subsequent sections cover a wide period of time including the major historical events and developments, ranging from the age of colonisation, to independence, to debt crisis, to structural adjustment and to the modern ages of new extractivism. The article focuses on a narrow historical thread relevant to the discussion.

3.1 Historical Incorporation

Dependence and world-system theorists (Frank 1966; Wallerstein 1979) consider the emerging European colonialism of the 16th century as the beginning incorporation of Latin American into the world economy. Andre Gunder Frank argues, therefore, that the expansion of the world economy converted Latin American regions into export economies and incorporated them into the structure and development of the world capitalist system. The early 16th century marked the beginning of national and regional development of underdevelopment in Latin America (Frank 1966: 22). Cardoso and Helwege (1992: 24) present in their contribution about Latin America’s economy a brief chronology of the main historical periods: the colonial years ranging from 1500 to around 1810 were characterised by colonial plunder, mineral extraction and a *hacienda* production system. Revolutions and

wars of independence took place from 1810-1824 and were followed by the entry into the world economy as sovereign nation states. Henceforward, export-led growth implied a dependent and merely partly successful development of the national economies. Another characteristic feature of Latin American overall development is an “extremely unequal income distribution throughout the past 500 years” (ibid.: 23). The following two sub-chapters provide some reasons and further insights.

3.1.1 Colonialism – Extractivism

The predominant colonial power in Latin America was Spain and the first material of extractive interest was silver. The New World offered favourable conditions for exploiting silver mining: relatively rich deposits and comparable “cheap” labour power played a crucial role in reshaping the existing socio-ecological order. The gigantic volume of lead and later mercury, used for the extraction of silver, polluted rivers and streams – and affected the health of labour alike. Mining towns (such as Huancavelica or Potosí) were the first satellite production centres in a peripheral region that organised profoundly unequal ecological exchange between Latin American peripheries and European cores (Moore 2007: 124 ff.). Jason Moore writes: “Ecological wealth flowed from country to city in the New World, and thence from urban centers in the periphery to the core” (ibid.: 130).

Besides silver, sugar was another important product of early colonialism. The incipient agricultural exploitation of the continent led to a vital feature of colonial and post-colonial labour organisation in Latin America: a massive slave import system from West Africa emerged (McNeill 2007: 200 f.). In fact, colonialism exploited nature and humans in a very direct and obvious way. The scheme of unequal exchange described and used in the Dependence and World-System Theory seems to have its roots right in the beginning of contact and trade with the New World. However, today it is, compared to colonial times, much more obscure. The Spanish crown, as the major ruler in the early phase, accumulated gold and silver through trade with the colonists. They acted through direct rule, prohibiting the colonies to trade with other European countries or between ports in Latin America (Cardoso; Helwege 1992: 26). In doing so, the Spanish crown ensured maximum profit levels and deprived its colonies of establishing alternative trade and production structures.

According to Bruce R. Scott (2011: 185), Europeans colonised Latin America earlier than North America due to the facts mentioned above: reports of gold and silver deposits and the promising areas for the cultivation of sugar cane, especially in North-western Brazil

and the Caribbean, attracted early colonists: “While the Spanish initially focused on precious metals, the Portuguese were also interested in opportunities to make money through agriculture” (ibid.: 197). In the mid-seventeenth century cocoa, tobacco, hides, cotton or indigo became additional agricultural goods of interest. Furthermore, the Spanish predominance suffered from the emergence of Britain and France. While the growth rates in Spanish America slowed down, Brazilian extraction could be raised. In Portuguese controlled Brazil gold and diamonds were discovered later than in most other colonies in the late 17th and early 18th centuries (Cardoso; Helwege 1992: 28 ff.). The Portuguese adopted similar rules as Spain did, and they attempted to monopolise the export industries: “Trade was confined to Portuguese ports, except that direct slave trade with Africa was permitted” (ibid.: 30). Such trading embargoes were quite harmful for the colonised export-economies. They could neither benefit from specialisation in production nor from regional different resource endowments, since they were not allowed to trade with other colonies. Additionally, the missing access to other European markets than Spain or Portugal respectively, hampered their development as many products were not easily sold to the Iberian Peninsula (ibid.: 32). In general, pathways (and positions in the world economy) adopted in colonial times were difficult to abandon again. This is especially true for extractive and export-oriented economical structures. James Mahoney (2010: 203) puts it in the following way: “Colonialism not only helped to create the countries of Spanish America; it also sorted them into different positions in the world hierarchy of development. And once these positions were occupied, most countries did not achieve significant improvements or suffer major setbacks in their relative standing.” However, Latin American countries could enforce their national autonomy relative early – compared to African or Asian countries.

3.1.2 Decolonisation and Independence

After around 300 years of colonial occupation, outstanding events happening in Western Europe pushed for revolutions and struggles for independence in Latin America. The first revolution took place in Haiti in 1791 and spread soon to other colonies. French ruled Haiti took advantage and inspiration from the outcomes of the French Revolution. Whereas Spanish dominated colonies took the opportunity to declare independence when Napoleon invaded Spain in 1808. Disastrous civil wars and wars against the Spanish army were the consequences (McNeill 2007: 210 f.; Rodríguez 1998). After being conquered by

Napoleon's forces the Spanish Crown was not able to provide justification for taxes and trade constraints any more. In addition, the idea of self-rule had become an important political ideal among Latin American intellectuals. Consequently, most former Spanish colonies secured their independence in the early 1820s. For instance, Argentina declared autonomy from Spain in 1810 and fought its war of independence until 1816. Bolivia waged war against Spain from 1809 to 1825, whereas Brazil was not forced to conquer its colonial power Portugal to achieve independence. Brazil could declare its sovereignty in 1822 due to declining influential power of the Portuguese Crown (Cardoso; Helwege 1992: 37 ff.; Weaver 2000: 40 ff.; Bulmer-Thomas 1994: 19). But even Brazil, which dissociated from Portugal without major struggles, was faced with post-independence territorial-boundary disputes, especially with Argentina. As a result, Uruguay was formed as a buffer state between Argentina and Brazil in 1828 (Bulmer-Thomas 1994: 20). Moreover, slavery was not abolished in all countries immediately after independence. For example, Brazil abolished slavery not until 1888 (Scott 2011: 214; Bulmer-Thomas 1994: 30).

However, the extractive and export-oriented newly independent economies neither abandoned their characteristic pathways nor declined their incorporation intensity into the world economy. Wallerstein argues that Latin American countries "had to be decolonized in order to mobilize productive potential in a way that had never been achieved in the colonial era" (Wallerstein 1979: 32). British merchants were among the first who tried to take advantage of the newly opened economies. But British traders were selling more of their manufactured goods than buying raw materials from Latin America. To obtain input materials they could still draw on their own colonies on other continents (Weaver 2000: 44 f.). Nevertheless, the emerging Industrial Revolution in Europe and North America and the increasing industrial output required more and more raw material input. Latin America, therefore, was to serve as a region providing the necessary resource inputs and to act as a purchaser of industrial manufactured goods. "[T]he new nations were forced into the world markets as exporters of primary products and importers of manufactured goods" (ibid.: 46). For instance, the growing industrial production in Europe and North America demanded vast quantities of copper, which were imported especially from Chile – a major trade link today. In spite of increasing agricultural exports, the main basis of the export economy for many countries remained mining until the second half of the 18th century (Bulmer-Thomas 1994: 34 f.). Basically, export booms in the 19th century were not lacking, but economic growth remained unsatisfactory. Latin America became increasingly integrated as a peripheral region to support the growth rate of industrial output in the core (Cardoso;

Helwege 1992: 40 ff.). According to this, Mahoney (2010: 204) finds that “particular export commodities and other geographically driven endowments have not fundamentally reorganized the countries of this region.” And Wallerstein even concludes that the independence of Latin American countries did nothing to change their peripheral status (Wallerstein 1979: 27).

But there is another major feature, besides the core-supporting export structures, Latin American economies adopted from colonial rule. The domestic unequal appropriation of land holdings and the uneven distribution of incomes and wealth are aspects that still shape modern economic structures (Scott 2011: 211), thus enabling even more economic patterns mainly serving for export reasons. Former political elites often preferred a post-colonial system “that left the basic power structures unaffected” (Bulmer-Thomas 1994: 31). This may also be an explanation for why Latin American countries are so poorly ranked in the worldwide GINI-ranking order of today (UNDP 2013).

This section aimed to reconstruct Latin America’s position in the world-economy from a historical point of view. This was done very briefly, but the basic ideas of why and how economic structures developed as they can be observed today should have become comprehensible. Subsequently, a great narrative leap forward is made from national independence to the mid-20th century in the following section.

3.2 Post-World War II Development

Most development theories define industrialisation and industrial growth as key features of a successful national “development”. This is also true for the World System Theory as well as the Dependence Theory. The main way to climb up in the world-system hierarchy is to manufacture goods on a higher value chain; that is via industrialisation. Latin American countries tried to reach this goal for a long period in the 20th century through an import substituting industrialisation (ISI). The traditional export-led growth model was abandoned to a high degree. The inward-looking ISI-model of national development was implemented already in the 1930s in response to the Great Depression. After some more or less successful decades, the ISI-model started to lose preference in the late 1960s and 1970s. Finally, the Latin American Debt Crisis in the 1980s marked a turning point in the strategic development orientation of many countries. International organisations from the World Bank group, like the International Monetary Fund (IMF), became more and more

influential. The 1980s in Latin America are widely known as the so-called Lost Decade. A new era of export-led growth was ushered in (Bulmer-Thomas 1994).

3.2.1 Development Strategies

Since their independence Latin American countries followed, to a large extent, similar development approaches. Differences arose, of course, due to resource endowments, different responses to external stimuli, or population and country size etc. Especially from a world-system perspective Latin American countries often appear as similar positioned. For example, primary commodities are still an important unifying element of Latin American exports. According to Bulmer-Thomas (1994: 8) they “still accounted for two-thirds of all exports at the end of the 1980s.”

However, a shared common target was also more independence of international volatilities and demands deriving from an erratic world-economy. The Great Depression from the 1930s and the Second World War provided enough stimuli to abandon the export-led development strategy. The new pathway was formulated as industrialisation via import substitution (*ibid.*: 9). Mainly the larger republics “turned away from export-led growth toward inward-looking development based on import substituting industrialization (ISI)” (*ibid.*: 17). After the Second World War export pessimistic intellectual work and theoretical justification was provided by the CEPAL (Economic Commission for Latin America and the Caribbean, ECLAC – since 1948). Even though the IMF, which was founded in 1944, recommended outward-looking policies, the CEPAL defended effectively inward-looking strategies (*ibid.*: 264 f.; 276). Bruce R. Scott (2011: 337) defined ISI as “an economic strategy that aims to accelerate economic growth and industrialization by substituting domestic production for existing imports and by forestalling future imports as demand grows.” Common implemented tools were import quotas and tariffs, overvalued exchange rates, and direct government investment in key industries (Scott 2011: 337; Cardoso; Helwege 1992: 90). Though, sectors like agriculture were systematically disadvantaged by domestic regulations, the ISI-model achieved partly significant successes in its main target: industrial growth. “The rates of Latin American industrial growth during the period were unprecedented and at least in good part attributable to the ISI policies. Between 1950 and the mid-1970s, the rate of manufacturing growth in Latin America as a whole averaged 6.9 percent a year” (Weaver 2000: 129). But the ISI-model faced more and more the serious dilemma of producing inefficiently.

The main problem was that though industrial growth took place, it has not been very efficient. Tariff-protected companies produced relatively expensive and low-quality goods for the domestic market. First, most firms were unable to compete on the international market. Second, the domestic market was often too small and represented too little purchasing power in order to profit from the economies of scale factor. These shortcomings had to be balanced by increasing state interventions (Bulmer-Thomas 1994: 10 f.; 283). “The high cost of industrial production made it difficult for manufactured goods to enter into international trade. The problem was compounded by the overvaluation of exchange rates and by the export pessimism surrounding policy throughout the 1950s” (ibid.: 283). The obstacle of inefficient production and the resulting lack of exports, coupled with the need for specific imports, resulted in chronic balance-of-payments deficits (ibid.: 285). Finally, a mix of unintended side effects of ISI such as increasing domestic prices, inflation, small domestic markets, the declining exports, and an overvalued currency brought down the inward-looking model of development (Scott 2011: 339). The intent to provide a training ground for (infant) industries faced two major problems: first, the disadvantage of small home markets was not fully appreciated (ibid.: 351); and second, too little attention was paid to foreign trade imbalances. Consequently, local companies failed to become competitive on the global market (Cardoso; Helwege 1992: 79 f.). Though successful in its main target, the ISI strategy failed to account for negative side effects and broader circumstances.

Accordingly, the ISI strategic orientation came to a serious downward swing. The late 1960s marked the beginning of a broad turn away from inward-looking development. As a consequence of the ISI failures, Latin American governments depended ever more on foreign loans from foreign private banks and multinational creditors like the IMF and World Bank. Important changes in the world economy, like the collapse of the Bretton Woods System in 1971 or the oil crises in 1973 and 1978/9, urged Latin America to change its attitude toward more openness. After the second oil crisis Latin American exports slowed down again and could not compensate for the rising debt services (Bulmer-Thomas 1994: 18; 323 ff.; 363 ff.). In the end, the exuberantly increasing debts and debt services compelled Latin American countries to abandon their chosen pathway and enter into a new age of export-led growth.

3.2.2 Latin American Debt Crisis

In 1982 Latin America slid into a severe debt crisis. Debts accumulated in the past decades to maintain the failing ISI. Debts services, domestic capital flight and a deteriorating development of the terms of trade soon confronted Latin American governments with enormous fiscal problems (Weaver 2000: 169 ff.). In the following section, financial reasons for the debt crisis and the course of this disastrous period are described.

In August 1982 the Mexican government declared national insolvency due to overburdened external debt services (Bulmer-Thomas 1994: 366). This declaration is widely seen as the beginning of the continent-wide debt crisis. Internal and external reasons have to be taken into consideration. The failures of ISI described in the previous section shall, for now, sufficiently explain internal causes. External sources range from the oil crisis, to the ‘recycling’ of petrodollars, and up to the raising of interest rates for development loans. The Organisation of Petroleum Exporting Countries (OPEC) doubled the price of oil in the 1970s. The increasing revenues in these countries were partly spent and partly deposited as so-called petrodollars in international banks, “largely in the USA and Germany” (Wallerstein 2000: 254). These huge amounts posed a problem to the banks, since their profits “depend on their being able to lend funds at higher interest rates than they pay depositors” (Weaver 2000: 172). Attractive lending opportunities were found in developing nations of Africa, Asia and Latin America (Cardoso; Helwege 1992: 116; Weaver 2000: 172). The phenomenon of cheap loans to the developing world began in the 1970s. The governments of Latin America, suffering from payment difficulties, appreciated the aggressively offered loans from international banks (Devlin; French-Davis 1995: 117). “These countries borrowed extensively, but then found it difficult to repay the loans, which thus cumulated until debt payments rose to intolerable levels” (Wallerstein 2000: 254). In the 1970s loans from private banks were the rule. The IMF played a minor role. The private lending banks paid little attention to the creditworthiness and made excess accumulation of debts possible. But at the end of the 1970s and beginning 1980s, the USA and other OECD countries shifted to tighter monetary policies, and they dramatically raised interest rates (Cardoso; Helwege 1992: 116). For example, the principal weapon of Ronald Reagan’s, elected president of the USA in 1980, anti-inflation arsenal was to double the interest rates on loans (Weaver 2000: 173). This measure posed a serious problem for debtors and a turning point in the international loan business.

Looking back, accumulating debts in the 1960s and 1970s was short-sighted and built on unsustainable growth, since the projects were mostly financed by and depended on foreign loans (Devlin; Ffrench-Davis 1995: 117; Scott 2011: 349). “In effect, debtors fell into the trap of taking the easy way out of their flagging inward-looking development strategy by boosting their spending capacity [...] through use of external bank loans” (Devlin; Ffrench-Davis 1995: 117). But the outbreak of the crisis prevented further private bank loans to Latin America. The time for the IMF has come. The debt crisis was an opportunity for the IMF to become a major player in the international financial matters again. The IMF organised the creditors into a coherent group and led the negotiations with the debtor nations (Weaver 2000: 176). “This put the IMF in an excellent position to apply maximum pressure on behalf of the creditor banks. [...] As the chief collection agent, the IMF negotiated directly with Latin American governments as debtors” (ibid.: 176). In the negotiations, two confronting views clashed in opposition to each other: The IMF represented the orthodox view from the centre, arguing that there is a trade gap due to inadequate adjustment to the international division of labour deriving from import substitution and failed export lines. On the other hand, the orthodox view from Latin America argued “that the trade gap itself is the result of the turning of the terms of trade against the periphery by the centre, in order to restore its profit margin and pass on the cost of higher oil prices” (FitzGerald 1985: 452). However, the negotiated adjustments are content of the subsequent section.

Indeed, the terms of trade for most Latin American export products deteriorated in the 1980s. The volume of exports was rising, but the value of exports stayed virtually unchanged (Bulmer-Thomas 1994: 380). This means that although export rates increased, the record-breaking interest rates could not be compensated. Consequently, the debts kept rising though the 1980s and early 1990s (Weaver 2000: 175 f.). Furthermore, imports were suppressed in order to fulfil adjustment requirements (Bulmer-Thomas 1994: 380). Latin America faced the dilemma of negative net resource transfers from 1982 to 1990 even though the IMF granted loans. This means that the sum of external debt services (interest and principal payments) exceeded the amount of new loans. Domestic capital flight and deteriorated terms of trade intensified fiscal problems (Devlin; Ffrench-Davis 1995: 118). The negative net resource transfer persisted until 1991 when it turned positive again. “Debt service ratios had improved, and capital flight was in reverse in many countries” (Bulmer-Thomas 1994: 377).

However, Latin America has entered the age of neo-liberalism (Wallerstein 2000). The countries were susceptible to IMF requirements, whose loans were conditional on austerity policies, a smaller state and other neo-liberal economic measures like promoting free trade and export. The emerging consensus among creditors became what is known as the Washington Consensus (Weaver 2000: 133; Bulmer-Thomas 1994: 366; 371). Devlin and French-Davis (1995: 118 f.) stated later an abrupt macroeconomic over-adjustment whose loser was social equity and distributive equality. The majority of the republics had to carry out far-reaching adjustment and reform programs that were far from being painless (Bulmer-Thomas 1994: 366). Frederick Weaver (2000: 133) writes that struggles “with the IMF were endemic in the post war period.” Linking together structural adjustment, the IMF and the Washington Consensus shall enlighten the development of the Lost Decade in the following chapters.

3.3 Structural Adjustment

The 1980s were in Latin America a decade of structural adjustment towards a new export-led growth model. In response to several adjustment and stabilization programs and forced by rising debts the republics finally prioritised export promotion. Even the intellectual climate turned in favour of free-market economics. Consequently, trade was liberalised, financial markets were deregulated and public enterprises were privatised. Especially by the mid-1980s important policy changes took place in a number of republics (Bulmer-Thomas 1994: 366 ff.). “As the decade came to a close, more and more republics opted for the new outward-looking strategy based on export led-growth” (ibid.: 383). These adjustments were part of the conditionality of IMF loans. “Because the rescheduling of debt was generally possible only if a country had signed an agreement with the IMF, the Fund found itself playing a key role in the design and implementation of the first wave of stabilization programs in the 1980s” (ibid.: 393). In terms of growth, this first wave of adjustment programs was not very successful. Structural adjustment programs by the IMF demanded a smaller state, meaning deregulation, liberalisation of imports, privatisation and less public expenditure etc. But inflation accelerated in most republics after 1981. In Bolivia and Argentina, like in many other countries, hyperinflation was recorded for several years. However, due to the adoption of an orthodox stabilization program, Bolivia could stop the hyperinflation in 1985. Wages were frozen, the fiscal system completely reformed and the market liberalised for foreign exchange. Though the economy stagnated over the coming

years and the prospects for real growth did not improve. The external adjustment was neither completed nor was the fiscal position fully resolved (Bulmer-Thomas 1994: 394 ff.; Cardoso; Helwege 1992: 169 ff.).

Yet this example was one of a few successful operated programs to stop inflation in the 1980s: “[S]tabilization programs in Argentina, Brazil, Nicaragua, and Peru have clearly failed” (Cardoso; Helwege 1992: 171). Moreover, in practice the followed adjustment policies were not necessarily homogenous. Some republics still tried to avoid liberalising policies. Argentina and Brazil, for example, followed heterodox plans (in opposition to the orthodox programs launched by the IMF). But inflation remained a severe problem in these countries and external accounts cannot be fixed without addressing inflation. Nevertheless, almost all economies became more outward looking and the ratio of exports to GDP increased steadily (Bulmer-Thomas 1994: 397; Cardoso; Helwege 1992: 169; 173).

In short, most orthodox programs aimed at one or more of the following core objectives:

- A smaller role for government;
- Stable prices through slower monetary growth;
- Greater efficiency and competitiveness by bringing prices into line with costs;
- Balance of payments stabilization through promotion of exports and foreign investment (Cardoso; Helwege 1992: 176).

Furthermore, “the purpose of devaluation is to set the economy in the direction of greater export orientation over the long run” (ibid.: 174). The protectionist structures of ISI were a thorn in the neo-liberal institutions’ side and, therefore, had to be abolished wherever possible. The institutions that set the directions were the World Bank and the IMF in particular. They “used the leverage provided by conditionality to push the debtor countries in the direction of trade liberalization” (Bulmer-Thomas 1994: 383). Their hope for a catching-up development through the inward-looking model was destroyed. Domestic markets became exposed to world market forces – erratic forces, especially in terms of trade.

3.3.1 Washington Consensus

The political consensus and transnational policy paradigm (Babb 2013), from an orthodox perspective, for adjustment and stabilisation was found in Washington, D.C. and accordingly called the Washington Consensus. John Williams identified in 1990 a set of ten

policies as a consensus among the top decision-makers at the IMF, World Bank, Inter-American Development Bank and the US Executive (ibid: 270). He named them the Washington Consensus, which was based upon the broad theory that stabilisation and liberalisation would lead to increased economic stability. The consensus originally contained the following ten points:

- Fiscal discipline
- Reorientation of public expenditures
- Tax reform
- Financial liberalisation
- Unified and competitive exchange rates
- Trade liberalisation
- Openness to foreign direct investment
- Privatisation
- Deregulation
- Secure property rights

(Scott 2011: 357 f.).

Accordingly to the agreed points and under the influence of the Washington Consensus and coercive pressures from powerful organisations, Latin American countries, like other developing countries in Africa or Asia, had to privatise formerly state-owned industries, abolish trade barriers and decrease public interventions in their economies in general (Babb 2013: 268; 273). This was the practice of conditionality: “making loans to governments in exchange for policy reforms” (ibid.: 269). The same scheme was applied like a universalistic medicine for all debtor countries irrespective of their national peculiarities. The most powerful and influential organisations in this respect were, again, undoubtedly the World Bank and the IMF, both located in Washington D.C. Conditional lending was the key feature of influence towards the goal of market-liberalising reforms in developing countries. Although the World Bank traditionally offered loans for tangible infrastructure projects like bridges, highways or dams, since 1980 the Bank’s newly launched ‘structural adjustment facility’ offered loans for balance-of-payments support in exchange for policy reforms. These structural adjustment loans aimed at changing the underlying structures of an economy to promote free trade and export, and to actually open up the developing countries to global market forces. Contrary to single definable projects, these lending forms target whole country plans for the national economy (ibid.: 270; 274 ff.).

Sarah Babb further argues, that the Washington Consensus was made possible, on the one hand, by a shift in thinking among US policymakers about how the provision of loans could be used to serve US American economic interests, and on the other hand, by the debt crisis, which had put many developing countries in a poor bargaining position. However,

exposure to conditionality was unevenly distributed among countries. Governments with stable currencies and without debt problems had little exposure to the Washington Consensus. For example, from 1986 to 2000 China had one single policy-based loan with the IMF and one with the World Bank. India had one IMF and four World Bank policy-based loans during the same period. Contrary to countries from Latin America: Argentina had seven IMF and 19 World Bank policy-based loans and Brazil three IMF and five World Bank arrangements of the same kind. Though it is noteworthy that Brazil's engagement with conditionality seems to have been milder than of other Latin American countries during the same period (ibid.: 277 f.). Victor Bulmer-Thomas (1994: 270) points out: "The new international economic order therefore benefited primarily the developed countries."

Even though there was clear external pressure to conform to conditionality, Latin American governments often resisted particular aspects or even the entire package: "Therefore, actual implementation was uneven across space and time, but the extent to which important parts of the program and its ideology were effected is deeply impressive. The range and depth of neoliberal reform in Latin America surpassed the magnitude of the reform that the United States was willing to inflict upon itself" (Weaver 2000: 179). At the beginning of the 1990s all of the Latin American republics had implemented some kind of policy reform (Wallerstein 2000: 406). The leading and most powerful international organisation in this regard, the IMF, and its distinctive adjustment programs are content of the subsequent section.

3.3.2 The International Monetary Fund

The International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (World Bank) were both found at the Bretton Woods Conference in 1944. The intent was to establish new international financial institutions that safeguard the operations of the international trade and exchange system. Additionally, the General Agreement on Tariffs and Trade (GATT) was found three years later in 1947. The GATT served as a forum to negotiate multilateral reductions in tariffs and quotas. In general, the responsibility of the Bretton Woods institutions was to police nations with balance-of-payments deficits. Their prime recipes were deflationary domestic policies to lower domestic incomes and wages, and subsequently to lower the domestic demand for imports and the prices of exports (Weaver 2000: 104 f.). In terms of domination, the USA had clear advantages over the other members: "Since the Soviet Union ultimately chose to join

neither the IMF nor the World Bank, the United States and its allies and clients have had little trouble dominating both institutions, where voting power is proportional to the quota each nation paid into the institutions” (ibid.: 105). The quotas and other regulations and conditions of the IMF are examined further below. Immanuel Wallerstein (2000: 251) considers the establishment of these new institutions as clever moves by the US-administration to implement a relatively stable world order according to their favoured conception. The USA was in a unique position to dictate terms at the conference. The ability of Latin American states to influence the final outcome was minimal (Bulmer-Thomas 1994: 266). The political foundations of this order solidified the management of the 1980s debt crisis: “Debt management empowered the multilateral financial institutions, especially the IMF, which joined with the World Bank in establishing a distinctive form of politicized market rule” (McMichael 2000: 681). Philip McMichael (ibid.: 681) gives two reasons for why the new system was politicized: first, SAPs are directed at debtor states and their citizens, rather than the banks holding their debt; second, adjustments were not simply economic, they were profoundly political in reorganising state structures and policies. He viewed the new order as “a form of financial colonialism”, for which currency devaluation is a prime example (ibid.: 682). The IMF became the main organiser of international debt agreements in the 1980s and changed its role as a source of finance to the role as adviser and negotiator (Cardoso; Helwege 1992: 172). The Fund developed different programs – a “lending toolkit” (IMF 2013b) – that helped to fulfil this new role.

The rest of this sub-chapter serves to elucidate some important features of IMF lending, including relevant lending options and conditionality in fund-supported programs. In doing so, it is possible to get a rough understanding on how the IMF could establish and maintain strong influential power on debtor countries. Reliable sources are therefore represented by diverse IMF factsheets. For instance, member countries are able to request resources from the IMF under a lending “arrangement”, which may stipulate specific economic policies a country has agreed to implement. These policies are formulated in a “Letter of Intent”, which has to be approved by the Fund’s Executive Board in advance (IMF 2013a: 1 f.). Accordingly, the “Letter of Intent” contains the conditionality in fund-supported programs – a link between the Fund’s financing and the implementation of the specified elements that is regarded by the IMF as a “salient aspect” of the Fund’s involvement. The Fund ensures successive tranches of financing only if the key policies are on track. Since the 1980s the scope of conditionality has expanded, and by the 1990s almost all programs included some

elements of structural conditionality (IMF 2001a). According to the IMF, conditionality is justified as follows:

When a country borrows from the IMF, its government agrees to adjust its economic policies to overcome the problems that led it to seek financial aid from the international community. These loan conditions also serve to ensure that the country will be able to repay the Fund so that the resources can be made available to other members in need (IMF 2013b: 1).

The Fund provides some tools, like program reviews, to assess periodically whether the supported programs are on track or if “modifications are necessary for achieving the program’s objectives” (ibid.: 1). One major objective inherent in almost all Fund-supported programs has been trade liberalisation. It plays a key role in the Fund’s argumentation: “trade liberalization both depends upon and contributes to a credible and consistent macroeconomic policy framework” (IMF 2001b). Only those who comply with the Fund’s instructions obtain access to loans. According to the IMF, transition away from inward-looking policies of import substitution has been most evident in Latin America and Central and Eastern Europe (ibid.). However, the possible loan amount is connected to the quota of a country. Quota subscriptions are the main component of the Fund’s financial resources. They are broadly based on the member country’s relative position in the world economy and regulate the financial commitment to the IMF, lending from the Fund as well as its voting power (IMF 2013c; Weaver 2000: 104).

Finally, three Fund-supported programs applied in Argentina, Bolivia or Brazil are exemplified below. These are the Poverty Reduction and Growth Facility (PRGF) in Bolivia, the IMF’s Extended Fund Facility (EFF) in Argentina and the Stand-by Agreement (SBA) in all three of them. The PRGF (IMF 2009) can only be granted to low-income countries. The PRGF-programs are framed in so called Poverty Reduction Strategy Papers (PRSPs) and belong to the concessional facilities, implying that favourable terms, like lower interest rates, are stipulated. The SBA programs are the most commonly used non-concessional lending facilities. All member countries facing external financing needs are eligible for SBAs (IMF 2013d). “Rates are non-concessional, although they are almost always lower than what countries would pay to raise financing from private markets” (ibid.: 1). SBAs are mostly used by middle income countries, since low income countries are eligible to non-concessional loans. SBAs have a relative short payback time, compared to other programs, that typically covers a period of 12-24 months (cp ibid.). The EFF provides a longer repayment period of between 4½-10 years. This program shall be applied in case of serious medium-term balance of payments problems (IMF 2013e). Commitments

to the IMF are expected to have a strong focus on structural reforms. However, it shall be noted that the IMF reacted in recent years to continuous criticism with modified programs that shall give more flexibility to the debtor countries.

3.3.3 The Lost Decade

The section on Latin America's Lost Decade provides some qualitative insights about how debt crisis and ensuing structural adjustment affected the socio-economic development. In a sense, it is a narrative step forward from analysing how the region's position in the world economy evolved to the socio-ecological consequences emerging from the fostered kind of development.

As indicated previously, the republics of Latin America moved especially during the 1980s and beginning 1990s toward more orthodox policies of trade liberalisation, implying export promotion. Furthermore, the geographical concentration of exports destination increased still further. The USA as the major target country of Latin American export products gained even more importance. But the composition of exports remained a source of concern. Much of the increased export-value came either from traditional exports or non-traditional natural resources, like copper or coal. In general the region's export remained heavily on primary products. Furthermore, the manufacturing sector declined again in absolute and relative importance in almost all republics (Bulmer-Thomas 1994: 384 ff.).

Nevertheless, export-led growth was far from being the only grave structural adjustment; even focus is laid on this phenomenon in order to grasp international socio-ecological interconnectedness. The debt crisis and the rising debt services in particular, forced the republics to increase exports quickly, to cut down imports and to privatise public companies and sectors. Additionally, inflation had to be countered by tax reforms, the cutting down of wages or freezing prices. Especially the target to reduce inflation to a modest level often failed in the first run. Stagflation – a combination of recession and inflation – became characteristic for many countries. Accordingly, the adjustment programs were difficult and painful for Latin American states – what articulated in deep recessions (ibid.: 387 f.; 398 ff.).

One particularly painful condition imposed by the IMF was currency devaluation. This measure had severe effects on the state and society: “Devaluation compresses real earnings, as domestic prices of food staples, essential drugs, fuel and public services inflate. Governments are then constrained to pursue anti-inflationary programs, shrinking the state

through reduction of public expenditure including social programs” (McMichael 2000: 682). In terms of decreasing inflation, the first wave of IMF-supported programs during the 1980s was definitely unsuccessful. The same is true for Fund-supported programs from the 1950s onwards to the mid-1980s in regard to social tensions: “IMF programs hurt income distribution, exacerbated social tensions, and made no improvement in the inflation and growth fundamentals” (Cardoso; Helwege 1992: 177).

The social sphere, which cannot be reflected adequately in the thesis, accounted for huge parts of the Lost Decade. How domestic socio-political factors, like the uneven acquisition of land and income within a country, or differences between privatised or nationalised economic sectors, affect the international socio-ecological performance, e.g. in terms of distribution of environmental goods and burdens, remains an open question. However, the decade of the 1980s brought about fundamental changes in Latin America. The hope for a real catching-up to developed nations through a more independent inward-looking development model was abandoned by the imposition of a neo-liberal model that, at least implicitly, favours unequal ecological exchange and the re-implementation of extractive economies.

3.4 New Extractivism

After two decades of conforming to neo-liberal demands, the beginning of the new millennium marked a broad turning point in Latin America towards a post-neo-liberal and post-Washington Consensus policy. A shift to leftist parties took place in many countries. Recent studies (Hogenboom 2012; Veltmeyer 2013) suggest that though political change occurred, the structures of the extractive economy were not abandoned – quite the contrary was the case. Newly elected leftists, like Chávez in Venezuela, Morales in Bolivia, or Lula da Silva in Brazil, aimed to reduce poverty in their countries, but in doing so they mostly relied on the exports of natural resources, wherefore the term of New Extractivism emerged.

Large segments of the population were highly frustrated by neoliberalisation: “Since the 1990s there has been an increasing incidence of local protests against large private mining and oil projects, in particular those employed by multinational corporations” (Hogenboom 2012: 140). There was increasing popular resentment against foreign companies that were making huge profits while exploiting workers and polluting the environment. In general, the leftist governments, in contrast to foregoing neoliberal regimes, aimed at a more prominent role of the state in the governance of natural resources. The civil society often claimed to

raise the state's control and public sector's share in the extraction of natural gas, oil or metals. After centuries of (colonial) exploitation and plunder, Latin America is still rich in mineral and fossil resources. The region is the world leading source of metals, such as iron ore, copper, gold, bauxite, nickel, silver or zinc. Countries such as Venezuela, Mexico, Brazil or Ecuador also hold huge oil reserves. Although the manufacturing and service sector have expanded, the export of oil, gas, metals and agricultural products remains the main source of growth and wealth. In 2009 primary products still accounted for 39 percent of the region's export (cp. *ibid.*: 134 ff.).

Even though post-neoliberal oriented governments made some achievements in alleviating poverty and enforcing social programs, they still relied to large extents on the exports of natural, and often non-renewable, resources. One major reason for this ongoing development, that prevented a break in the dependency on exports of raw materials, is unquestionable the rise of China as a global industrial power. The twenty-first century opened with a booming demand for energy and non-renewable natural resources like minerals, metals or fossils. The terms of trade moved strongly in favour of exporting raw materials like copper, tin, oil, but also agricultural products like soy, wheat, corn and sugarcane. However, the so called China-Effect (worldwide growing resource prices due to the increasing demand) was of even greater importance for Latin America than the direct effects of increasing exports to China, even though China has turned into the world's largest importer of iron ore and other products. As the main export destination of Brazil, Chile, and Peru, and the second for countries like Argentina and Venezuela, China became the new major export destination for all resource-rich Latin American countries. The People's Republic also invested massively in Brazil or Argentina (*ibid.*: 142 f.). Consequently, post-neoliberal regimes of Latin America have coincided with a commodity boom towards increasing resource extraction – the new extractivism evolved as a post-Washington Consensus, more socially inclusive and equitable form of development (Veltmeyer 2013: 79; 83). However, an “index of real average wages in the formal sector of the labour market in Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela shows some discouraging results” (*ibid.*: 83).

To illustrate this point, the new extractivism is applied across different regime types in Latin America. Irrespective of whether the policy regime may be described as clearly neoliberal (Colombia, Mexico), post-neoliberal (Argentina, Brazil, Chile) or radical populist and resource nationalist (Bolivia, Ecuador, Venezuela), the policy dynamics show an equal reliance on natural resource extraction, foreign direct investment (FDI) and primary

commodities exportation – it is a coincidence of interests (ibid.: 83 f.). Therefore, policies of deregulation or liberalisation have often been abolished, at least to some extent, but policies of promoting resource extraction for export reasons have been taken over from the Washington Consensus. Post-neoliberal regimes argue in an orthodox way that extractive industries based on FDIs generate jobs, a trickle-down effect and fiscal resources for public benefits and altogether an inclusive growth and development. “In the context of a continuing strong global demand for energy, industrial minerals and metals, agro-food products and other commodities, these regimes are committed to a reliance on FDI and the development of the natural resource industry, as well as primary commodity exports” (ibid.: 87). Summarised, the hope for national development is set again on the extraction and exportation of natural resources. For instance, governments in Brazil and Argentina could reimburse their remaining IMF debts before deadlines ended.

There still remain many debates, social tensions and conflicts on extractive industries. Leftist governments, like Morales in Bolivia, have reacted almost as negatively to some of the local struggles for the protection of land, water, and biodiversity as other centrist governments. Indigenous groups and local communities, who are primarily affected by environmental injustice due to mining or oil extraction, often do not find their new presidents open to their concerns (Hogenboom 2012: 150 ff.). Furthermore, Veltmeyer (2013: 88) notes that in case of conflicts governments in Argentina, Brazil and Bolivia tend to take the side of the foreign mining companies against local communities.

Apparently, Latin America was not able to overcome its role as a supplier of natural resources in the world economy. Rising domestic resistance is, therefore, likely to continue. The following contribution contains the actual empirical investigation. It is the main part of this thesis and will be carried out according to the procedures illustrated in chapter 2.2. The outcomes will be embedded with regard to the theoretical findings as well as to the country’s historical specific features.

4 Country Analysis

The country specific analysis will be organised in the following way: After a short general introduction to the development and structural adjustment of the chosen countries each of them is presented in an own chapter. Every section is structured according to the same scheme. First, the socio-economic system of the last decades will be described very concisely and with a focus on macroeconomics, in particular trade policies. Second, the

structural reforms from the 1980s and 1990s implemented in the respective country will be presented and examined. Third, the PTB and the PTB calculated only with the core countries are presented and embedded in the contemporary history. Fourth, further analysis related to the PTB, like export shares to the core, are carried out and merged with the foregoing results to possibly increase the significance of the findings. To complete, the three country chapters will be concluded and followed by a comparative chapter that draws further comparisons about the PTBs per capita, monetary values of physical trade relations or material intensities of trade.

The findings of chapter 3 suggest a rough classification of development phases in Latin America: from the end of the World War II to the 1970s an inward-looking-model of ISI was predominant in most countries. Severe crisis of the 1970s and early 1980s mixed with diverse internal and external deteriorating conditions and shocks produced the lost decade of the 1980s. The 1990s can roughly be summarised as a phase of neoliberal adjustment. And around the turn of the millennium new forces favoured the emergence of a new extractive period.

During the whole period, from the 1950s onwards, numerous liberalisation programs were applied to Latin America. And even partial success involved high social as well as socio-ecological costs (Cardoso; Helwege 1992: 179). Latin American countries were systematically brought in a position where they heavily rely on the export of primary products. In this regard Harriet Friedmann (2000) provides an overview of the evolution and spreading of the Green Revolution and how the application of hybrid seeds in combination with industrial chemicals changed the conditions of agroecologies. In the case of Latin America the clearing of tropical rainforests on a massive scale to create surfaces for agriculture and cattle grazing was the most apparent change. Local consequences often have been soil depletion and water pollution. Additionally, the clearing of tropical rainforests threatens the biodiversity in the most complex ecosystem on earth and often involves displacement of indigenous people.

However, the local and global consequences of increasingly intensive colonised ecosystems cannot be treated in an adequate manner in this contribution. Emphasis is laid on the material flows generated from domestic extraction that are internationally traded. The suspicion is that different development regimes and policy orientations respectively imply diverse intensities of international involvement in physical trade. Therefore, the history of changing foreign policy orientation can be regarded as different approaches to improve the relative position in the world system. At least approaches of ISI had the clear

target of a catching-up development. It was no coincidence that the subsequent development directions were, in terms of an independent development, less ambitious and sought for solutions through an outward-oriented export model of development, which, in fact, merely reinforced their peripheral position in the world system.

During the outbreak of the Latin American debt crisis in 1982, Argentina, Bolivia and Brazil were reined by military governments. But soon after the outbreak of the crisis, military governments had to retreat and allowed democratic elections. Hernán Siles Zuazo was re-elected president of Bolivia in 1982. Argentina elected Raúl Alfonsín president in 1983 and José Sarney won the elections of Brazil in 1985. These representatives, elected right after the debt crisis, were not all too enthusiastic about adhering to the Washington Consensus and responded to the debt crisis by policies more in line with ISI than with structural adjustment. Their efforts included a limit of debt payments, the protection of social programs and governmental control of prices, wages and exchange rates to contain inflation. However, these ambitions were not effective and faced varying difficulties ranging from weak export prices and unmanageable fiscal deficits to continuing Washington Consensus hostility. Their failures were marked by massive inflation as we shall see in the upcoming chapters. As a consequence, this led to a second wave of presidents and policies. For example, Carlos Menem became president of Argentina in 1989; Victor Paz Estenssoro was re-elected for the third presidency of Bolivia in 1985; and Collor de Mello succeeded José Sarney as president of Brazil in 1990. This wave of presidents either succumbed to Washington Consensus pressure (Menem) or was elected on candidly neoliberal platforms (Paz, Collor de Mello) (Weaver 2000: 184; 201). To sum up, neoliberal structural adjustment did not take place immediately after the outbreak of the debt crisis. In the first instance, the military governments had to retreat. The subsequent democratic elected presidents tried to withstand the crisis through adhering to policies of ISI rather than structural adjustment. But the resistance had to be given up sooner or later in the second half of the 1980s. The newly elected presidents complied much more with the requirements of the international lenders and, in doing so, gave rise to the Fund's influence.

Key objectives of the IMF (2005a) have always been stabilisation, growth and structural reform. Furthermore, structural reforms often included reforms in the area of external trade, capital account liberalisation, tax reforms, privatisation and labour market reforms. Especially trade liberalisation was an area of considerable progress during the early 1990s, though financial openness exceeds trade openness and the latter is still described as relatively low. A number of countries, including Argentina, Bolivia and Brazil implemented

trade reforms abruptly beginning with the second wave of presidents in the mid-1980s and late 1980s. Trade reforms involved the reduction of tariff rates as key components. Furthermore, most republics, including Argentina, Bolivia and Brazil (all in 1995), joined the WTO (formerly GATT) during this period. Another area of concern was fiscal and monetary stability, in particular inflation. Argentina, Bolivia and Brazil as well as other Latin American countries experienced periods of hyperinflation during the 1980s. Therefore, inflation control was one essential element of the reform programs. Some countries, like Argentina and Bolivia, tried to prevent inflation through an outreaching dollarization of their own currency. Bolivia hold large deposits in USD and Argentina guaranteed full convertibility between dollars and pesos in the period from 1991 to 2002, when the system finally collapsed. In contrast, Brazil prohibited holdings of foreign currency deposits for non-transactions purposes. On the one hand dollarization can help to prevent domestic capital flight; on the other hand it limits the scope for an independent monetary policy (ibid.).

But in general, these measures did not succeed in reducing poverty or income inequality, whereas financial sector reforms had even negative effects on household levels. The authors of an IMF review paper on Latin American experience with stabilisation and reform since the early 1990s conclude: “Looking back, it is clear that the structural reform agenda was too narrow in scope and comprehensiveness” (ibid.: 17). The IMF (2006) had to admit that social key objectives, like income poverty, had not come down as predicted and income inequality further increased in some countries. Moreover, the relative income gap to high-income countries – to the core –has also failed to narrow down. All this happened in spite of significant structural reforms in the late 1980s and early 1990s (ibid.: 3 f.).

The PTBs are considered to illustrate the implication of these structural changes on the bio-physical interrelation to the core and other (semi-)peripheral regions. The PTBs add a biophysical perspective to the mostly socio-economic led discussions of development. Moreover, the increasing importance of exports can be shown in physical terms and this enriches monetary trade data interpretations.

4.1 Argentina

Argentina followed inflationary finance policies in the 1960s after increased external imbalances and risen expectations of the growing working class. In 1976, a military induced coup has overthrown the regime of Isabel Perón. At this time Argentina faced hyperinflation

and the major priority of the new regime was to stabilise prices. But the budget deficit increased due to deteriorating terms of trade, rising domestic capital flight and growing external interest payments. When Alfonsín came to power in 1983 the inflation rate was up to 600 percent (Cardoso; Helwege 1992: 184 f.).

In the course of structural adjustment Argentina privatised important industries on a large scale (IMF 2006: 18). New opened mines are exempted from all taxes for the first five years. Though contemporary Argentina is an example of a post-neoliberal state committed to an economic model that promises a more equitable distribution of wealth (Veltmeyer 2013: 87). The following two sub-chapters provide an overview of the macroeconomic development of Argentina during the past decades, which is of relevance for the subsequent PTB figures.

4.1.1 Socio-Economic System

Argentina is the second largest country of Latin America. Its population rose steadily and nearly doubled in the last decades from over 21 million inhabitants in 1962 to over 41 million inhabitants in 2012 (World Bank 2013). The following figures (Figure 2) show the development of two important macroeconomic indices. On the one hand, Argentina experienced, like many other countries of Latin America times of high and times of hyperinflation. Since 1975 and during the whole Lost Decade of the 1980s the inflation rate was only once (in 1986) below 100 % and reached unprecedented heights in 1989 and 1990 of over 3.000 % to over 2.000 % respectively. Moreover, taking the GDP growth rate as supplementary information into account, periods of stagflation can be defined – and again, the Lost Decade lives up to its name. The inflation rate could be reduced to low levels by orthodox measures in the 1990s, whereas the GDP rate of the early 2000s indicates the crisis of the neoliberal system. The post-neoliberal regime of Kirchner could restore growth rates and led Argentina to one of the highest GDPs per capita of contemporary Latin America.

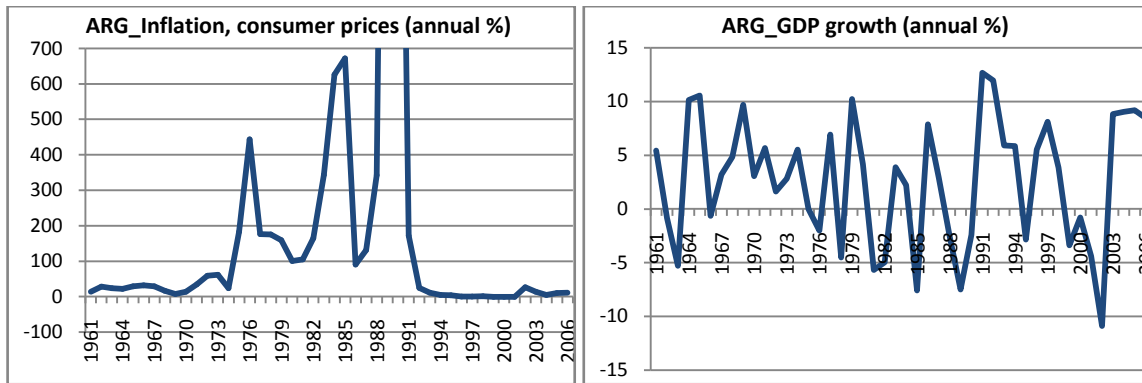


Figure 2_Inflation in Argentina, in percent of annual consumer prices, 1961-2006 (left); and Gross Domestic Product growth of Argentina, in percent per annum, 1961-2006 (right).

Source: Own illustrations; based on World Bank 2013.

Note: Annual inflation amounted to 3.080 % in 1989 and to 2.314 % in 1990.

Argentina was ruled by a military government since 1966. After the oil shock in 1973, which hit the Argentine economy profoundly and reinforced social tensions, the military saw no alternative than to permit the return of the aged General Perón, who governed the country already between 1946 and 1955. But Juan Perón died during his second presidentship and his wife Isabel Perón took over presidency in 1974. However, her leadership did not endure for a long time. The coup of 1976 brought the military back to power. At first the overthrow was widely appreciated, but what followed was not. Between 1976 and 1983, when Alfonsín became president, many Argentines were killed by the repressive military and even more were jailed and tortured. This violent period came to an end when Argentina lost the war against England over the Falkland Islands in 1983. This happening diminished the military's authority significantly (Kingstone 2012: 220).

As already mentioned President Alfonsín, who was elected in 1983, largely insisted upon ISI policies. Towards the end of Alfonsín's legislative term Argentina opened its economy slowly with considerable pressure from multilateral organisations. But not until Carlos Menem took over presidency, neoliberal economic reforms were implemented to a larger extent to reduce public influence and enhance the role of markets in the economy (ibid.: 228). However, the country's opening was accompanied by a commercial expansion that was dominated by exports of low value-added agricultural and energy products. Furthermore, it is important to note that export growth in the early 1990s was primarily due to enhanced regional trading; in particular Brazil became an important trading partner. Though, trade liberalisation was not the only neoliberal measure undertaken by Menem. Already in his first year as president, he enacted laws to privatise state-owned companies. In addition, fiscal and administrative barriers to competition were removed across sectors (Pastor; Wise 1999). Menem simply followed the recipe disseminated by the IMF and the

World Bank: reduce state spending, eliminate state interventions in the economy and open up the economy to foreign competition. Practically this often meant programs of austerity and capitalist restructuring. Moreover, the principal contribution to a surge in exports came from agriculture, where a transformation (may also be called Green Revolution) via agrochemicals, hybrid seeds and mechanisation took place (Romero 2002).

After a decade of adhering to neoliberal doctrines Argentina witnessed a crisis of remarkable severity in 2001 (IMF 2004). According to Wylde (2012) the country faced the largest debt default the world had ever seen; after ten years the dollar-peso-currency exchange regime had to be abandoned. Subsequently the peso underwent devaluation and the GDP-rate fell in the course of the crisis. The state repressed social protests which broke out all over Argentina. But the country recovered in economic and social terms. Since 2003 the GDP growth rate and exports increased again and the unemployment rate fell. A factor that contributed to growing exports was unquestionable the rise in global commodity prices. The world economy steadily expanded and demanded, therefore, more and more external inputs. In particular, China and India's increasing importance in world demand created favourable terms of trade for Argentina's export economy. With growing revenues from exportation, Argentina was able to repay the loans of the IMF before date of expiry. Néstor Kirchner, who was elected president in 2003, became known as a tough negotiator in agreements of debt rescheduling with the IMF and other external creditors. As a result the Fund's influence over Argentinean economic policy decreased to a historical low level. Indeed, domestic economy could be decoupled from external creditor's influence, but Argentina could not get independent from low-price agricultural commodities (ibid.).

4.1.2 Structural Adjustment

This section shall enlighten the role of the IMF in Argentina and the implemented structural adjustment programs. Argentina joined the IMF in 1956 and had eleven arrangements with the Fund since 1984. The last stand-by agreement expired in 2006 and today there are no outstanding amounts any more. Most of the lending facilities were stand-by agreements. In the period from 1984 to 2006 each arrangement expired after an average of two years and every second year a new treaty was signed, meaning that there was no single year without obligations to the Fund (www.imf.org).

The most visible structural adjustment to fulfil the Fund's requirements was probably the broad program of economic deregulation and trade liberalisation announced by President

Carlos Menem in 1991. Furthermore, the privatisation of state-owned companies, like the sale of the state oil company, were authorised by law in 1992. Basically, the country should be opened to international competition of foreign firms. Therefore, two basic laws were passed by Congress: The Law of Reform of the State, and the Economic Emergency Law. The first authorised privatisation and liquidation of public enterprises; the second should promote the improvement of public finances and structural reforms.

In addition, the Convertibility Law of 1991 pegged the Argentine peso to the USD. It was the response to the high inflation and brought the rate down to moderate levels in the subsequent years. However, the exchange rate arrangement was only a part of a larger Convertibility Plan. The plan further included a broader agenda of market-oriented structural reforms: service sectors were deregulated, foreign trade was liberalised, price-fixing schemes were removed, and privatisation proceeded on large scales in different sectors. Tariff reductions promoted exports, in particular to member countries of the MERCOSUR like Brazil, which is still the largest trading partner in terms of both export and import. Nevertheless, the convertibility regime had to be abandoned, mostly due to external shocks, which included a weakening of demand in major trading partners, a fall in commodity prices, or the strengthening of the USD. Thus, the GDP growth rate fell and the economy never recovered throughout the end of the convertibility regime. Before that date, the IMF provided exceptional financial support to Argentina, in form of an extended fund facility and a supplemental reserve facility. But market confidence did not recover as expected and consequently the convertibility regime was formally replaced in January 2002 (IMF 2004).

To sum up, Argentina long resisted the pressure from international creditors to open up its economy. But there was a dramatic shift in policy when Menem came to power. Under his presidency Argentina complied extensively with the demands of orthodox forces (which were, of course, not only international ones). The inflation rate could be reduced considerably, whereas the GDP growth rate was still unsteady and finally ended in another crisis. However, the interesting point is that the crisis of the 1980s changed the development of the PTB significantly (including far reaching re-structural programs), while the crisis of the late 1990s did nothing to change the progress – as the next chapter shows. It seems that Argentina's economy was restructured deeply in a way that it responds to international demand with the supply of commodities that comply to the “locational advantage”.

4.1.3 Physical Trade Balance

The PTB shows the direct material flows traded across the national borders. It is calculated as the sum of imports in a material category minus the sum of exports in the same category. The differences are represented in the PTB as material specific bars. In doing so, five items remain that either appear as positive or negative bars. If a bar lies below the zero-line more tons are exported than imported in the respective material category. The contrary is true when the bar appears above the zero-line. Consequently, if a bar lies above the zero-line does not mean that the country did not export any commodities from the respective material category. This merely indicates that the import mass was larger than the corresponding export mass – and vice versa. In short, only the differences, i.e. net-trade, but not the total mass traded are shown. To comprehend the totality of physical trade, the import and export graphs are part of the appendix (A2).

In the case of Argentina the different policy orientations can be retraced very soundly by the major changes in the PTB (Figure 3). From 1962 to the late 1970s the PTB suggests low international trading intensity, which is characteristic for an inward-looking policy orientation. The PTB was more or less balanced and the import and export tables show relatively low physical trade intensities. During the Lost Decade of the 1980s the PTB turned slowly negative, mostly due to shrinking imports. In general, Argentina has always been a net exporter of biomass. The largest shares within the biomass export category formed primary crops, in particular cereals and oil bearing crops. Argentina mainly acts as a net importer of iron ores (from Brazil). Furthermore, until the beginning of the 1990s, the country was a net importer of fossil fuels, mainly petroleum. From the outgoing 1990s onwards Argentina's PTB turned more and more negative. It remained a net importer of ores and minerals, but the net-exportation of biomass products as well as fossil fuels increased significantly. Since then Argentina acted as a net exporter of fossil fuels, particularly petroleum and natural gas. Additionally, the exportation of cereals and fodder crops augmented steadily during the last two decades. In short, the opening of the economy turned the PTB of Argentina appreciably negative. For example, the average net-export in the 1970s was on average more than 5 million tons per annum, during the 1990s more than 38 million tons were net-exported on average p.a., and the 2000s brought about an annual average of more than 70 million tons p.a.

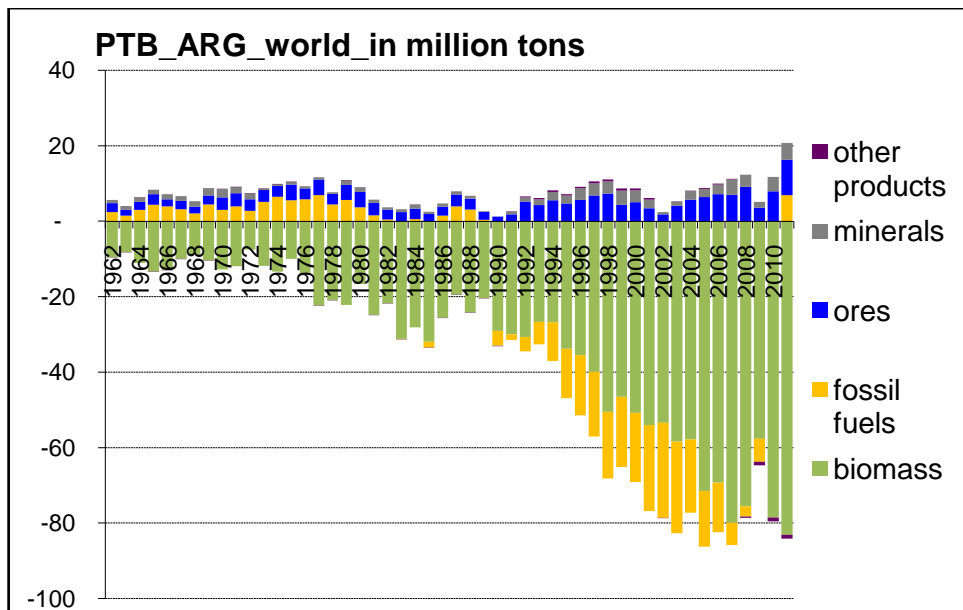


Figure 3 Physical Trade Balance of Argentina, in million tons, 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

To set the PTB in relation to the domestic extraction (DE) the database from SERI and Dittrich (2012) was used. A graph showing the DE of Argentina from 1980 to 2010 is to be found in the appendix (A2.1). The DE increased in these three decades from approximately 438 million tons in 1980 to over 636 million tons in 2010. The vast majority of approximately two thirds over the period consisted of biomass extraction. Accordingly, domestic biomass extraction increased steadily, but not in the pace as the export of biomass commodities did: in 1980 the export of biomass made up about one tenth of the extracted biomass, 30 years later the same relation intensified to around one fifth; meaning that one fifth of the domestic extracted biomass was exported in 2010 – mainly primary and fodder crops like soybeans, maize and wheat.

To show the physical exchange system with the core states in particular, Figure 5 presents the PTB of Argentina with the core states. The trade with the core states is, of course, also included in Figure 3, the global PTB. Associated import and export graphs are again to be found in the appendix (A2.1). The PTB with the core states has been negative for the whole period and probably ever since, but therefore the relative deterioration in the 1990s and 2000s was not that remarkable. The main material category of exportation is again biomass. While Argentina was a net importer of all other material categories for nearly all years until the 1980s, the bars above the zero-line nearly diminished in the decades that followed and Argentina became a net exporter of fossil fuels too. Moreover, the beginning of the 1990s marked a further deepening of the unequal exchange that reached new heights in the 2000s. Despite this development, the last three years may mark

the beginning of an opposing trend, as relatively less tons were exported and more were imported. However, the PTB with the core states is still very negative, but the development trend is not more unequal as it is reported by the total world-related PTB.

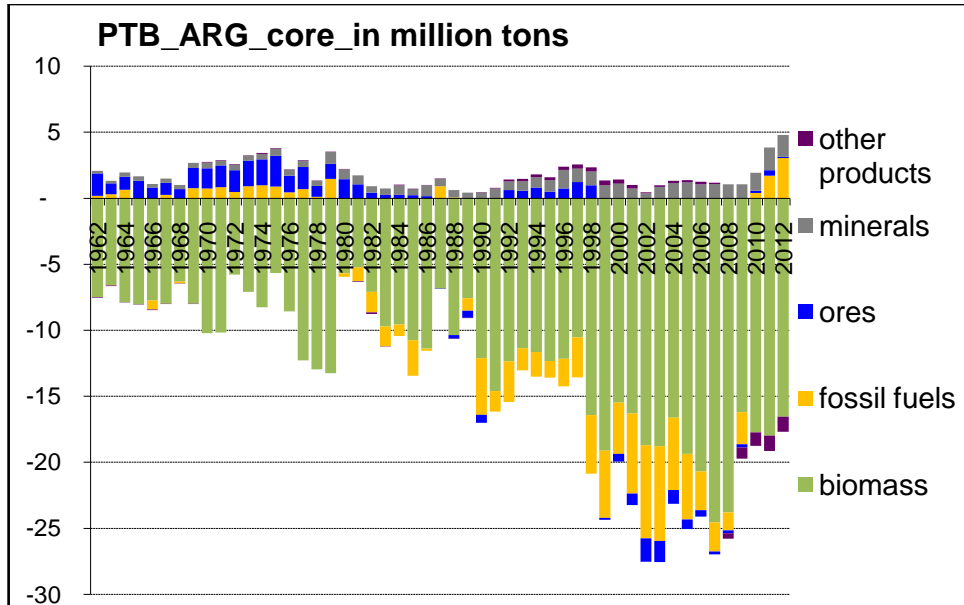


Figure 4. Physical Trade Balance of Argentina with core states, in million tons, 1962-2012. Source: Own calculation; based on UN-Comtrade database 2013.

4.1.4 Analysis

The aim of this chapter is to carry out further analyses related to Argentina's PTB. Since it is rather difficult to derive exact figures from the PTB illustration on how many shares exports or imports respectively represent, the following Figure 5 shows the share of exports of total trade (that is imports plus exports). The remaining percent represent the import share. The constant line of Figure 5 indicates the export share of trade with the world as trading partner, whereas the dotted line shows the export share of trade with solely the core states as trading partners. It is clearly shown that Argentina's trade consists, in terms of physical quantities, to a vast majority of exports. The share of exports in core-trade reached unprecedented heights of over 90 % in 1990 and 2002, meaning that Argentina exported nine to ten times more tons to the core than it imported from the core respectively. An average export-share-rate of 78 % indicates that Argentina exported during the examined period approximately 3.5 times more physical quantities to than it imported from the core.

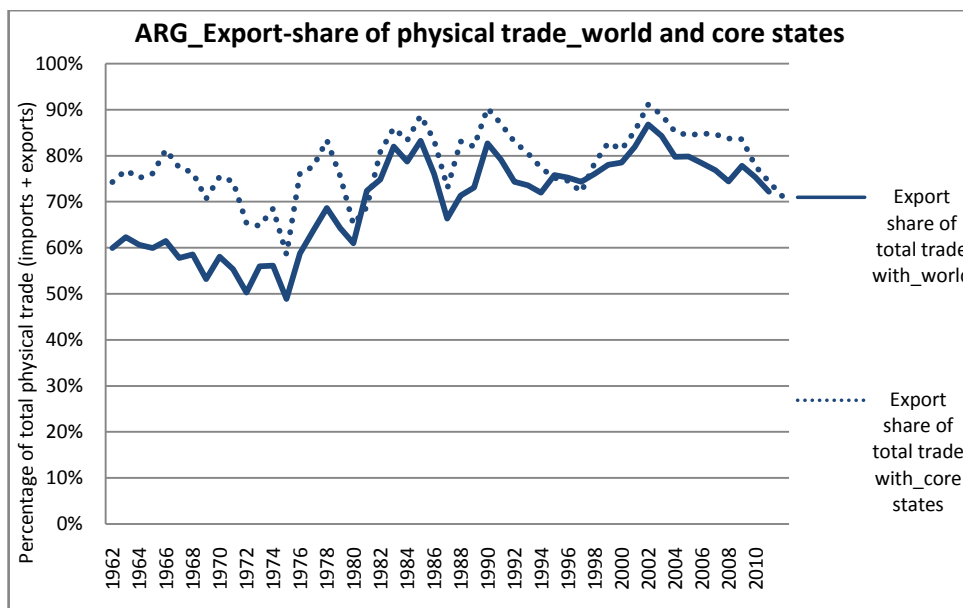


Figure 5_Export-Share of Argentina's physical trade (imports + exports); trading partners: world, 1962-2011; and core states, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

In general, trade with the whole world is less unequal, even though the export share was only once below the 50 % line (in 1975 the export share amounted to 49 %). During the whole period, Argentina exported on an average 2.3 times more tons to its trading partners than it imported, that is an average export share of 70 %. Taken the whole represented period into account again, both lines show similar trends: the crisis of the 1970s and the early 1980s led to an increase in exports or a decrease in imports respectively. The decade of the 1990s mark a slight but steady increase in export shares, whereas the early 2000s represent a declining trend.

In sum, the export sector is clearly emphasised in Argentina. But how relevant is the trade with the core? To answer this question, the following Figure 6 should provide some insights. It represents the trade shares with core states from the total exports and imports respectively (based on physical quantities). Taking into consideration that the core states make up only a small proportion of the world's population, export shares of more than 70 % to the core during the 1960s and early 1970s are remarkable, particularly as solely direct trade flows are included. Furthermore, none of the surrounding Latin American countries is defined as a core state and, therefore, exports had to make long ways to other continents. The main export partners of the core are the USA and countries of the EU (like the Netherlands, Spain, Germany and Italy).

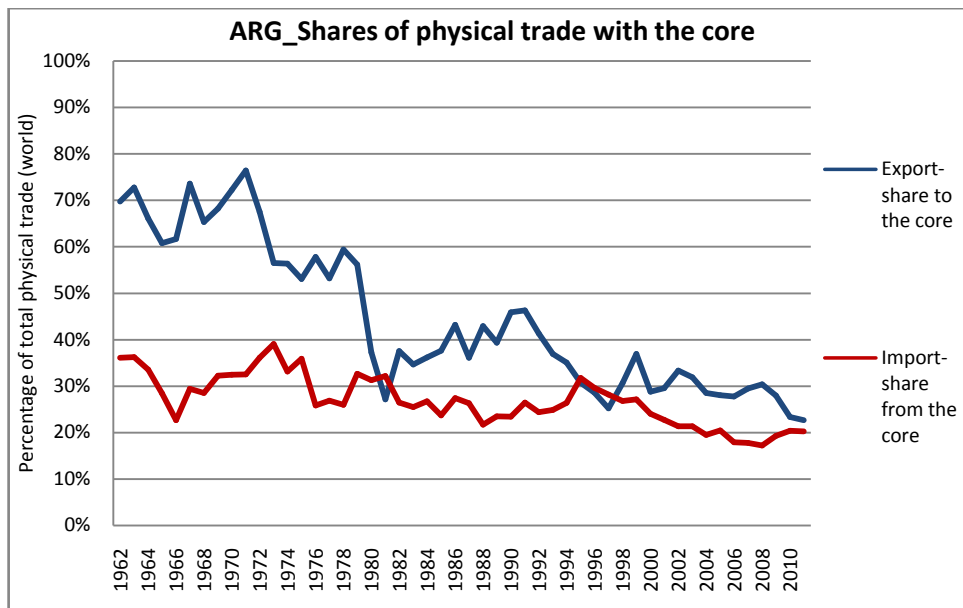


Figure 6_Argentina's shares of physical trade with the core states, in percentage of total trade (world), 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

However, the ratio declined significantly in the course of the Latin American debt crisis, and since then never reached the 50 % line again, indicating that Argentina's main export markets were not to be found in the core any more. The 1990s generally brought a steady decline, and finally the export share to the core laid just slightly above 20 % in 2011. On the other hand, the import share from the core has never been above 40 % and decreased from an all-time peak of 39 % in 1973 to 20 % in 2011. Taken together, the trade with the core steadily decreased in relevance. In fact, even the opening of the country's economy in the 1990s and the new extractivism of the 2000s did nothing to intensify the trade relation with the core – on the contrary. The emergence of other economies outside the traditional core and intensified trade with surrounding countries (MERCOSUR) are among the possible explanations for this development.

4.2 Bolivia

Regarding bygone macroeconomic orientation and development, the Plurinational State of Bolivia is widely comparable with its neighbouring countries. Inward-looking orientation has a long history. For instance, the important tin industry was nationalised in 1952, whereas incentives for the export sector were entirely ignored. Consequently, export earnings crippled, national debts accumulated and inflation was on the rise (Bulmer-Thomas 1994).

What followed was the repeating story of austerity and liberalising measures. Under pressure from international lenders, Bolivia executed reforms of inflation control, privatisation, liberalisation of trade and financial systems as well as other fiscal and monetary measures, particularly since 1985. The reforms promised growth and a competitive economy. However, Bolivia was long ruled by military governments, which reigned and implemented reforms in an authoritative way. This was not the case in the 1980s when democratic elections took place. By now, lower-income groups and indigenous people could not be ignored any more. Therefore, leftist political and economic movements emerged in the course of the Lost Decade and of structural adjustment in the 1990s. Accordingly, the current president Juan Evo Morales Ayma personifies the post-neoliberal and anti-Washington Consensus stance of contemporary Bolivia (Ascher; Mirovitskaya 2012).

4.2.1 Socio-Economic System

The Plurinational State of Bolivia is the 6th largest country of Latin America (after Brazil, Argentina, Mexico, Peru and Colombia). The population density is still relatively low, even though Bolivia's population nearly tripled from 3.5 million inhabitants in 1962 to over 10 million in 2012 (World Bank 2013). A remarkable feature of Bolivia's population is the comparatively high share of indigenous people. Approximately 62 % of the populace identify themselves as indigenous and speak a native language – that is the highest percentage share of indigenous people in Latin America (Postero 2010: 63).

Figure 7 shows the annual inflation and GDP growth rate in percent. A possibly record-breaking peak of the inflation rate of 11.750 % was recorded in 1985. This extraordinary high was surrounded by years of an inflation overshooting 270 %, but the rate could be restored to acceptable levels by 1987. However, the entry into the Lost Decade marked a time of stagflation, when a shrinking economy faced hyperinflation. The GDP growth rate recovered in the late 1980s, but grew at only low stages, especially after 2000. This led, together with population growth and an increasing unequal distribution of income, to a slight increase of poverty-rates to 65 % (Webber 2011: 143).

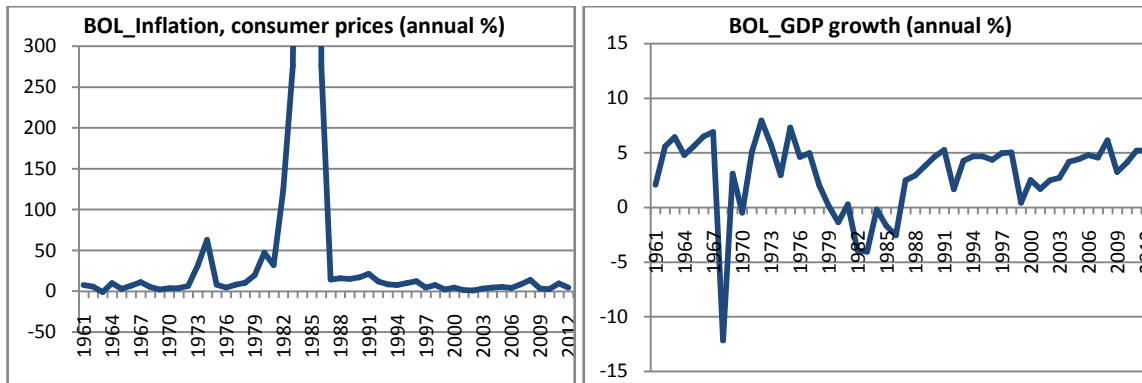


Figure 7_Inflation in Bolivia, in percent of annual consumer prices, 1961-2012 (left); and Gross Domestic Product growth of Bolivia, in percent per annum, 1961-2012 (right).

Source: Own illustrations; based on World Bank 2013.

Note: Annual inflation amounted to 1.281 % in 1984 and to 11.750 % in 1985.

In 1971, Bolivia's leftist government was overthrown by the military under the leadership of Hugo Bánzer, who subsequently reined the country for nearly a decade and ushered in a pro-imperialist dictatorship. His regime was characterized by an authoritarian brutality, censorship and repression. However, Bánzer's economy of state-subsidisation relied on foreign credit and, therefore, executed shocks to reduce public demand already in the early 1970s – backed by IMF programmes. Throughout his regency Bolivia accumulated substantial foreign debts. Nevertheless, major sectors like the agro-industry, hydrocarbons, mining (tin), finance, commerce or construction experienced growth during the 1970s due to favourable terms of trade and international demand. Oligopolistic patterns evolved in most of these sectors (Webber 2011).

After Bánzer had been forced out of office in 1978, Bolivia witnessed 11 different presidents until 1982 when Hernán Siles Zuazo was the first whose presidency lasted for more than a year. But the circumstances for the first democratic elected president – after decades of authoritarian dictatorships – were marked by unmanageable debts. Since capital was required to serve debt-service payments, the state's ability to invest in productive investments was heavily constrained. In sum, Zuazo's executed macroeconomic programmes were deeply inconsistent. Hyperinflation remained the most critical issue of regulation.

However, Víctor Paz Estenssoro succeeded Siles Zuazo in 1985 and brought Bolivia on a clearly neoliberal pathway “forcefully backed by creditors” which were presented as “the country's only salvation” (ibid.: 109). The debt crisis and the period of hyperinflation were used to justify the orthodox neoliberal restructuring of the 1980s and 1990s. Paz Estenssoro initiated a neoliberal revolution with the so called New Economic Policy (NEP). The overall goal was to overcome hyperinflation and, indeed, the NPE was successful in reducing the

inflation rate to moderate levels. This included a dramatic liberalisation process and a downsizing of the public sector. In general, the formulation in the NEP was designed to meet the demands of IMF, World Bank, Inter-American Development Bank (IDB) and United States of America (ibid.).

A second phase of Bolivian neoliberal adjustment was ushered in when Gonzalo Sánchez de Lozada was elected president in 1993. The second wave comprised privatisation of most state owned enterprises. For instance, the once mighty tin-mining unions were dismantled and the most state-mines were either shut down or privatised through sale to private mining companies. However, the new keyword in the ideological framework became neoliberal multiculturalism. Sánchez de Lozada tried to combine neoliberal politics with a greater incorporation of deprived indigenous people. Neoliberal multiculturalism was implemented in Bolivia through a series of laws and reforms under Sánchez de Lozada. These were inherently contradictory, since certain indigenous rights were recognised, whereas neoliberal mechanisms of exploitation and privatisation of community or state owned natural resources were further promoted. For example, the Law of Capitalisation and the Hydrocarbons-Law of 1996 enforced the privatisation of the important and growing hydrocarbon sector. Moreover, the agricultural sector and especially agricultural exports were increasing alike throughout the 1990s. The emergence of competitive export sectors was a critical component of the new liberal model and succeeded particularly in the hydrocarbon and soybean sectors (Barndt 2012). But the privatisation of key-sectors had an unintended side-effect on the national economy: the state lost massive revenues, especially from the hydrocarbon and mining sector. The trickle-down effect to poor social strata practically ceased. According to Hindery (2004), the Bolivian state received relatively small proportions of revenue through capitalisation: for example, only 18 % from new gas fields and 50 % from existing fields – compared to the investing foreign companies. Indeed, taking into account that in 2002 around 97 % of the hydrocarbons reserves were new, the virtual reduced share becomes apparent. In addition, the newly discovered reserves were liable to reduced taxes and fees (Hogenboom 2012: 138). Furthermore, and paradoxically, the higher accumulation of debts, resulting from revenue losses due to privatisation (which was required by international creditors), enforced the lenders' leverage again over Bolivian governmental decisions. As an ironic result, the IMF demanded cuts in social spending to make up for the budgetary shortfall. Finally, and less paradoxically, the neoliberal paradigm was increasingly questioned by the late 1990s (Webber 2011; Hindery 2004).

The so-called “Water War” and “Gas War” in 2003 emerged from massive demonstrations against further privatisation plans of the neoliberal president Sánchez de Lozada (by now in his second presidency). The violent suppression of the protests forced the president to resign, thus paving the way for Morales’ anti-neoliberal movement. He announced the exhaustion of neoliberalism and promised the re-nationalisation of the gas resources, to restore Bolivia’s sovereignty from international creditors, and social justice for the poor and indigenous people. Evo Morales was finally elected president in 2006. He tried to implement and balance a liberal democracy and free trade. The state became a primary actor in the country’s economy development once again and Morales fulfilled his promise to nationalise natural gas in 2006. Subsequently, state-welfare programs benefited from significantly improved governmental revenue-shares (Postero 2010). Moreover, Morales announced shifts from purely extraction to additional activities of manufacturing, like refining. “In practice however, Bolivia’s new policies have been less radical than the images created in the media and political discourses” (Hogenboom 2012: 147).

4.2.2 Structural Adjustment

In terms of structural adjustment programs, Bolivia features the admission to the concessional facilities of the IMF (chapter 3.3.2). The PRGF-programs imply relatively favourable interest rates and focus on poverty reduction. Nevertheless, Bolivia witnessed enormous domestic adjustment programs in order to fulfil conditionality and requirements of creditors. The nation joined the IMF in 1945 and had six arrangements with the IMF since 1986. Most of them were PRGF-programs (later called Extended Credit Facility) with an average duration of more than four years. The last facility expired in 2006 and no new arrangements are in sight under the Morales administration (www.imf.org).

In general, Bolivia’s “medicinal potpourri” (Webber 2011: 117) for a neoliberal shock therapy in 1985 resembles the already well known old story of freezing wages, devaluation and stabilisation of the domestic currency, a slashing of public-sector employment, the implementation of a new regressive tax-system, the liberalisation of foreign trade, the deregulation of labour-markets, the elimination of subsidies, the promotion of foreign investment, and the reduction of fiscal deficits. The described shock therapy of the mid 1980s was basically promoted by the World Bank and IMF and in close concordance with the liberal development strategy (NEP) of the newly elected President Víctor Paz Estenssoro:

Beginning in 1985, the government began the structural reforms that made it possible to stabilize the economy and bring about conditions conducive to growth. These reforms redefined the role of government, turned the economy toward a free market direction, and promoted opening to the rest of the world. Actions were established to liberalize markets for goods and factors, open the economy to foreign trade, and liberalize the financial system (Government of Bolivia 2001: 18).

A second wave of Bolivia's structural reforms was set out by President Sánchez de Lozada in 1995 and included e.g. the privatisation of the prominent hydrocarbon sector (Hogenboom 2012). Together with the adjustment programs from the 1980s these formed "the most extensive structural reforms of any Latin American country" (IMF 2005b: 5). However, extreme poverty and social exclusion could not be eliminated. Structural adjustment paved much more the way for violence in the subsequent years, as the gas and water wars indicate (Barndt 2012; Webber 2011; Government of Bolivia 2001). In the face of the extensive magnitude of structural adjustment and reforms, the authors of an IMF staff report from 2005 defined the main remaining question in the following way: "[H]ow could a country that undertook one of the boldest and most celebrated economic reform programs of the 1990s [...] find itself, only a few years later, in a situation of large deficits, sharply increasing debt, declining per capita income, financial instability, and social unrest?" (IMF 2005b).

Besides the open question of sustained poverty and social unrest, the entrance of multinational (oil) corporations, which was facilitated by laws of structural adjustment like the Hydrocarbons Law of 1996, were blamed to be responsible for negative social and environmental impacts throughout the country (Hindery 2004). Kaimowitz, Thiele and Pacheco (1999) describe deforestation in Bolivia due to the rapidly growing mechanised farm sector since the mid-1980s. The domestic agricultural markets were accordingly liberalised in the course of the shock therapy of 1985. However, measures like these were implemented to promote a competitive export sector. The resulting PTB shows differentiated outcomes.

4.2.3 Physical Trade Balance

In general, Bolivia's physical involvement in international trade seems to be rather limited. But foreign trade (imports plus exports) is of outstanding relevance for the GDP, as we shall see in chapter 4.4. However, the traded physical quantities are relatively low in

comparison to the domestic extraction, resulting in low trade intensity. For instance, Bolivia extracted domestically an average of 95 million tons per annum from nature during the last three decades, whereas merely an average of 1.8 million tons was imported and 7 million tons were exported respectively each year during the same time period. A major exception is presented by the extraction and trade of hydrocarbons. An average domestic extraction of 5.7 million tons faces an average export quantity of 5.5 million tons per annum, whereas the import quantities in this category are insignificant. The respective graphs are provided in the appendix (A2.2). However, the remaining material categories of biomass, ores and minerals are of less importance for international trade.

Bolivia's PTB (Figure 8) presents a rather idiosyncratic data visualisation. The remarkable finding is that there are no significant changes recognisable during the period of structural adjustment. International trade played a negligible role during the early 1960s. The 1970s brought about an increase in fossil fuels exports which turned the mass balance clearly negative. There was no significant import of any other material category that could counterbalance the hydrocarbons exports. This condition of moderate fossil fuels exports and practically negligible imports sustained for nearly three decades. Interestingly, neither the end of ISI, nor the Latin American debt crisis, nor the structural adjustment and broad opening of the economy since 1985 are reflected in the PTB. Dramatic changes did not take place until turn of the millennium. The early 2000s were marked by a massive increase in exports of natural gas, and petroleum to a lesser extent. Additionally, fodder crop production (mainly soybeans) was progressively increased and mostly exported. The main destination of exports is Brazil, followed by the USA. The export boom of hydrocarbons slowed down again since 2008.

In sum, the most remarkable conclusion is undoubtedly that Bolivia's exports did not increase dramatically in spite of structural adjustment. Even though the economy was forcefully opened, neither exports nor imports changed significantly. Possible reasons for this steady equilibrium are manifold and might be found in internal as well as external arenas. One possible explanation might be that Bolivia's export sector was not competitive enough to generate higher levels. Another one might be that Bolivia resisted external pull-factors until the terms of trade improved. It is also conceivable that structural adjustment became effective with delay, since important laws for the hydrocarbons sector were legislated not before the mid-1990s. However, there is no absolute certainty about the explanatory factors and future development.

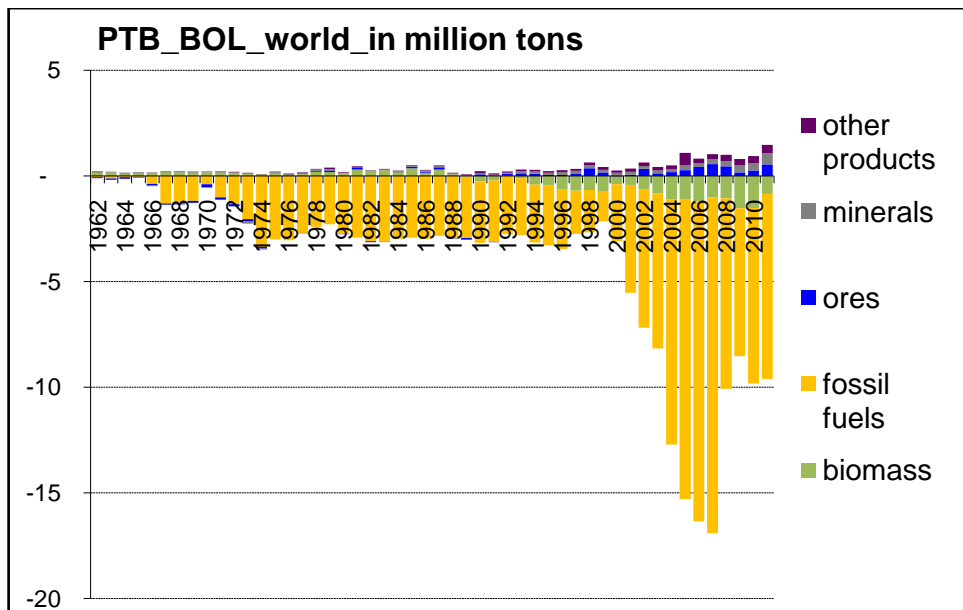


Figure 8 Physical Trade Balance of Bolivia, in million tons, 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

Regarding the physical exchange with the core states, Bolivia represents another exemption. As Figure 9 indicates, the PTB calculated for trade with the core does not show a clear trend but is highly fluctuating. Furthermore, Bolivia’s role as a net-exporter or net-importer respectively of distinctive material categories changed over the time. This may also be due to the relatively low exchange quantities with core states (Please note: quantities are given in 100.000 tons). The core-related PTB generally shows that the country is a net-exporter of fossil fuels and ores, and a net-importer of biomass. Apparently, Bolivia relied for a long time on biomass imports. The late 1960s are marked by a sharp increase in fossil fuels exports to the core which did not lasted for a longer period. A data error in this instance cannot be excluded, since other databases do not provide sufficient data for the respective time period. However, it seems that the exports to the core came almost to a halt during the 1980s. In the 1990s and 2000s a slowly increasing export of petroleum and ores arose, whereas the import of biomass decreased and the export increased at a slow pace respectively. More accurate data of pure imports and exports are provided in the appendix (A2.2).

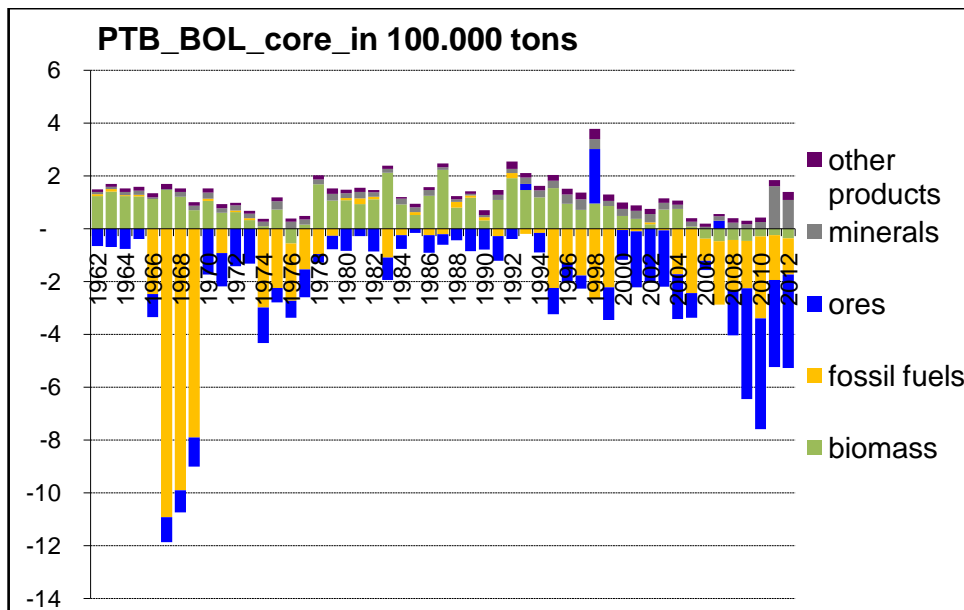


Figure 9 Physical Trade Balance of Bolivia with core states, in 100.000 tons, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

In short, the case of Bolivia does not support the hypothesis very soundly whereupon SAPs intensified an unequal ecological exchange between core and periphery, whereas Bolivia represents the clearest case of periphery in this contribution and in whole Latin America. If missing competitiveness, absent financial preconditions and infrastructure, or the intended resistance to act as a raw material supplier of wealthier countries or both, are responsible for the results remains an open question at this point.

4.2.4 Analysis

Figure 10 addresses the special case of Bolivia. It is shown that Bolivia is in first line a net-exporter of physical quantities, as indicated by the export share of total trade with the world. The share of total exports rose sharply during the late 1960s and persisted, since then, on a high level of around 80 % export share. The data show that Bolivia constantly exported around four times more than it imported. Surprisingly, the ratio became more equal since the late 1980s, whereas the period of New Extractivism entailed an increase of relative export shares once more. And finally, since Morales became President, the relation of exports and imports became more equal again.

The export share of total trade with the core states developed similarly to the world-trade-line during the 1960s. But from the 1970s onwards imports from the core increased and exports decreased, resulting in a shrinking export share. An average export-share of

53 % from 1962-2012 attests a well-balanced physical exchange with the core states. Interestingly, it seems that the Lost Decade marked two important trends: First, Bolivia mostly imported more tons than it exported. Second, the difference between trade with the core and total trade was highest during this period. The import of biomass and the nearly non-existing export to the core during the Lost Decade are responsible for this development. Though, the 1990s and 2000s were marked by a steady increase of the export share, but still remained below the export share of Bolivia's global trade.

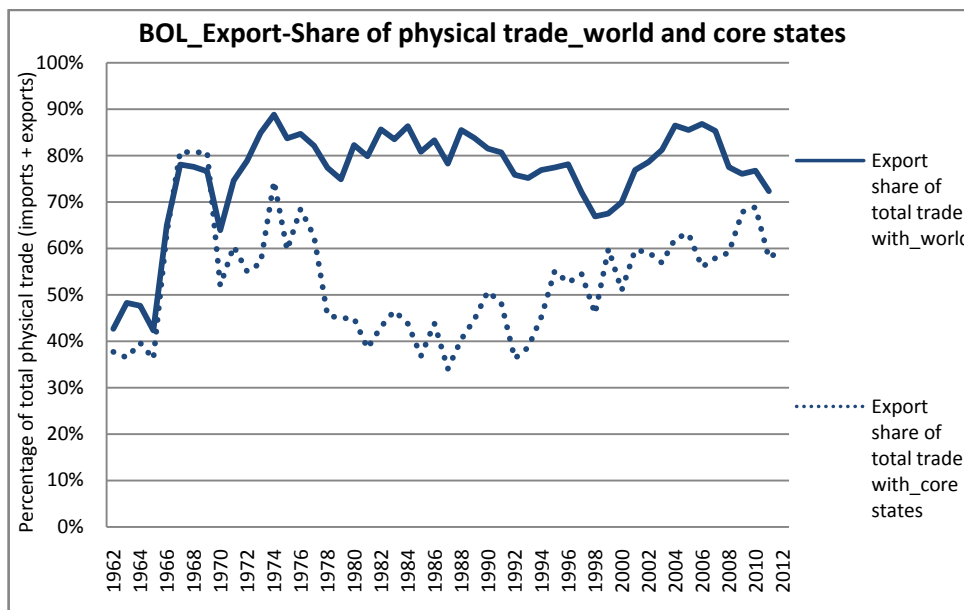


Figure 10_Import-Export-Share of Bolivia's physical trade; trading partners: world, 1962-2011; and core states, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

The next graph (Figure 11) illustrates the relative importance of the core in Bolivia's foreign total trade scheme. Starting with rather high trade shares in the 1960s, the relative proportion of trade flows relating to the core countries declined substantially in the early 1970s. Especially the export-share shrunk drastically, from over 80 % in 1967 to 10 % in 1973. The Lost Decade of the 1980s brought about an export-share to the core of merely 4-9 %. After a short revival until the late 1990s, the importance of the core as trading partner again reduced to a minor and practically negligible role for Bolivia's export sector during the last decade.

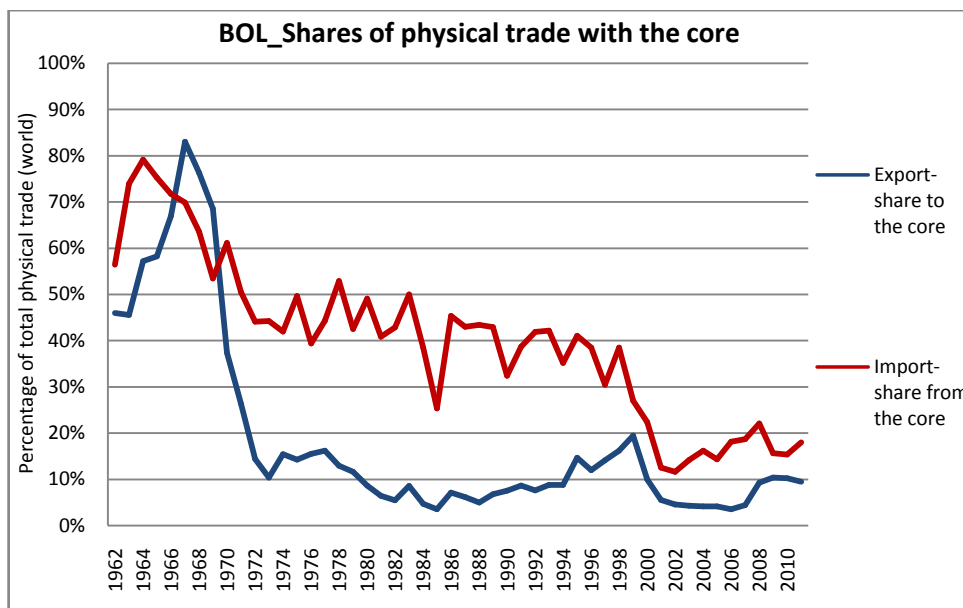


Figure 11_Bolivia's intensity of physical trade with the core, in percent of total trade, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

On the other hand, the core was generally a relatively important source of supply for a long period. But the relative importance in terms of import-shares from the core witnessed a steady decrease during the whole examined period. The core-specific import-share was around or above 50 % until the early 1980s. Subsequently, the following years of the 1990s implicated a further decline and especially the turn of millennium brought about a drastically diminishment of imports from the core.

Finally, the total trading shares with the core decreased steadily. Structural adjustment did nothing to improve the relevance of core states as trading partners. And in fact, the emergence of the New Extractivism implied a further major reduction of Bolivian core-trade-shares.

4.3 Brazil

The largest economy of Latin America has established importance on the world market. Thus, Brazil does not just provide and allocate raw materials. Its demand and financial position are important benchmarks for other economies' trajectories of production and trade. Accordingly, Brazil has an important role in WTO negotiations. But due to the common history of Latin American republics, Brazil now finds itself in the position of an extractive economy that relies heavily on international price volatilities (Wylde 2012; Luna; Klein 2006).

Like almost all other Latin American countries, Brazil has a long history of military governments and virtual dictatorships. In the case of Brazil, the military pushed itself to power in 1964, and implemented a regime that lasted until 1985. The pursued ISI-strategy was comparatively more successful in launching infant industries and diversifying the production sector, but still faced common difficulties of low competitiveness and a constantly growing need for imports of expensive capital goods. Even though the military rule of Brazil was less violent and repressive than in Argentina or Chile, persistent protests and the debt crisis of the 1980s forced the regime to retreat and open the way for democratic elections (Kingstone 2012).

4.3.1 Socio-Economic System

Brazil is by far the largest country of Latin America and also the most populous of the continent. The population more than duplicated from 1962 with around 77 million inhabitants to over 198 million inhabitants by 2012 (World Bank 2013). Like Argentina and Bolivia, Brazil had to struggle with hyperinflation during the 1980s and early 1990s (Figure 12). Inflation data are only available from 1981 onwards, and, since then, the annual inflation rate increased constantly to unprecedented heights, particularly between 1988 and 1994. In comparison, GDP growth figures attest the military junta a rather positive report with high growth rates between 1969 and 1980. In contrast, the 1980s were marked by recessions. Brazil postponed the deregulation until 1990. The so-called Real Plan (*Plano Real*) of 1993 is considered to represent, together with the liberalising measures undertaken by Fernando Collor de Mello, the main political program of Brazil's neoliberal structural adjustment. The implementation of the Plan Real slowed down inflation and restored growth (Luna; Klein 2006; Ban 2013). Indeed, the opening of the economy from the 1990s onwards brought about a relative steady, but less impressive, annual GDP growth rate. However, Christopher Wylde (2012: 138) correctly mentions that Brazil's GDP growth rates were during the last two decades consistently below those reached by most other emerging economies.

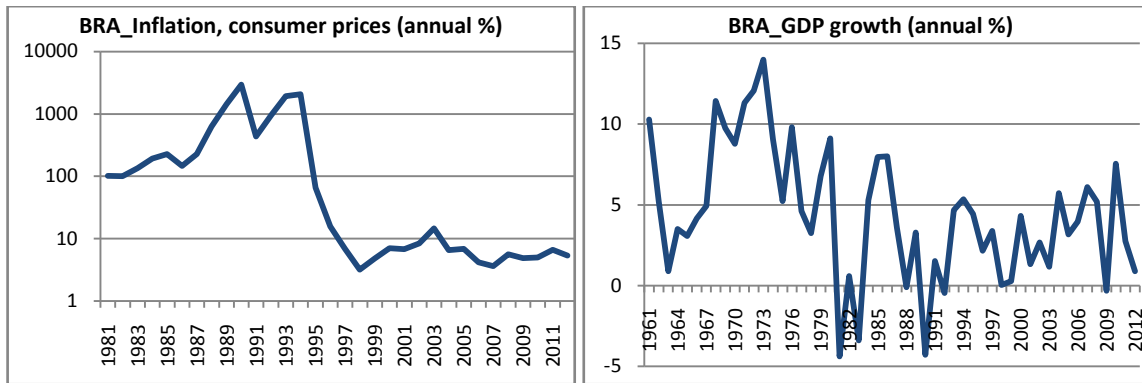


Figure 12_Inflation in Brazil, in percent of annual consumer prices, 1981-2012 (left); and Gross Domestic Product growth of Brazil, in percent per annum, 1961-2012 (right).

Source: Own illustrations; based on World Bank 2013.

Note: Annual inflation is scaled logarithmically; it reached records of 2.948 % in 1990 and 2.076 % in 1994.

The first democratic presidential election after the military regime took place in 1985. When José Sarney came to power the country faced immense unfavourable political and economic conditions. After more than two decades of military rule, Sarney's administration tried to implement new measures to liberalise the regime. In doing so, a new and more democratic constitution had to be prepared. However, due to the persisting crisis and hyperinflation, Sarney's government had little political and popular support. In 1990 Brazil elected a new president. Luiz Inácio Lula da Silva stood for his first time for election. But Fernando Collor de Mello won the election in the second run and succeeded Sarney as president. To restore growth and dampen inflation the new president installed the liberal discourse of the Washington Consensus in Brazil. The well-known measures of market opening for competition, promotion of foreign investments, and privatisation soon called popular mass demonstrations into action. As a consequence, Collor's vice president, Itamar Franco, took over presidency in 1992. And his minister of finance, Fernando Henrique Cardoso, not only directed the famous Real Plan in 1993, but also became the new president in 1995. The implementation of the Real Plan provided resolutions for a stable economy, fight against inflation and increasing economic liberalisation measures. Cardoso continued and deepened the dismantling of the interventionist state initiated by Collor's administration. He implemented a broad program of neoliberal reforms. For instance, state monopolies in the oil, electronic, or telecommunications sector were broken (Luna; Klein 2006). Wylde (2012) summarises the neoliberal reforms in the following way:

1. Extensive regulatory reform;
2. Closure of several government agencies and departments;
3. Privatisation of national assets;

4. Liberalisation of domestic finance, foreign trade, exchange rate movements, and the capital account (ibid.: 132).

During the 1990s the overvaluation of domestic currency and high interest rates should have attracted foreign investments. This strategy deliberately boosted the liberalisation of imports, but also forwarded domestic capital flight. However, newly experienced popular consumerism ensured Cardoso's re-election in 1998. In his second mandate Cardoso continued his reform program. But difficulties in the international economy slowed down domestic growth rates and increased unemployment rates. Additionally, the domestic shift in policy (particularly the privatisation of strategic sectors) had far reaching impacts, especially on the manufacturing industry where one-third of all jobs were lost during the 1990s. In 1998 Brazil finally slipped into a currency crisis. Sustained capital flight and a detrimental balance of payments forced the Central Bank to devalue the overvalued Real in 1999. Hence, Cardoso's political and popular prestige became low at the end of his second term. The way for Lula's presidency was paved (Luna; Klein 2006; Wylde 2012).

In 2003, Lula finally achieved success in his fourth attempt at the presidency. Even before the start of his term, Lula had to make concessions to the economy and creditors to maintain economic stability and accept the maintenance of the IMF agreement: "Lula was forced to assure markets that he would continue the fiscal and monetary policies set in place by FHC [Fernando Henrique Cardoso]" (Wylde 2012: 137). A new agreement with the IMF provided the framework for the continuity of core macroeconomic policies. The major point was that Brazil should not declare default on the country's foreign debt. The international financial community appreciated the continuation of the conservative economic policy, since Brazil was still highly indebted. The economic situation after the crisis of 1999 remained severe. The total public debt amounted to 58.7 % of GDP in 2003 and interest payments totalled to 8 % of GDP in 2004. But under the Lula administration Brazil managed to reinforce and sustain growth – until the global financial crisis in 2008. Favourable international circumstances undoubtedly helped significantly to restore growth rates. An increase in exports and improved terms of trade are responsible for significant surpluses generated by foreign trade after devaluation in 1999 (Luna; Klein 2006; Wylde 2012). In this regard chapter 4.4 provides an informative figure illustrating the monetary counterpart to the PTB.

However, Lula's administration brought major changes to the social security system. For instance, the famous *Bolsa Familia* program helped many of the poorest in Brazilian

society. The reduction in poverty also served to reduce inequality (Wylde 2012). In fact, Lula's socioeconomic policy regime was neither a revolutionary departure from the Washington Consensus doctrine, like in the case of Bolivia, nor strict adherence to it. For example, on the one hand Lula promoted exports and refused protectionism; on the other hand he opposed further privatisations (Ban 2013). Lula did not change the status of the leading companies like PETROBAS (oil) or Vale (iron), which have been (partly) privatised in the 1990s. In return the state ensured advanced revenues (Hogenboom 2012). Regarding exports, Brazil maintained an active industrial policy to foster industrial competitiveness and diversify export products through a greater value-added production (Wylde 2012). Indeed, Brazil managed to export more manufactured products than primary products until 2006. In chapter 4.4 a comparative figure shows that Brazil is in this regard the exception to the rule.

4.3.2 Structural Adjustment

Brazil joined the IMF early in 1946. Unlike Argentina and Bolivia, Brazil did not have constant arrangements with the Fund until 1998. Except one Extended Fund Facility in the early 1980s Brazil thereafter consistently relied on Stand-by Arrangements. Two Stand-by Arrangements with short duration and little drawn amounts were signed in the late 1980s and early 1990s respectively. From 1998 onwards, three more arrangements of this kind were agreed upon, which had longer durations and higher agreed and drawn amounts. The last one expired in 2005 and Brazil is not in favour of signing any new agreements with the Fund (www.imf.org).

In the course of the outbreak of the Latin American debt crisis international banks closed their doors to Brazil and demanded the state to sign agreements with the IMF. As mentioned above, negotiations with the IMF that should lead to a neoliberal structural adjustment started in the early 1980s. But Brazil could not fulfil the Fund's requirements, since inflation and public deficit made it virtually impossible. Although the economy was still in serious conditions, negotiations with the Fund reached a standstill in the mid-1980s. The Sarney-administration could not resolve the problems of inflation and foreign indebtedness (Luna; Klein 2006).

A fundamental commitment to a neoliberal ideology came relatively late to Brazil. It was finally implemented by Collor de Mello and the Real Plan in the early 1990s. Though, Cornel Ban (2013) describes Brazil's privatisation efforts of the 1990s as half hearted and

short-lived. Accordingly, the government maintained state control over strategic sectors like banks, oil, electricity or aerospace. For instance, PETROBRAS, one of the biggest companies in the world, was only partly privatised. ELECTROBRAS, the biggest power utility company in Latin America and the tenth largest in the world, is still owned by the state. And even “in firms where the state owns less than 52 per cent of the stock, its control and intervention remain significant” (Ban 314). Like Vale, the world’s biggest mining company, is indirectly controlled by the state through a state-owned bank and government-related pension funds. Therefore, the label “neoliberal” is least credible in the area of public enterprises and privatisation (ibid.).

In contrast, trade liberalisation was a main feature of the government’s truly neoliberal package. Non-tariff barriers were eliminated, such as prohibitions and quantitative controls. Reduced tariffs should become the main trade regulating instruments. But external crisis (Asian financial crisis 1997 and Russian crisis 1999) and a growing trade deficit paved the way for another “Brazilian” crisis (Castilho; Menéndez; Sztulman 2012). By the late 1990s the IMF tried to avert a Brazilian default with another agreement. In return Brazil had to reduce public spending once more, to raise interest rates and taxes. Consequently growth was zero and unemployment increased again. “But despite the many measures taken and the agreement with the fund, instability and the loss of the reserves continued” (Luna; Klein 2006: 71).

Yet, Lula’s government was able to bring back stability and growth to the economy with a turn in fiscal policy: After the expiration of the last agreement with the IMF Lula did away a Fund’s conditionality that constrained structural adjustment in terms of public intervention since Cardoso’s legislative term. The state began to invest in infrastructure, state banks expanded credits to public enterprises, which in turn expanded their investment. Lula’s administration adopted a “Growth acceleration program” including a highly central position of the state (Ban 2013: 305).

Finally, the Fund’s influence also came to an end in Brazil. But some important features of neoliberal adjustment from the Washington Consensus sustained and shaped the economic activities, like the open and export oriented economy, or the goal of macroeconomic stability in the fiscal policy (Ban 2013).

4.3.3 Physical Trade Balance

The PTB suggests an evident development: Brazil developed from a rather closed country towards a relatively open export-oriented economy. Taking the figures of the domestic extraction and exports (both see appendix A2.3) into account, a trend in the direction of increasing shares of export quantities becomes apparent: both numbers were growing, but the exports at a higher pace than the DE. In 1980 exports amounted to 8 % of DE, in 1995 exports made up already 10 %, and in 2010 export quantities amounted to 15 % of total DE. For comparison, Argentina developed on a similar path (5-13-16) and Bolivia remained a rather closed economy (4-5-9; though with heights of 15 % in 2006/07).

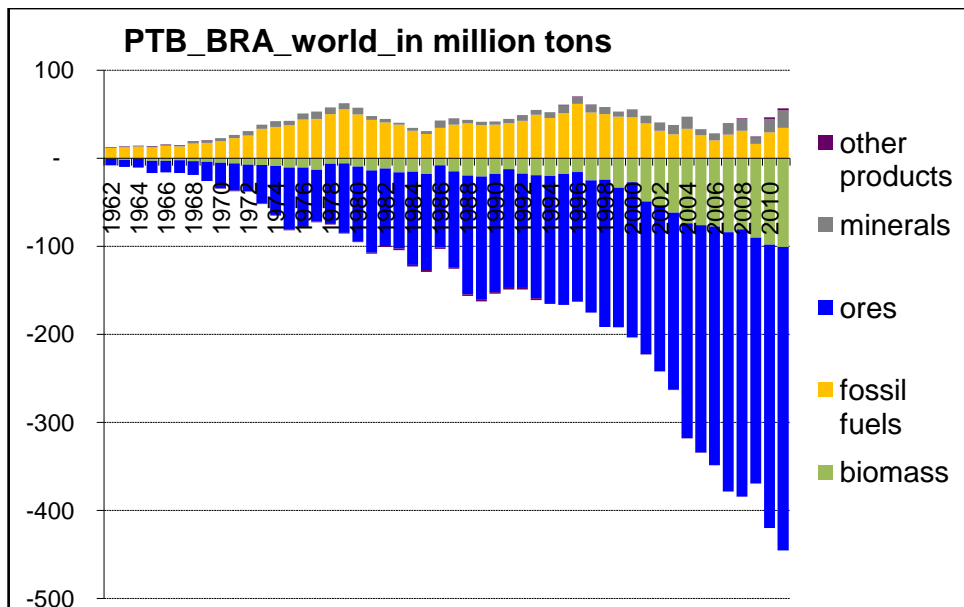


Figure 13 Physical Trade Balance of Brazil, in million tons, 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

The PTB indicates a low involvement in foreign physical trade in the 1960s. Like in Argentina and Bolivia, policies of ISI are strongly reflected in the balance. The 1970s were marked by a slow abandonment of ISI and simultaneously rising imports and exports. Until the 1980s the PTB remained relatively balanced, since then imports remained constant or increased at a slow pace whereas exports increased strong and steadily, resulting in a negative PTB. This trend continued until today. The main import materials are clearly fossil fuels (mainly petroleum and hard coal), followed by chemical and fertiliser minerals. The major export materials consist largely of ores (iron ores) and biomass in form of primary and fodder crops (especially soybeans). The main trading partners are in exports as well as imports China, the USA and Argentina. In general, the PTB turned visibly negative in the

1990s, when relevant programs to open the economy were undertaken, but even more during the 2000s – in times of post-neoliberal governance and new extractivism.

In short, Brazil has not always been a net exporter of materials. Until the early 1980s the net-importation of fossil fuels outstripped the net-export of ores. The forced opening of the economy left its marks on the PTB in form of an increasingly negative balance. It is though remarkable that the political “left turn” in 2003 ushered in an even greater “negative turn” in the PTB, with less net-imports and subsequently higher net-exports. In the case of Brazil this development trend may cause future troubles, since the export sector relies on favourable terms of trade and contributes to large shares of the GDP. Ban (2013: 321) notes that “the sustainability of growth hinges on external demand.” Additionally, as we shall see in chapter 4.4, a negative PTB does not automatically imply a positive monetary trade balance.

The Brazilian PTB with the core represents a steadily growing unequal ecological exchange. There are no major shifts, but the net-exportation of ores and biomass grew constantly, whereas the net-importation of fossil fuels and minerals appear insignificant. The quantities exported solely to the core countries are particularly remarkable considering their relatively small proportion in the global community of nations. However, net-exports to the core increased steadily, but not at the same pace as net-exports to the total world did, suggesting a still extremely unequal but less important relationship with the core. One possible explanation for this trend might be new “South-South strategy” introduced by Lula in 2003. The intent was to strengthen connections with countries in Latin America and Africa to boost sales growth abroad (Wylde 2012: 154). Moreover, in his second administration Lula planned to reduce dependence on traditional OECD markets and commodity exports and instead fostered trade relations with Asia and a more diverse export structure (Ban 2013).

Summarised, the original opening of Brazil’s economy in the early 1990s resulted in a more negative PTB with the core states. But this belongs merely to a much broader trend that existed from the 1960s onwards until the 2000s. Though, it must be challenged whether this development would have taken place anyway and without neoliberal adjustment. The results from 2009 onwards suggest either a decreased demand from core states or a Brazilian reorientation of export destinations.

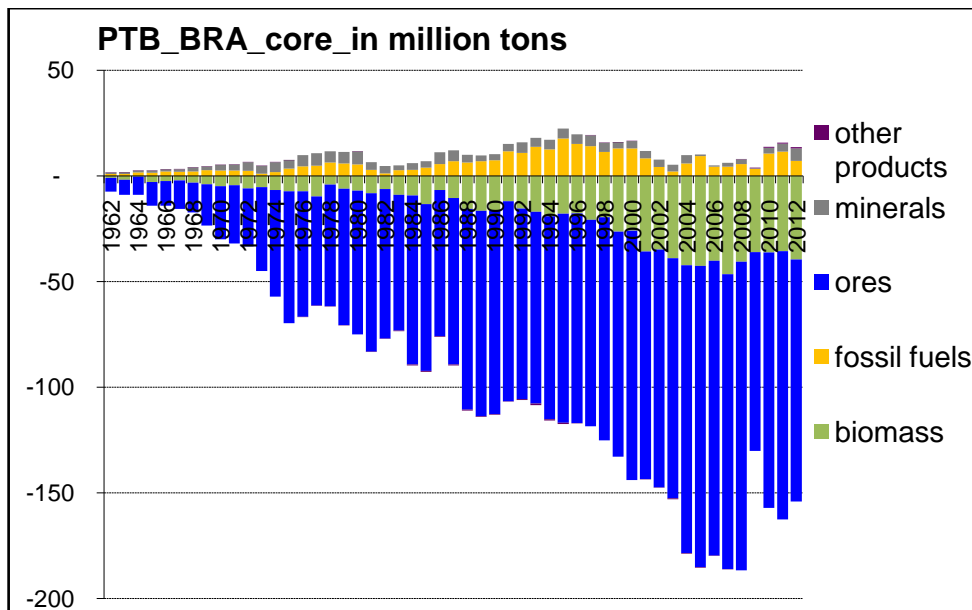


Figure 14 Physical Trade Balance of Brazil with core states, in million tons, 1962-2012.
Source: Own calculation; based on UN-Comtrade database 2013.

4.3.4 Analysis

Empirical evidence suggests that during the second half of the 20th century Brazil turned into an export-economy (see Figure 15). The export-share of physical quantities of total-world-trade (constant line) shows a steadily growing proportion from a relatively balanced initial state in the 1960s to heights of over 80 % export-share in the 2000s. The export-import-ratio significantly changed with the beginning 1980s and mid-1990s, reflecting both higher exports as well as comparable lower imports. Export-shares of over 80 % are based upon export quantities which are more than 4 times higher as their import counterparts. Considering the whole reflected time period Brazil's export-share averaged to 66 % of total physical-world-trade between 1962 and 2011.

Trade with the core states (dotted line in Figure 15) is in terms of physical trade very export-dominated. In contrast to the total-world-trade, trade with the core was never balanced since 1962. Brazil always exported higher proportions to the industrialised world. It is, though, rather difficult to specify major shifts in the given ratio. The line oscillated mostly between 70 % and 90 %, with a generally increasing tendency. The average share of exports accounts for 81 % between 1962 and 2012. This indicates an average export-share that is more than 4 times higher in comparison to the respective import-share. Yet it is important to note that both curves experienced an approximation, particularly since Lula's open economy met favourable external conditions and ended in new extractivism.

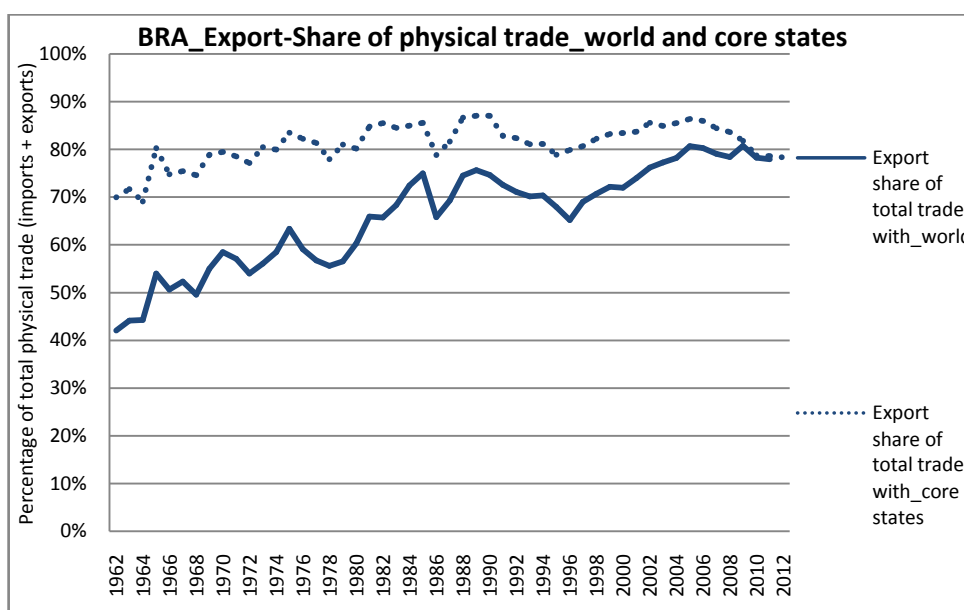


Figure 15_Export-Share of Brazil's physical trade; trading partners: world, 1962-2011; and core states, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

The relative importance of the core as an export destination for Brazilian commodities is further analysed in Figure 16 (dark blue line). The export-shares to the core as a percentage of Brazil's total export reached heights of 86 % in the late 1960s and early 1970s (in 1969 86 % of Brazil's export was destined for the core). These impressive figures indicate that the core was the main destination of export for a long time. However, the proportion slowed down constantly during the whole period of the 1970s, 1980s and 1990s. In addition, as already suggested the beginning of new extractivism in the 2000s marked a remarkable intensification of the declining tendency that has already been in place. But all that does not mean that core related export quantities were not growing or stagnating during this time. In fact, they were growing but not in the same pace as exports did in general.

Brazil is the only one of the three analysed countries that witnessed increasing shares of imports from the core. Interestingly the outbreak of the Latin American debt crisis involved a visible shift towards higher import rates from the core. Besides some further ups and downs, this was the only change worth mentioning. Taking the import statistics into account, this shift occurred mainly due to a decrease in imports of fossil fuels from non-core countries.

Summarised, core related trade still plays a significant role in Brazil's foreign exchange relationships. This is especially true in comparison to Argentina's and Bolivia's international trading schemes. But although constantly higher export quantities, recent core

related export and import ratios amount practically to the same shares of the associated total world exchanges.

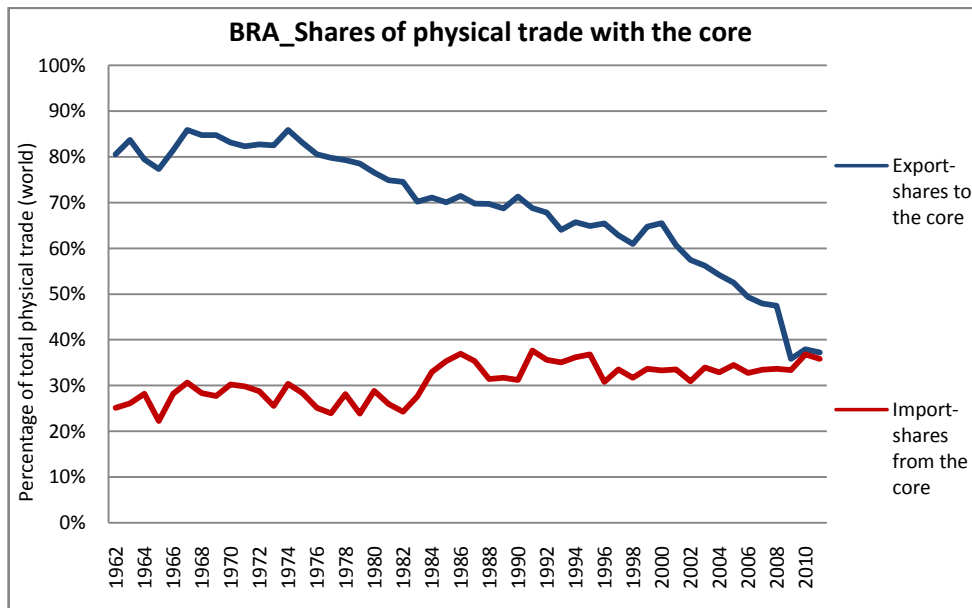


Figure 16_Brazil's shares of physical trade with the core states, in percentage of total trade, 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

4.4 Comparison and further Analysis

This concluding analytical chapter aims at (1) drawing comparisons between the three examined countries and at (2) introducing new data and ways of representation to grasp a deeper systemic meaning of exchanges. Therefore, the sum of trade will be set in relation to the country's GDP to identify the importance of trade and to determine "trade openness" of the country. Subsequently, separate subchapters will treat single issues: in chapter 4.4.1 PTBs will be examined per capita to improve comparability; the following section (chapter 4.4.2) deals with the stage of processing of exported commodities; in chapter 4.4.3 the monetary values of traded goods are brought in to realise the unit price for one average ton of exports and imports; finally the traded physical quantities are set in relation to their respective monetary values (chapter 4.4.4). Wherever possible and appropriate, these analyses are undertaken with respect to the trading partners, either the whole world or just the core countries.

The IMF (2005a) describes the countries of Latin America as relatively closed economies. This is justified by rather limited trade openness, particularly prior to neoliberal adjustment. The Fund is confident that Latin America's low trade openness is another

explaining factor for its low growth performance over a long period: “There is abundant empirical evidence that the more open an economy is to trade with the outside world, the better is its growth performance relative to others” (ibid.: 93). Consequently, further trade liberalising measures were recommended and suggested. Furthermore, the Fund stresses that agricultural protection in industrial countries particularly hampers Latin America’s exports of these products. In short, in 2005 the IMF still relied on recommendations of higher trade openness and praised a higher export orientation as a great opportunity to earn foreign exchange to service debts (ibid.: 101).

However, the subsequent Figure 17 illustrates the importance of trade measured as a percentage of GDP. It is important to note that the underlying data, in this case, do not derive from physical quantities reported to the UN-Comtrade, but are drawn from the World Development Indicators (<http://data.worldbank.org/data-catalog/world-development-indicators>). Trade is defined as the sum of imports and exports of goods and services. Accordingly, trade-data differ from those used apart from this illustration. The aim is, though, to show the relative importance of trade regarding the GDP.

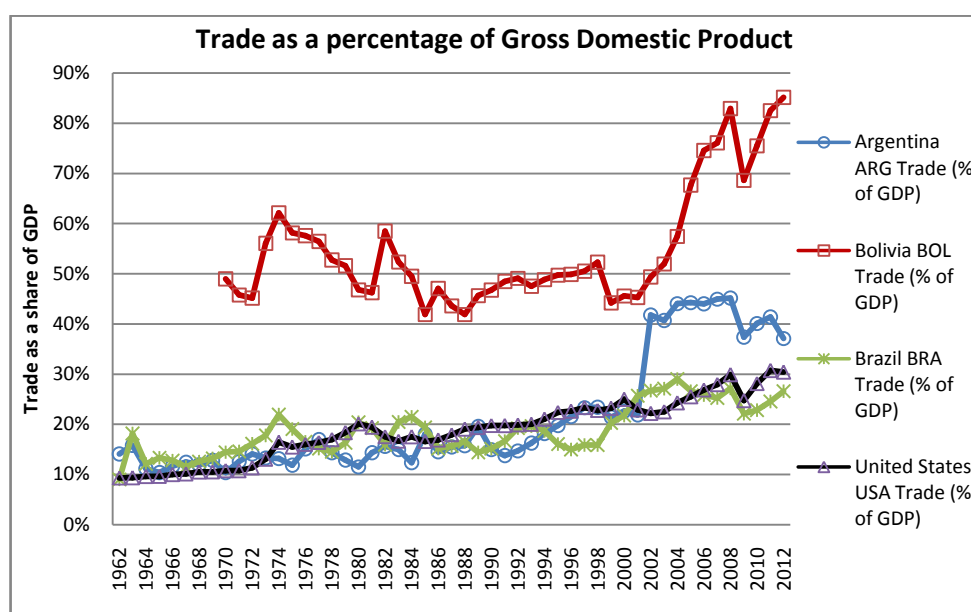


Figure 17 Trade as a percentage of GDP; Argentina, Bolivia, Brazil and the USA, 1962-2012.

Source: Own illustration; based on World Bank 2013.

Note: Trade is defined as the sum of exports and imports of goods and services measured as a share of gross domestic product. Data for Bolivia were not available until 1970.

The graphs indicate that, measured as a percentage of GDP, Bolivia is the most open economy. Taking the PTB of Bolivia into consideration, there is an obvious suspicion that the low GDP is responsible for the high trade share in terms of monetary value. In fact, Bolivia’s GDP per capita has nearly stagnated for the last decades and makes up only a

fourth to a fifth of that of Argentina and Brazil (World Bank 2013). However, the extent of a country's geographical area is the overwhelming major feature influencing its international trade involvement. In general, the larger a country the less it depends on foreign exchange. Argentina is approximately 2.7 times and Brazil is more than 8 times larger than Bolivia. Argentina's and Brazil's trade percentage of GDP was considerably lower until turn of the millennium. It was not before the age of new extractivism when trade shares of GDP increased significantly. In IMF-terms this would indicate low trade openness. Interestingly, the same indicator ascribes the USA rather similar data as Brazil (in historical as well as actual data), which represents the "lowest trade openness" in Figure 17. Considering that the USA has more or less the same geographical surface area as Brazil, the Fund's recommendation for a more open economy becomes somewhat relative.

4.4.1 Comparison of PTBs per Capita

The PTB calculated per capita takes the population size and its development into account. Though the main structure and trend of the traded material categories remain similar, the per capita illustration enables comparisons between the countries' different physically involvement into international trade (Figure 18). In order to maximise comparability the PTBs are equally scaled. It appears that Argentina's and Brazil's PTBs per capita differ considerably in terms of quality of material flows, but not too much in terms of quantity. Argentina has a "tradition" in exporting biomass, whereas Brazil generates its export earnings mainly through ores. Both countries end up on a physical net-export of approximately two tons per year and capita. The local consequences of this kind of development for people and nature are far reaching and much too often devastating. But this is beyond the scope of this Master Thesis.

However, it is clearly visible that Bolivia is much less involved in world trade than its two big neighbours. The per capita illustration accounts for the relative small population, but still exports and imports remain partly far below the respective flows of Argentina and Brazil. From this comparative perspective the export of natural gas seems to be the only noteworthy material flow. Though, as mentioned above, the main trends, shifts and turns in the PTBs per capita resemble those of the total PTB.

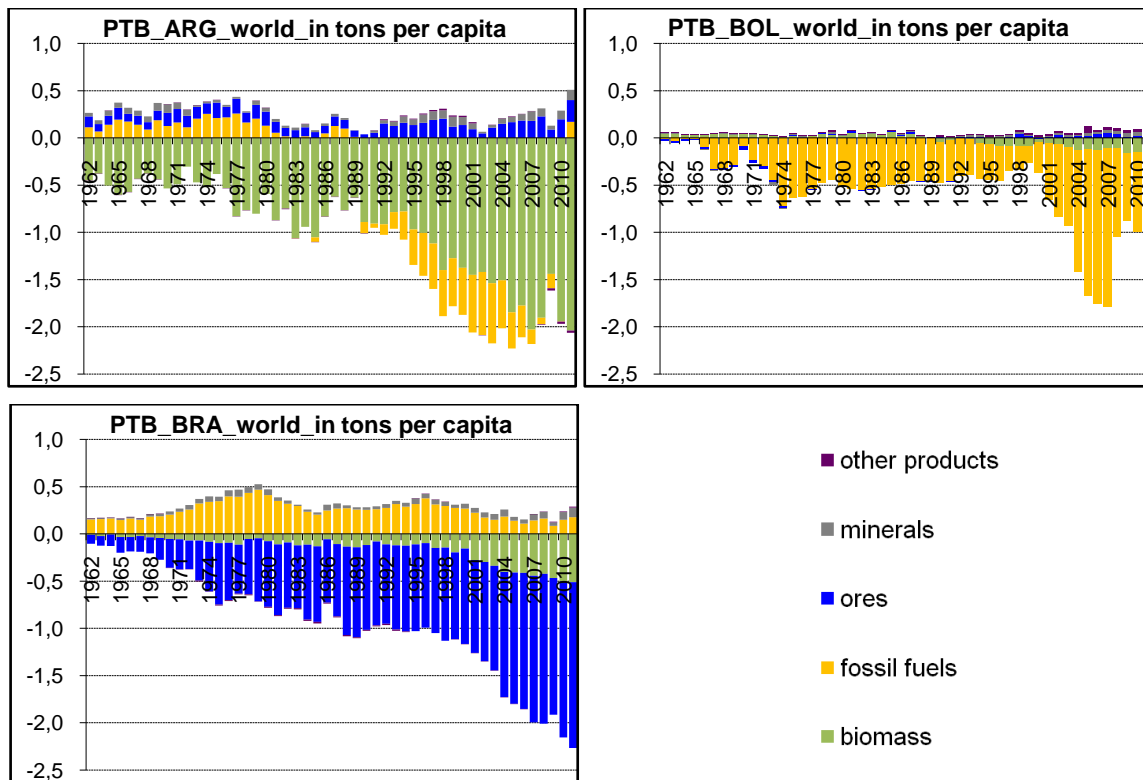


Figure 18 Physical Trade Balance of Argentina, Bolivia and Brazil; in tons per capita, 1962-2011.
 Source: Own calculation; based on UN-Comtrade database 2012; Population data: World Bank 2013.

Figure 19 provides the PTBs with the core states per capita. It allows comprehending the physical trade involvement with the core and a comparison with the foregoing figure about how many tons per capita of total trade related to exchanges with the core. Again scales are generalised. As a consequence, Bolivia's PTB per capita with the core appears of marginal relevance. Except the unexplainable export flow of fossil fuels during the late 1960s, no clear trend in any direction is recognisable. And this is just partly due to the small quantities traded. In the case of Bolivia, there is no such evidence that structural adjustment programs would have led to a more negative PTB per capita with core states.

The opposite is true for Brazil: Nearly the half of all exports and imports are related to trade with the core. This fact is fairly remarkable since none of the surrounding countries is recognised as a core country. Exact figures were contained by chapter 4.3.4, figure 16. Compared to Argentina and Bolivia, Brazil has the highest affinity to core-trade per capita. The Brazilian case shows a consistently deteriorating PTB per capita, but there is no evidence that SAPs would have changed it in a direction that favours exports to the core more than exports in total, as figure 15 and 16 already indicated.

Argentina's export to the core per capita amounts to an average of 400 kg per annum for the last 50 years. The vast majority consisted of biomass export. Within the material category of biomass fodder crops (soybeans) made up the bulk, e.g. in 2011 more than 70 %

of Argentinean biomass-exports to the core came from fodder crops that are used to rear the livestock there. The large quantities of biomass-export, on which Argentina obviously relies, may explain the poor performance when it comes to export earnings— as the next chapters consistently demonstrate.

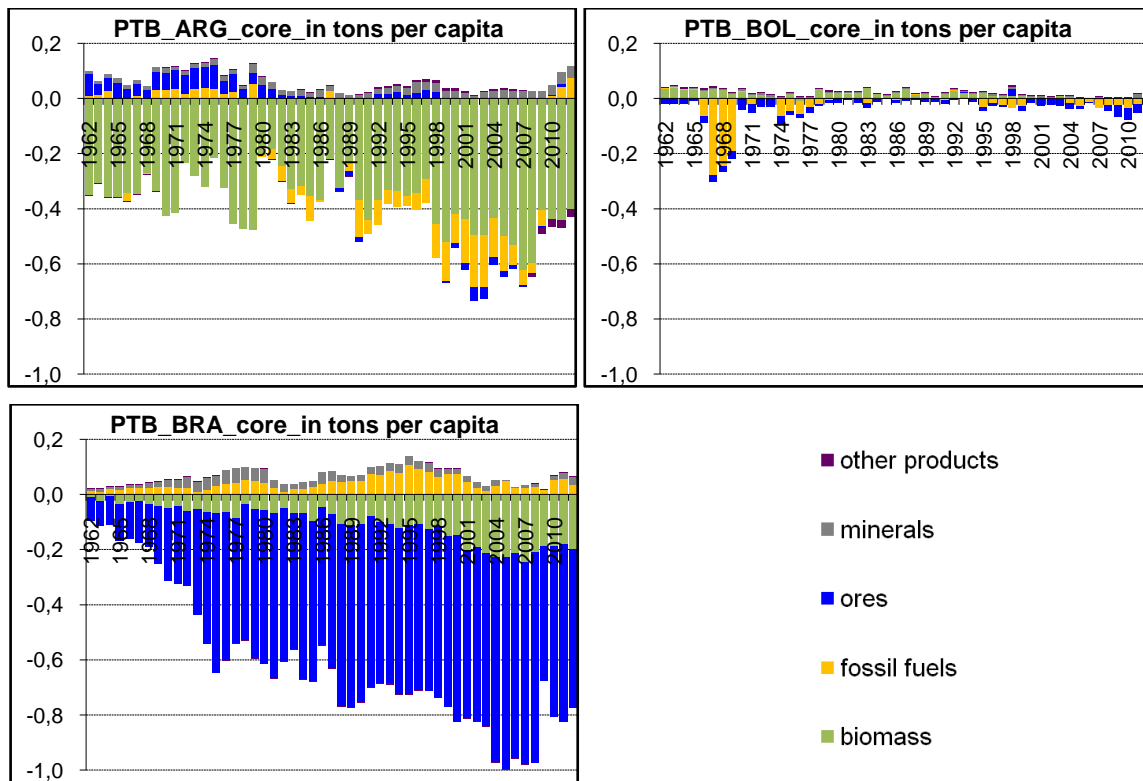


Figure 19 Physical Trade Balance of Argentina, Bolivia and Brazil with core states; in tons per capita, 1962-2012.
Source: Own calculation; based on UN-Comtrade database 2013; Population data: World Bank 2013.

4.4.2 Stage of Production of Exported Commodities

As stated in chapters 2.2.2 and 2.2.3, the PTB provides no information about how many of the traded materials are already processed, manufactured or still in an unprocessed, raw and primary state. The theory of unequal ecological exchange suggests in addition to an unequal exchange in terms of physical quantities, an unequal exchange in terms of stage of production of the traded commodities (cp. chapter 2.3). Therefore, additional data from the CEPAL were consulted and evaluated (CEPALSTAT 2013). Figure 20 shows the exports of primary and manufactured products as percentage of total exports. It is important to note that these data are based on monetary values and not physical quantities. Unlike all other graphs presented, this figure is built up on a calculation of monetary units.

The differentiation between primary and manufactured products is still rather vague. However, according to the CEPAL (1999) the first group of primary products contains all unprocessed goods from agriculture, mining and petroleum products, whereas the second category of manufactured products includes all goods from traditional resource-based and not scale-intensive industries, like textiles, food, tobacco, wood, leather, furniture, etc.; other resource-based industries but with significant economies of scale, like steel, copper or glass; all durable goods; and industries from technical production, like machinery, electronic, chemicals or instruments.

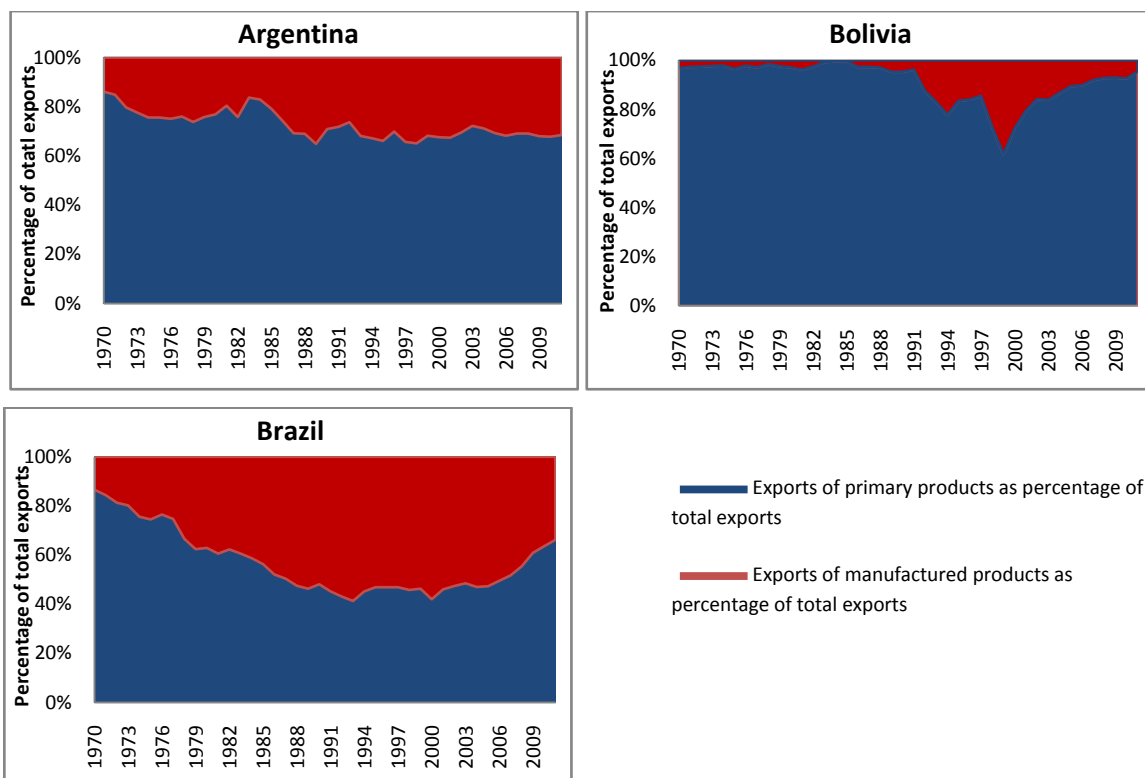


Figure 20 Composition of exports according to the level of manufacture, 1970-2011.

Source: Own illustration; based on CEPALSTAT 2013.

The IMF (2005a) communicated that considerable efforts of trade liberalisation paved the way for a diversification of Latin American countries' exports and for an increased share of manufactured goods of total trade. Regarding the three chosen countries, the evaluations of the data from CEPALSTAT imply differentiated results that do not really confirm the Fund's estimation. E.g., Argentina's export-composition improved steadily but far below one might have expected. In 2011 more than two-thirds (68.5 %) of Argentinean incomes from export still consisted of primary products. The early 1970s and early 1980s marked periods of increasing proportions of manufactured products. Whereas the neoliberal opening of the economy from the 1990s onwards did not show any steps forward – on the

contrary, export-earning shares of manufactured products even slightly decreased after a height of 35.1 % in 1989.

Bolivia once again confirms its position as the most peripheral country in this comparison. Until the early 1990s exports of manufactured products were almost non-existing. After shortly decreasing shares of primary products in the 1990s, the age of new extractivism brought back in a negligible importance of manufactured products. Taking into account that manufactured products are usually of higher value compared to their physical weight than primary products, the unequal export-shares carry even more weight.

Finally, neither the Bolivian nor the Brazilian case supports the estimation of the IMF, even though Brazil made the most substantial progress in exporting higher value-added commodities. But these proceedings came to an end and reached its height in the early 1990s (58.7 % export revenues from manufactured goods in 1993) and are therefore more attributable to successions of ISI-policies rather than trade liberalisation and other neoliberal reforms. The rest of the 1990s and the early 2000s were marked by a relatively constant ratio, whereas the policies of new extractivism seem to favour the export of unprocessed matter again. In 2011 Brazilian export ratio was comparable to that of Argentina. Two-thirds (66.2 %) of the generated incomes from all exports came from the export of primary products.

4.4.3 The Monetary Value of Physical Trade

The relative low monetary value of Latin America's export commodities in relation to the quantity of exported matter, which has already been suggested in the foregoing chapter, will be further concretised in Figure 21. The illustrated graphs provide additional import data and hence enable a comparison of the unit prices for one ton of exports or imports. The UN-Comtrade database provides next to the physical unit the respective monetary value of the traded commodity that has either been paid or received in the course of exchange. Figure 21 compares the monetary values of exports and imports of Argentina, Bolivia and Brazil in relation to the traded physical quantities. The measurement unit is USD per ton. Each graph shows the development of the unit price for an average ton of total exports (blue line); total imports (red line); exports solely to the core (dotted blue line) and imports solely from the core (dotted red line). The lines indicate how many USD could be earned with one ton of exports or how much had to be paid for one ton of imports respectively. All results

represent, of course, the average monetary value of one traded ton of matter in a year, since all material categories were subsumed in one traded mass.

In order to support the inter-national comparability of the results, all graphs are equally scaled. The findings indicate that the average export prices were clearly below the prices which had to be paid for the average imported ton. The average value for one ton of exports exceeded the 500-USD-mark only exceptionally. The average value of imports largely amounted to more than twice of it. Imports from the core states were constantly of higher value, whereas the average values of exports to the core were similar to those of the world average – with the exemption of Bolivia.

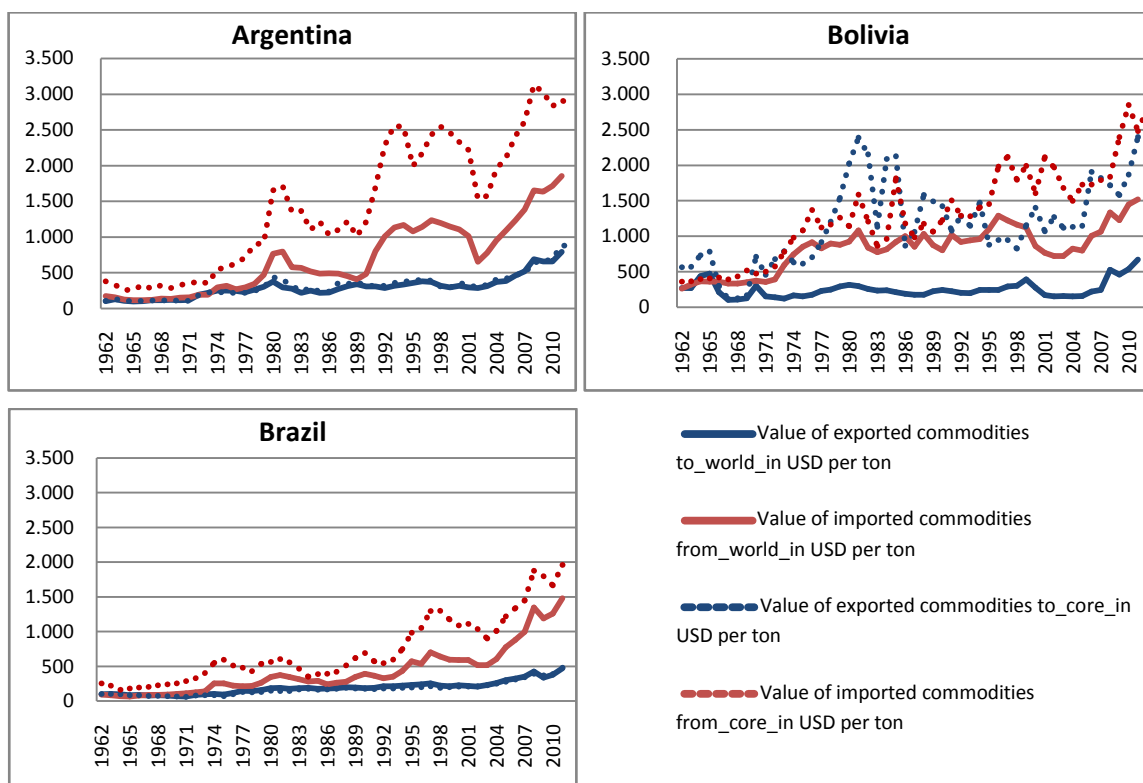


Figure 21_Value of exported and imported commodities; in USD per ton, 1962-2011/12.

Source: Own calculation; based on UN-Comtrade 2012/2013.

The Bolivian case is insofar remarkable, as the value of commodities exported to the core competes on a similar level with the respective import values. Bolivia's average exports were, like Argentina's and Brazil's, of rather low value compared to the average value of imported products. However, the trade with the core states did not influence this relation significantly, since trade flows with the core were in both directions of higher value. The relative high value of exports to the core results mainly from precious metals, like tin or silver, which were of high monetary value but of low physical weight.

In contrast, Argentina's export to the core was of the same low value as that to the world average. One major reason for this poor result is the large share of exported primary crops and other biomass products. The value of imports, per contra, increased at a much faster pace. The relative parallel curves of import unit prices (world + core) indicate that the high-valued imports from the core determined to a large extent the course of the total import curve. Taking Argentina's highly negative PTB into account, one can assume that Argentina's supply of massive low valued matter and the simultaneous import of higher valued products resulted in a rather bad deal. Indeed, Argentina's core-related trade over the last five decades resulted in a negative monetary trade balance, even though Argentina's PTB became ever more negative – as the next chapter indicates.

Brazilian unit prices of exports (to both the world and the core) show a rather similar development as the Argentinean, indicating a low value of average export quantities. The average unit price of on tone of imports increased steadily and at a higher pace as export unit prices did. Imports from the core were particularly expensive, compared to their physical weight and to the values of the other trade flows. The import of products mainly from metals (e.g. machines) from the core made up the highest expenses. The following short example shall illustrate the relevance of higher value-added products imported from the core: The total import reduced by the core-related import would result in a unit price that would be quite similar to those of the exports – until the early 2000s when the evolution of new extractivism favoured the export of commodities with low value per ton to non-core countries alike.

4.4.4 Physical and Monetary Trade Balances

The last analytical chapter will summarise and concretise findings suggested in the foregoing chapters and will provide further insights into unequal exchange relationships by contrasting the PTB with its respective MTB (monetary trade balance). The MTB is not equal to the national balance of trade, since no trade of services is included. The data of the MTB are fully based on the reported prices of the traded commodities reported to the UN-Comtrade database. The graphs of figure 22 illustrate the monetary losses and profits that accompany the PTB. The horizontal axis (abscissa – x-axis) represents the summed up PTB-values in million tons. All dots appearing on the left side of the vertical axis (ordinate – y-axis), which represents the MTB in billion USD, indicate a negative PTB since they are located below zero. The MTB, which is applied to the y-axis, represents the monetary

values generated by the exchange of commodities. All dots below the x-axis, and subsequently below zero, indicate a negative monetary result achieved by the physical exchange in the respective year – and vice versa, all dots above zero show the revenues realised by the physical exchange. Each dot stands for one year and is defined by the results obtained by the PTB and the corresponding monetary value. They are linked by a black curve that shall enable a retro-traceability of the development in chronological order. In general, the chronological order moves from the centre to the left, since the PTB usually got ever more negative.

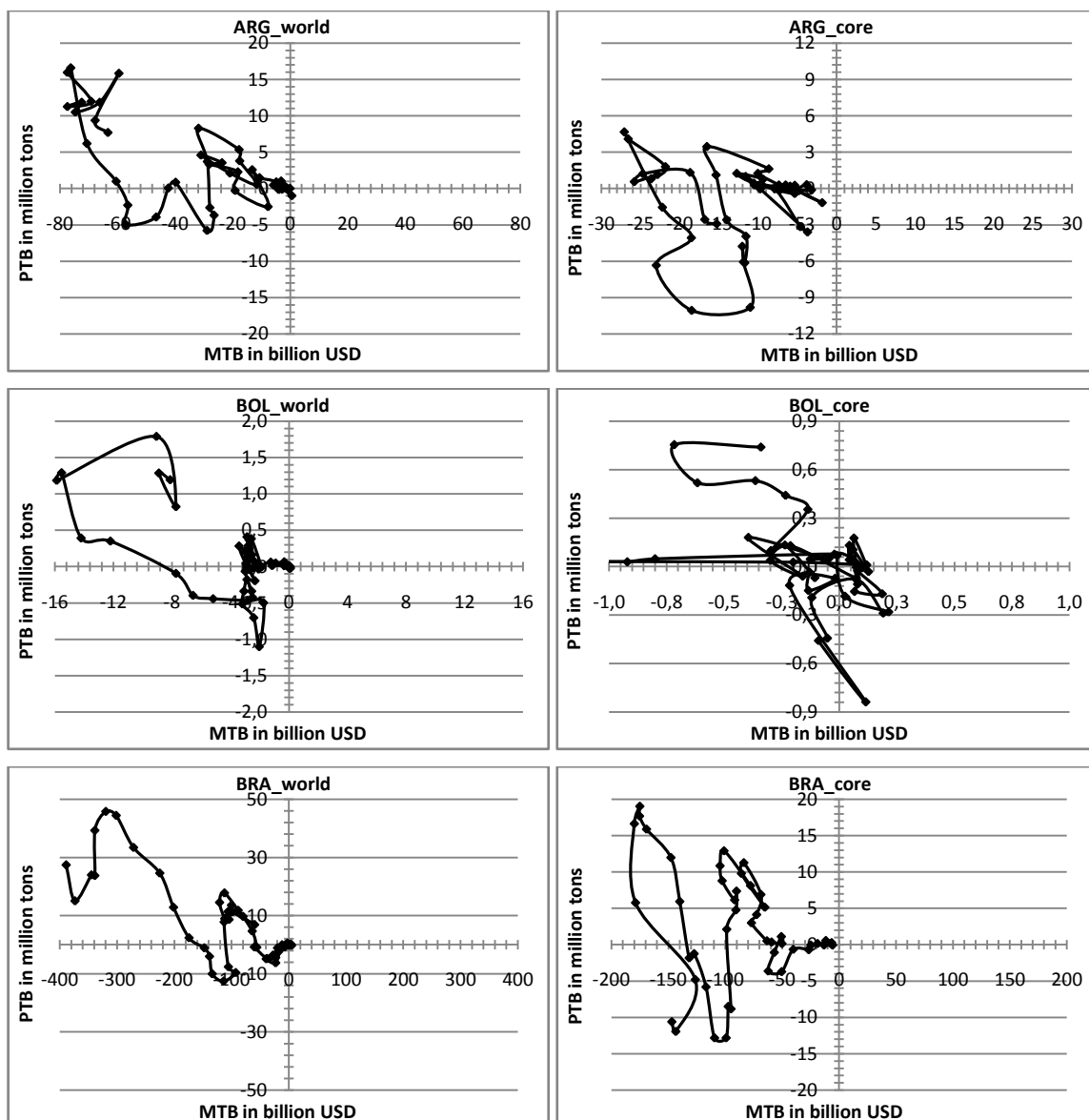


Figure 22_Physical and Monetary Trade Balances in crossed scales, in million tons and billion USD, 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012/2013.

Note: The ordinate represents the MTB scaled in billion USD. The abscissa represents the PTB scaled in million tons. In order to improve the visibility of trends, graphs are scaled differently. The Monetary Trade Balance (MTB) is based on the monetary values of the physical trade reported to the UN-Comtrade database.

The used illustration-format has the obvious disadvantage that the mentioned chronological order cannot fully be retraced in every single case, since the dot-linking curve does not always follow a clear direction, or the differences between the single dots are too small. This is the case for Bolivia, particularly for the core-related trade, and for Argentina to some extent. Though, in order to maximise the visibility of trends, the graphs are unequally scaled. However, apart from these weaknesses the chosen format enables to compare the results of the PTB with their corresponding monetary performance. Additionally, findings can be drawn from differences of unequal exchange relationships between total-world and core-related trade. The appendix (A3) provides the same illustration in per capita terms, which enables a higher comparability between the countries, and, therefore, graphs are scaled equally.

In the case of Argentina the PTB became more and more negative, while this generated largely positive incomes until the early 1990s when a net-export of 29 million tons resulted in a net-loss of 6 billion USD in 1994. The same phenomenon repeated in 1998 when a net-export of 58 million tons yielded in monetary expenses of more than 5 billion USD. Since then the terms of trade improved and a still deeper physical exploitation resulted finally in physical trade earnings of more than 16 and 17 billion USD per annum in the 2000s. The comparison with the Argentinean core-related trade provides some remarkable findings. At first the trend is rather difficult to retrace. Until the 1990s no significant direction is visible, the PTB becomes gradually more negative while generating insignificant monetary revenues. After a short height in 1990 when a net-export of 17 million tons to the core yielded an income of around 3 billion USD, the trend deteriorated substantially. Nearly the whole decade of the 1990s and the early 2000s was marked by massive net-exports and simultaneous net-losses in foreign core-related trade. This means that even though the PTB with core states became more and more negative, the MTB remained negative for a long period alike. Furthermore, Argentina could not benefit from improved terms of trade when trading with the core. Indeed, net-exports of 27 million tons resulted in revenues of 4 to 5 billion USD in 2002/2003; the trend deteriorated again and led to negative monetary yields of around 3 billion USD while exporting net-amounts of more than 15 million tons. In sum, core-related trade still seems not to be a big deal for Argentina. This may be underlined by the following figures: Argentina exported a net-matter of more than 600 million tons to the core during the last five decades. Paradoxically, this high appearing number resulted in a monetary net-loss of more than 40 billion USD. This indicates that Argentina provided large quantities of low value commodities (primary materials) for the core, and imported

less weighty, processed and high value-added products from the core. Taking the average unit prices, the course of the PTB, and the share of exported primary products into consideration, an unequal ecological exchange with the core is undeniable. The implementation of SAPs further aggravated this phenomenon. And even though Argentina's actual GDP per capita may be comparable to those of core countries, the conducted investigation clearly suggests that Argentina is in terms of an ecological adjusted world-system theory a peripheral country, which position did not change dramatically.

The interpretation of Bolivia's data is even more challenging. From 1970 to 2000 Bolivia's foreign trade virtually stagnated at a very low level of slightly positive or negative MTB results and around a net-export of two to three million tons per annum. The emerging new extractivism brought about larger net-exports and subsequently, with some years delay, also a positive MTB. Bolivia generated with rising exports (mainly natural gas) external incomes up to 1.8 billion USD in 2008. Bolivia's core-related trade seems not interpretable in this illustration. In fact, the data do not indicate a significant trend in any direction. From 2004 onwards the MTB was constantly positive, the PTB as expected simultaneously negative. It is remarkable that Bolivia is the only examined country that could generate a positive MTB and a corresponding positive PTB with the core at the same time, for example during the early 1980s. However, it is rather difficult to interpret these data, since they range on a quite insignificant scale. Bolivia is unquestionable the poorest country of the trio. The fact that it did not extensively export matter might be explained by the actualities that Bolivia had on the one hand no competitive export infrastructure and on the other hand hesitations and a deep-rooted reluctance to supply raw material at unfavourable terms of trade. Hence merely the evolution of new extractivism, with improved terms of trade and a higher proportion of public revenues from exports, could boost Bolivia's physical export quantities. Bolivia can be described as a country that refuses and resists to act and fulfil the role as a peripheral supplier of cheap raw material.

On the contrary, Brazil tries to make usage of its rich natural resource endowment and exports massively. But it is important to note that Brazil has different preconditions: the country itself is much larger than Bolivia; the population is nearly 20 times larger; the domestic market is internationally competitive; policies of ISI brought more success and a diversified economy; the GDP per capita is about four times larger than that of Bolivia and so forth. It is relatively easy to retrace the course of the Brazilian trend-curve. Starting with low trade intensities in the 1960s, the PTB soon turned markedly negative in the 1970s. At first, the generated foreign trade value was negative, but the MTB became positive in the

early 1980s. This situation of a negative PTB and positive MTB sustained until 1996 when the generated monetary value turned negative again. Nearly the whole area of neoliberal adjustment was subsequently marked by a loss of money in the exchange for net-exports of matter. For example, in 1998 Brazil had a net-export of 139 million tons and yielded a corresponding loss of over 10 billion USD. And again, since the early 2000s the improved terms of trade turned both the MTB highly positive and the PTB even more negative. In 2006 Brazil witnessed a height of 320 million net-exported tons that generated 46 billion USD incomes from foreign exchanges. However, the core-related trade shows a differing picture. Until 1977 the PTB became gradually more negative with a corresponding slightly negative MTB. The whole 1980s were marked by a relative slow deteriorating PTB and a constant positive MTB. The neoliberal adjustment of the 1990s turned the MTB negative again. During that time Brazil net-exported more than 100 million tons to the core and generated a monetary loss with these trade relationship of up to 13 billion USD (e.g. in 1998). Interestingly, in 1998 Brazil net-exported a total of 139 million tons to the whole world, of which 109 million tons were destined for the core. As mentioned above, the government registered in this year a total monetary loss of 10 billion USD, and the monetary loss generated solely with core-related trade amounted to over 13 billion USD. This indicates that Brazil could balance its loss partly by a less unequal trade with non-core states. But the so-called “China-effect” and a post-neoliberal policy orientation forced the core to purchase Brazilian imports at higher prices and consequently the MTB turned highly positive from 2002 to 2008. Remarkably a slightly less negative PTB corresponded with a sharply deteriorating MTB during the last few years, highlighted by a monetary loss of 12 billion USD and corresponding net-exports of 143 million tons. The Brazilian case shows an exploiting country that generates in the meantime large revenues from exports, but this success is dearly bought by an alarming negative PTB. Especially core-related trade seems to involve many features of an unequal ecological exchange.

5 Conclusion

The concluding chapter is structured in the following way: the first part of the conclusions deals with the concrete findings of the study and sets them in relation to theoretical assumptions and questions raised in the introduction. The second part goes beyond the focus of this thesis and provides links to further issues of relevance: it introduces the topic of indirect flows, the shifting of environmental burdens and

environmental distribution conflicts. These links are all tightly related to international trade and provide, therefore, incentives for further research.

5.1 Interpretation of Results

The results clearly indicate that the three examined countries are net-exporters of physical quantities. However, their physical involvement in world- and core-related international trade differs greatly, both in total and per capita terms. Taking the stage of processing of export commodities and the MTB into account, many characteristics of an unequal ecological exchange can be confirmed. A relevant finding is that exactly during the time of neoliberal adjustment, the MTB as well as the PTB deteriorated substantially, even though it was the goal and promise of SAPs that a liberalisation of trade (what for Latin America in fact meant more exports) would result in foreign exchange earnings. Bolivia represents an exception to some extent. Interestingly, the two countries (Argentina and Brazil) that could today be considered as semi-peripheral states show highly negative PTBs, whereas the poorest country (Bolivia) that clearly belongs to the periphery shows mixed results. It is supposed that a domestic natural exploitation for export reasons needs pre-conditions, like a minimum standard of export infrastructure and internationally competitive production. However, international competitiveness in terms of primary commodities export does not always implicate a sophisticated development model. Furthermore, the specialisation on “traditional” comparative advantages may be a misleading concept within a catching-up development model.

The analyses showed that the different development orientation phases were highly observable in Argentina’s PTB: the period of inward-looking development during ISI resulted in a relatively stable balance that lasted until the debt crisis of the 1980s. The Lost Decade brought about less imports, exports grew only marginally. The neoliberal adjustment policies of the 1990s paved the way for outstanding export increases. This reorientation in export-led growth and outward-looking development was perpetuated in the age of new extractivism, resulting in a highly negative PTB. On the contrary, Bolivia’s PTB shows a less characteristic development. It is difficult to retrace different development orientations on the PTB – except for the new extractivism. Bolivia’s foreign trade seems not to be very susceptible to external stimuli, even though the government implemented structural reforms already in 1985. From the early 1970s to the early 2000s the PTB shows rather the same picture. Apparently, solely the policies of new extractivism and improved

terms of trade could bring Bolivia to boost its exports. Brazil represents a different case: the government already started during the phase of ISI, in the 1960s and 1970s, to set incentives for exports. During the 1970s exports and imports grew at the same pace. The debt crisis of the 1980s reduced imports, while exports further increased. The 1990s and neoliberal adjustment policies meant moderately increasing exports, whereas the 2000s and the “left turn” induced a truly considerable shift towards growing exports. In sum, the different PTBs represent quite different development trends. The new left turn and new extractivism of the 2000s meant generally higher exports than the period of neoliberalisation, but the latter may be responsible for the susceptibility to the growing global demand for resources of the former.

The comparison with core-related trade uncovers further relevant findings: In general, the PTBs as well as the MTBs were more negative. Argentina’s PTB with the core shows little difference to total trade patterns; the imports fell in relation to the exports, and the exports increased steadily but at a lower rate compared to the global exports. This indicates that the core lost its position as main trading partner. Furthermore, Argentina is the only country that generated negative monetary results concerning core-related trade during the 1990s, even though the PTB was considerably negative. This means that Argentina provides natural resource without gaining economic revenue from selling those. In contrast, Bolivia’s core-related PTB shows mixed results which do not allow for general conclusions. The remarkable finding is, though, that there is no significant (export-) trend to reveal. Finally, Brazil tells another story: metal and biomass exports were already high during the 1970s. This means that, like in Argentina, the exports grew at a slower pace compared to the global trade. The core-related PTB has been vastly negative already before structural adjustment. The consideration of monetary values reveals that core-related trade implies a quite unfavourable mass to value relation. But the importance of the core as trading partner decreased steadily.

Taking the PTB and the supplementary analysis as an estimation of an unequal ecological exchange, it could be found that first of all to Argentina follows in the 1990s the typical development path described by the concept of unequal ecological exchange. At that time core-related trade implied a loss of mass and money at the same time. The results for Brazil point into a similar direction. However, in Brazil the relative proportion of core-related trade decreased and, therefore, unequal ecological exchange is not entirely supported by SAPs – as the concept is defined by exchanges between core and periphery. Core-related trade is still characterized by the worst mass to money relation, but so-called South-South

trade is on the rise. Though, the fact that the three countries increasingly export to non-core countries still does not allow for rejecting the concept of unequal ecological exchange.

Frederick Weaver (2000) identified the new international political economy that emerged in Latin America in the 1980s and 1990s as “an amalgam of a number of elements from previous phases” (Weaver 2000: 203). He defined the enforcement of free trade and investment by the world’s most powerful nation as “Free Trade Imperialism”. Yet an accurate analysis of the PTBs and the analyses of related supplementary evaluations suggest, as mentioned above, a rather complex picture. For example, the period of new extractivism brought about much larger quantities of exports than the whole era of structural adjustment did. Furthermore, the importance of the core as trading partner decreased steadily. But still, core-related trade implicated the highest trade deficits – in both physical and monetary terms.

5.2 Further Perspectives

Other issues associated with unequal ecological exchange cannot be addressed by using the PTB. For instance, to measure the shifting of environmental burdens through international exchange relations requires additional information about indirect flows related to trade (Dittrich; Bringezu 2010). Moreover, an unequal distribution of environmental goods and burdens tends to result in environmental distribution conflicts. Both perspectives on unequal ecological exchange were not part of the study, but shall be mentioned briefly below.

5.2.1 Indirect Flows

Indirect flows are those material flows used in the production process of the traded goods but are not physically included in the commodities traded. Indirect flows associated with exports include all upstream material input flows required to produce the exported goods. The calculation of indirect flows requires additional efforts and estimation-models like Input-Output-Tables and multiplication coefficients (Dittrich; Bringezu; Schütz 2012). Upstream requirements are often termed raw material equivalents: “[I]ndirect material flows should be measured in terms of raw material equivalents, which express the amount of used raw materials required along the whole production chain of an imported or exported

product” (Bruckner et al. 2012: 569). The calculation of indirect flows associated with trade shows that while direct trade flows increased during the past five decades, the indirect flows grew at an even faster pace. The indirect flows associated with traded metal goods are of outstanding relevance and account for around the half of all indirect flows since 1962. The second largest indirect trade flows are associated with traded biomass (Dittrich; Bringezu; Schütz 2012).

Thomas Wiedmann et al. (2013) calculated the raw material equivalents by using a global multi-regional input-output model resulting in the so-called material footprint of nations. The material footprint of a nation considers the domestic extraction used within the country as well as all direct and indirect requirements from other countries. Through this method Wiedmann et al. point out the externalisation of resource-intensive processes to peripheral regions and contradict the often praised resource-decoupling of matured economies. The authors argue that the material footprint indicates that even relative decoupling did not take place in most developed countries. However, this method also has some shortcomings, e.g. the input-output model is based on monetary coefficients, and the allocation of upstream requirements of specific products in physical units via monetary relations might result in flaws (Kastner et al. 2013). Regarding indirect flows, Joan Martinez-Alier (2010: 2) notes: “Inclusion of indirect flows increases the comprehensiveness of the analysis but it also increases its arbitrariness.”

Though, the provision of indirect flows associated with international trade is a precondition to estimate the shifting of environmental burdens: “If a country's exports and their indirect flows are higher than the country's imports and their indirect flows, the difference equals a net resource extraction due to foreign trade in that country, which can be interpreted as a net shifting of environmental burden to that country” (Dittrich; Bringezu; Schütz 2012: 33).

5.2.2 Shifting of Environmental Burdens

The relevant scientific literature coincides that the core countries increasingly shift environmental burdens to countries of the (semi-)periphery (Matthews et al. 2000; Muradian; Martinez-Alier 2001; Martinez-Alier 2002; Bringezu; Schütz; Moll 2003; Bringezu et al. 2004; Giljum; Eisenmenger 2004; Schütz; Moll; Bringezu 2004; Weisz 2007; Dittrich; Bringezu; Schütz 2012). This becomes apparent by growing physical net-imports and associated indirect flows. Through an externalisation of primary production

processes to the periphery, core countries seem to improve their local environmental conditions. By that, economic growth is based on a shift of resource-, environment- and emission-intensive production (and accordingly environmental burdens) from domestic to foreign territory (Matthews et al. 2000; Bringezu et al. 2004).

It is evident that international trade can be used to source out resource-intensive processes and to shift environmental burdens: “The impacts associated with resource-intensive extraction and processing industries are increasingly shifted to other, usually less developed countries” (Bringezu; Schütz; Moll 2003). For example, the associated flows with raw material extraction, like mining or harvesting of crops and infrastructure development to open up new resources, are immense. Hence, resources imported to sustain the physical basis of an industrialised country put environmental pressure on the suppliers – mostly developing countries. Environmental costs of extracting and processing raw materials range from soil erosion and reduced soil fertility in the case of crop exports, to the moving of huge amounts of covering materials and overburden in the mining industry. Both forms of extraction often lead to changes in land cover and land use, and consequently to increasing pressure on biodiversity (Adriaanse et al. 1997; Bruckner et al. 2012). From a world-system theory perspective the unequal spatial separation of production steps between core and periphery is a distinctive feature of an expanding capitalist world-system. The international division of labour is basically characterised by primary production processes with a large throughput of matter and energy in the peripheral regions and technological advanced production processes with comparatively less input of matter and energy in the richer countries. This accordingly leads to an unequal distribution of environmental pressure with a systematic disadvantage for the extractive economies (Weisz 2007; Giljum; Eisenmenger 2004). Environmental pressure in reliance to resource extraction and processing is manifold: contamination, acidification or eutrophication of soil and water may be caused by mining and agriculture; landscape changes, loss of natural habitats, stress on biodiversity and decreasing natural sink capacities may be along the long term consequences (Bringezu; Schütz; Moll 2003). Some environmental damages may even be irreversible, like the future lack of availability of destroyed natural resources and biodiversity, or the contamination of soil and groundwater (Martinez-Alier 2002). Freer trade, like as it has been enforced by SAPs, “can promote increasing environmental-load displacement from the importing to the exporting country” (Muradian; Martinez-Alier 2001: 286). The shifting of environmental burdens through unequal trade relations, therefore, may create a pseudo-decoupling from economic growth and environmental degradation.

5.2.3 Ecological Distribution Conflicts

Ecological distribution conflicts arise from an unequal appropriation of natural resources and the shifting of environmental burdens from core-like to poorer and low-empowered regions. Joan Martinez-Alier identifies them as “conflicts over the principles of justice applicable to the burdens of pollution and to access to environmental resources and services” (Martinez-Alier 2002: 168 f.). The shifting of environmental burdens is associated with an unequal exchange which does not take the exhaustions of resources and local externalities into account (ibid.). Wallerstein (2000) noticed that the expansion logic of the capitalist world-system encounters increasing resistance when it comes to the relocation of environmental burdens. Accordingly, ecology movements have been growing during the last decades and communities worldwide increasingly articulate the defence of their places, environments, and ecosystems (Escobar 2006). Arturo Escobar’s argumentation follows a similar line: He argues that conflicts and struggles often remain the only way to encounter a neoliberal globalisation and environmentally destructive practices that put irresistible pressure on nature and humans (ibid.).

Joan Martinez-Alier (2001) draws attention to the fact that ecological distribution conflicts are not merely struggles for higher benefit-sharing or other forms of monetary compensation. In fact, different valuation-schemes of environmental damages exist. The economic valuation is mostly realised to be the common standard. But not all value-struggles can be expressed in monetary terms, since they rest on different standards of valuation. For instance, intrinsic natural values, sacredness, culture meanings, livelihood, indigenous rights, human rights, etc. cannot be grasped in monetary terms. Moreover, the long-term loss of sink capacities, ecosystem services and biodiversity etc. are rather difficult to estimate. Irreversible environmental damages and cultural values of nature cannot simply be internalised into the price system.

For this reason, environmental justice movements rose to conquer the disproportionateness of environmental burdens. Different kinds of conflicts use different vocabulary references (Martinez-Alier 2010), e.g. the notion of indigenous environmentalism shall emphasise territorial rights and ethnic resistance against external exploitation; the reference to human rights might be useful when livelihoods are threatened; and the perception of environmental racism signifies the disproportionate environmental burdens carried by unprivileged parts of the population.

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Deutsche Kurzfassung

Um zu wachsen und den Fortbestand zu gewährleisten sind Volkswirtschaften auf materielle und energetische Inputs angewiesen. Dabei verzeichnen industrialisierte Länder mit einem hohen Massenkonsum einen größeren Material- und Energiedurchsatz als weniger reiche Staaten. Der internationale Handel spielt eine immer größer werdende Rolle um den physischen Wohlstand industrialisierter Nationen aufrecht zu erhalten und ihren Bedarf zu decken. In diesem Zusammenhang beschäftigt sich diese Diplomarbeit mit den bio-physischen Merkmalen und Strukturen von internationaler Entwicklung. Der spezielle Fokus liegt auf den bio-physischen Austauschbeziehungen zwischen dem Norden und dem Süden. Drei Länder Lateinamerikas wurden ausgewählt um die Perspektive des Südens zu analysieren: Argentinien, Bolivien und Brasilien. Das Ziel ist insbesondere den Einfluss von Strukturanpassungsprogrammen auf die physischen Handelsbilanzen der Staaten zu untersuchen. Dadurch werden bio-physische Konsequenzen, die sich im internationalen Handel niederschlagen, ersichtlich. Das Konzept vom *unequal ecological exchange* wird deshalb, neben der Weltsystemtheorie, als zweite theoretische Säule herangezogen. Die physischen Handelsbilanzen (gerechnet als Importe minus Exporte) dienen dazu den *unequal ecological exchange* zu quantifizieren und das Konzept zu operationalisieren und zu überprüfen inwiefern ein ungleicher ökologischer Austausch durch die Strukturanpassungsprogramme intensiviert bzw. hervorgerufen wurde.

Da sowohl die Weltsystemtheorie als auch das Konzept vom ungleichen ökologischen Austausch einen signifikant ungleichen physischen Handel insbesondere zwischen Zentrums- und Peripheriestaaten besagen, wurde eigens für jedes der drei Länder eine zusätzliche physische Handelsbilanz erstellt, die nur den physischen Handel mit den Zentrumsstaaten beinhaltet. Dadurch können Annahmen aus der Theorie überprüft werden und Vergleiche zwischen dem Welthandel und dem Handel nur mit dem Zentrum getroffen werden. Die Ergebnisse der physischen Handelsbilanzen weisen die drei Länder eindeutig als Netto-Exporteure aus. Dennoch unterscheiden sich ihre Bilanzen signifikant voneinander was Quantität und Qualität betrifft, auch wenn die Bilanzen pro Kopf ausgewertet werden. Berücksichtigt man den Fertigungsgrad der Exportprodukte und die zugehörige monetäre Handelsbilanz, können viele Kennzeichen eines ungleichen ökologischen Austausches bestätigt werden. Eine bemerkenswerte Erkenntnis wurde bezüglich der Phase der neoliberalen „Anpassung“ gezogen: sowohl die monetäre als auch die physische Handelsbilanz verschlechterten sich gleichzeitig, obwohl das vorgegebene Ziel und Versprechen der Strukturanpassungsprogramme erhöhte Deviseneinnahmen aus internationalem Handel waren. Die Nettoexporte nahmen in dieser Phase zwar eindeutig zu, die sogenannte Phase des *New Extractivism* brachte jedoch noch höhere Nettoausfuhren und damit eine noch negativere physische Handelsbilanz. Gleichzeitig verloren aber die Zentrumsländer zusehends an Relevanz als Handelspartner. Gesamt gesehen bedeutet der Handel mit dem Zentrum für die drei untersuchten Länder signifikant höhere Defizite als der globale Handel – sowohl in physischen als auch in monetären Werten. Bolivien bildet in einigen Fällen jedoch eine Ausnahme.

Academic CV



Personal Information

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Education

Tertiary	since 03/2012	MA Social and Human Ecology, University of Klagenfurt, IFF Vienna
	09/2012-01/2013	Exchange Semester, Roskilde University Center, Denmark
	since 10/2008	Diplomstudium Development Studies, University of Vienna
	10/2008-02/2012	BA Sociology, University of Vienna
Secondary	09/2002-06/2007	Commercial Academy, Waidhofen/Ybbs, Lower Austria
	09/1999-06/2002	Grammar School, Waidhofen/Ybbs, Lower Austria
	09/1998-06/1999	Grammar School, Billrothstraße, Vienna
Primary	09/1994-06/1998	Primary School, Kindermannngasse, Vienna

Personal Skills

Mother language German
Other languages English, French
Computer skills Competent with Microsoft Office Programs, SPSS
Driving licenses A, B

7 Appendix

A1) PTBs' compilation record

Data source: United Nations Commodity Trade Statistics Database:

<http://comtrade.un.org/db/>

Access: world-related trade: 10/2012

core-related trade: 02/2013

A1.1) List of Core-Countries

Australia	Greece	Norway
Austria	Hungary	Poland
Belgium	Iceland	Portugal
Canada	Ireland	Slovak Republic
Czech Republic	Italy	Slovenia
Denmark	Japan	Spain
Estonia	Republic of Korea	Sweden
Finland	Luxembourg	Switzerland
France	Netherlands	United Kingdom
Germany	New Zealand	United States of America

A1.2) Adjustments in world-related trade

The physical unit is 1.000 metric tons, the monetary unit is USD.

Argentina:

Imports: -

Exports:

B.3.5. Clays and Kaolin: no data entry for 2008.

Estimation via average prices:

	2007	2008	2009
\$	56.026.491	58.649.143	50.365.049
tons	142,247	0,000	134,290
\$/t	393.868	384.458	375.047
tons		152,550	

Bolivia:

Imports:

No entries for 1973 (no physical, no monetary).

Some biomass data could be derived from the FAOSTAT (1.000 t):

B.1.1.1. Cereals, primary and processed 156.391

B.1.1.3. Sugar crops, primary and processed 0.200

B.1.1.8. Fruits, primary and processed 3.800

B.1.8.3. Dairy products, birds eggs, and honey 6.500

Remaining data were estimated via averaging physical data of adjacent years.

B.1. Biomass:

The following entries seem implausible high considering their corresponding monetary value:

B 1.1.8. Fruits primary and processed: data for 2004 derived from FAOSTAT: 25.955.

B 1.1.10. Other crops: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 6.254).

B 1.8.3. Dairy products, birds eggs, and honey: data for 2000 derived from FAOSTAT: 15.561.

B.1.9. Products mainly from biomass: no data entry for 2000.

Estimation via average prices:

	1999	2000	2001
\$	87.992.367	93.378.026	101.613.413
tons	85,953	0,000	101,021
\$/t	1.023.731	1.014.798	1.005.864
tons		92,01641126	

B.2. Metal ores:

The following entries seem implausible high considering their corresponding monetary value:

B.2.1. Iron Ores: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 112.072).

B.2.3. Products mainly from metals: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 131.650).

B.3. Non metallic minerals:

The following entries seem implausible high considering their corresponding monetary value:

B.3.5. Clays and Kaolin: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 17.415).

B.3.6. Chemical and fertilizer: Estimation via average prices 1990 and 2000:

	1989	1990	1991
\$	2.449.313	2.813.874	8.348.712
tons	5,412	807,778	19,665
\$/t	452604,3	438573,8	424543,2
tons		6,415965	

	1999	2000	2001
\$	7.763.581	6.812.912	6.366.791
tons	9,946	69,967	22,271
\$/t	780537,3	533206,2	285875,1
tons		12,77726	

B.3.8. Other mining and quarrying products n.e.c.: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 170.066).

B. 3.10. Products mainly from non-metallic minerals: Estimation via average prices 2000:

	1999	2000	2001
\$	13.449.322	12.660.440	12.862.779
tons	20,118	56,265	22,923
\$/t	668535,58	614828,28	561120,99
tons		20,591831	

B.4. Fossil Energy carriers:

B.4.3. Petroleum: data for 1997 derived from IEA-statistics: 308; data for 2000 derived from IEA-statistics: 277.

B.4.6. Products mainly from fossil energy carriers: Estimation via average prices 2000:

	1999	2000	2001
\$	77.696.582	90.692.467	92.577.909
tons	76,447	218,254	88,002
\$/t	1016340,8	1034168,9	1051996,959
tons		87,695993	

B.5. Other products: data for 2000 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 121.604).

Exports:

B.5. Other products: data for 1991 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 6.103).

Brazil:

Imports:

B.1. Biomass:

B.1.1.7. Vegetables, primary and processed: data for 1996 derived from FAOSTAT: 641.064.

B.1.1.8. Fruits, primary and processed: data for 1996 derived from FAOSTAT: 595.502.

B.1.5.1. Timber, primary and processed: Estimation via average prices 1995:

	1994	1995	1996
\$	26.210.667	29.870.986	27.460.817
tons	273,128	761,914	407,377
\$/t	95964,691	81686,758	67408,82524
tons		365,67721	

B.1.5.2. Wood fuel and other extraction, primary and processed: Estimation via average prices 1995 and 1996:

	1994	1995	1997
\$	590.166.021	1.190.865.497	1.043.450.634
tons	310,026	1581,059	526,640
\$/t	1903601,904	1942467,896	1981333,888
tons		613,0683032	

	1995	1996	1997
\$	1.190.865.497	941.099.936	1.043.450.634
tons	613,068	1653,444	526,640
\$/t	1942467,896	1961900,892	1981333,888
tons		479,6878067	

B.2. Metals:

B.2.2.3. Lead: data for 1996 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 53.285).

Exports:

B.5. Other Products: Estimation via average prices 1994, 1995 and 1996:

	1993	1994	1995
\$	5.324.888.226	5.303.441.940	5.455.749.870
tons	2216,556	3453,164	1533,532
\$/t	2402324,878	2979980,759	3557636,64
tons		1779,689994	

	1994	1995	1997
\$	5.303.441.940	5.455.749.870	6.021.942.161
tons	3453,164	4436,974	1079,307
\$/t	1535820,843	3557636,64	5579452,437
tons		1533,532067	

	1995	1996	1997
\$	5.455.749.870	5.653.235.194	6.021.942.161
tons	1533,532	4253,563	1079,307
\$/t	3557636,64	4568544,539	5579452,437
tons		1237,425869	

A1.3) Adjustments in core-related trade

Argentina:

Imports:

B.1. Biomass:

B.1.1.3. Sugar crops, primary and processed: data for 1994 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 3.523).

B.2. Metals:

B.2.2.9. Other metals: data for 1979 were divided by factor 10, since the decimal place seemed to be entered incorrectly (calculated result: 8.222).

Export:

B.1. Biomass:

B.1.1.10. Other crops: Estimation via average prices 1989:

	1988	1999	2000
\$	53.480.514	63.788.633	88.626.426
tons	47,235	126,037	70,318
\$/t	1132227,7	1196293,2	1260358,8
tons		53,321904	

Bolivia:

Imports:

No entries for 1973 (no physical, no monetary).

All data were estimated via averaging physical data of adjacent years.

B.1. Biomass:

B.1.9. Products mainly from biomass: Estimation via average prices 2000:

	1999	2000	2001
\$	16.802.778	13.308.831	17.453.053
tons	18,336	90,244	15,160
\$/t	916359,58	1033817	1151274,5
tons		12,873488	

B.2. Metal ores:

B.2.3. Products mainly from metals: Estimation via average prices 2000:

	1999	2000	2001
\$	625.130.938	519.789.629	352.264.342
tons	99,030	291,136	40,489
\$/t	6312550,91	7506386,25	8700221,59
tons		69,2463206	

B.3. Non metallic minerals:

B.3.5. Clays and kaolin: Estimation via average prices 2011:

	2010	2011	2012
\$	2.276.243	4.989.078	5.455.174
tons	2,837	75,533	5,923
\$/t	802283,303	861649,8	921016,297
tons		5,79014584	

B.3.6. Chemical and fertilizer minerals: Estimation via average prices 2000:

	1999	2000	2001
\$	5.557.151	3.514.901	2.725.317
tons	3,825	59,780	11,270
\$/t	1452782,708	847301,8169	241820,926
tons		4,148345878	

B.5. Other products: Estimation via average prices 2000:

	1999	2000	2001
\$	104.916.918	118.335.254	115.575.836
tons	29,356	168,441	23,997
\$/t	3573939,98	4195131,129	4816322,278
tons		28,20776046	

Exports: -

Brazil:

Imports:

B.1. Biomass:

B.1.1.3. Sugar crops, primary and processed: Estimation via average prices 1994:

	1999	2000	2001
\$	5.626.208	16.723.714	20.781.577
tons	3,716	41,999	9,055
\$/t	1514053,59	1904520,126	2294986,663
tons		8,781064462	

B.1.6. Fish capture: Estimation via average prices 1988:

	1987	1988	1989
\$	68.001.317	48.446.287	88.485.709
tons	21,110	0,075	20,289
\$/t	3221251,1	3791220,5	4361189,9
tons		12,778546	

B.2. Metals:

B.2.2.7. Aluminium: Estimation via average prices 1987:

	1986	1987	1988
\$	15.299.799	28.470.937	25.502.396
tons	2,440	0,000	4,002
\$/t	6271213,9	6321982,1	6372750,4
tons		4,5034827	

B.3.8. Other mining: Estimation via average prices 1995:

	1994	1995	1996
\$	396.287.582	549.500.781	535.729.061
tons	1088,071	4693,852	1422,888
\$/t	364211,2362	370359,7837	376508,3312
tons		1483,694519	

Exports: -

A2) Domestic Extraction, Imports and Exports

A2.1) Argentina

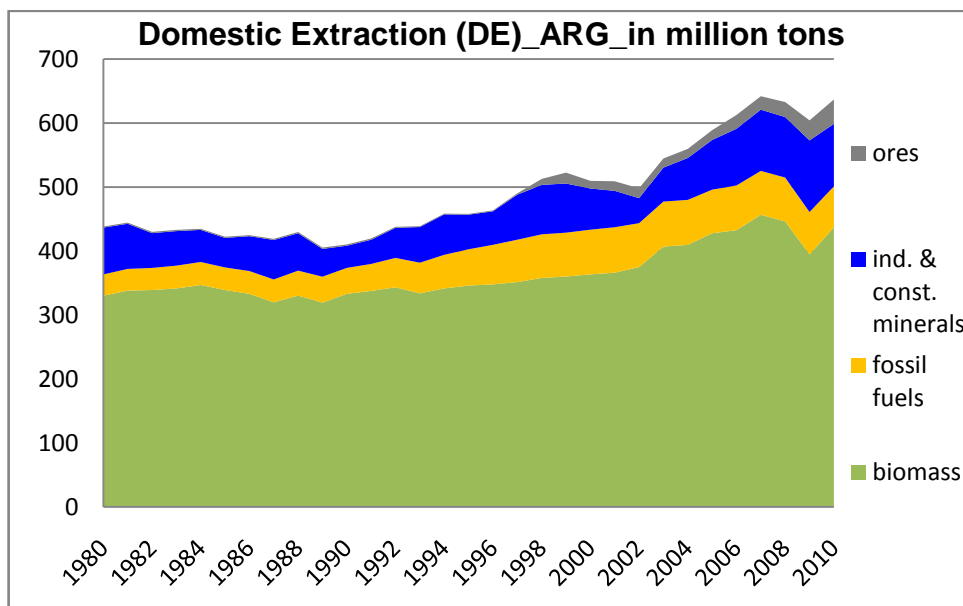


Figure 23_Domestic Extraction of Argentina, in million tons; 1980-2010.

Source: Own illustration; based on SERI; Dittrich 2012.

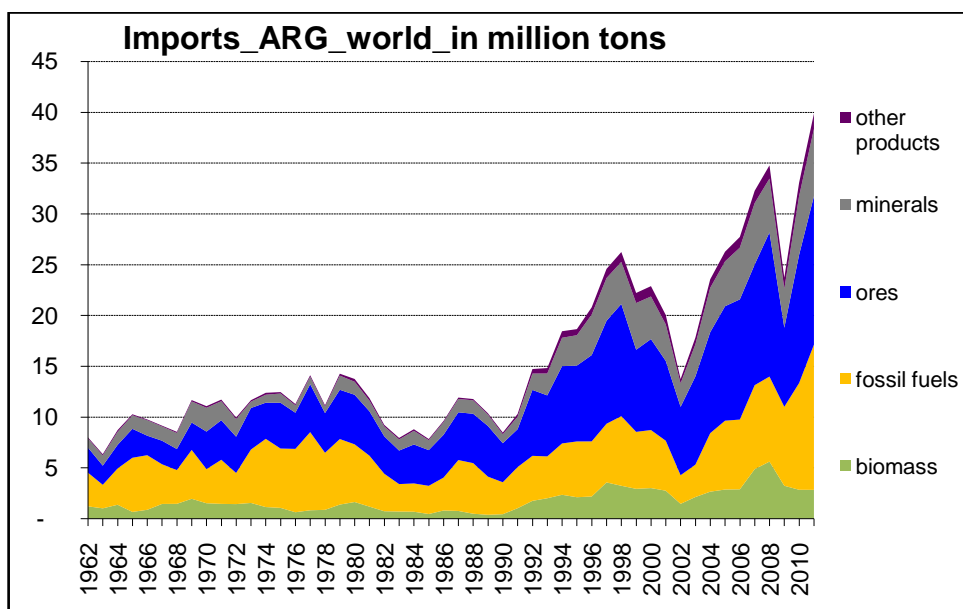


Figure 24_Argentinean Imports, in million tons; 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

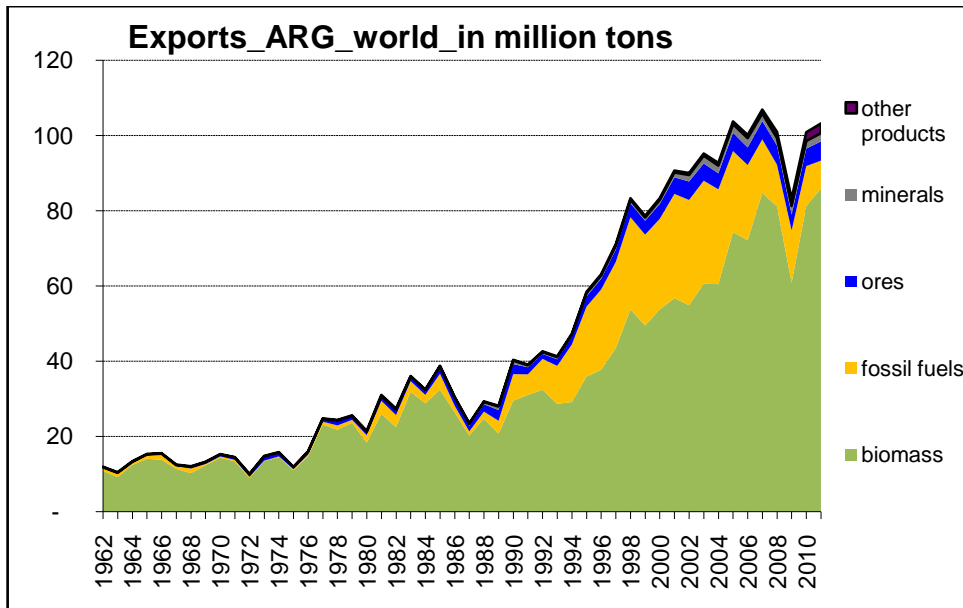


Figure 25_Argentinean Exports, in million tons; 1962-2011.
 Source: Own calculation; based on UN-Comtrade database 2012.

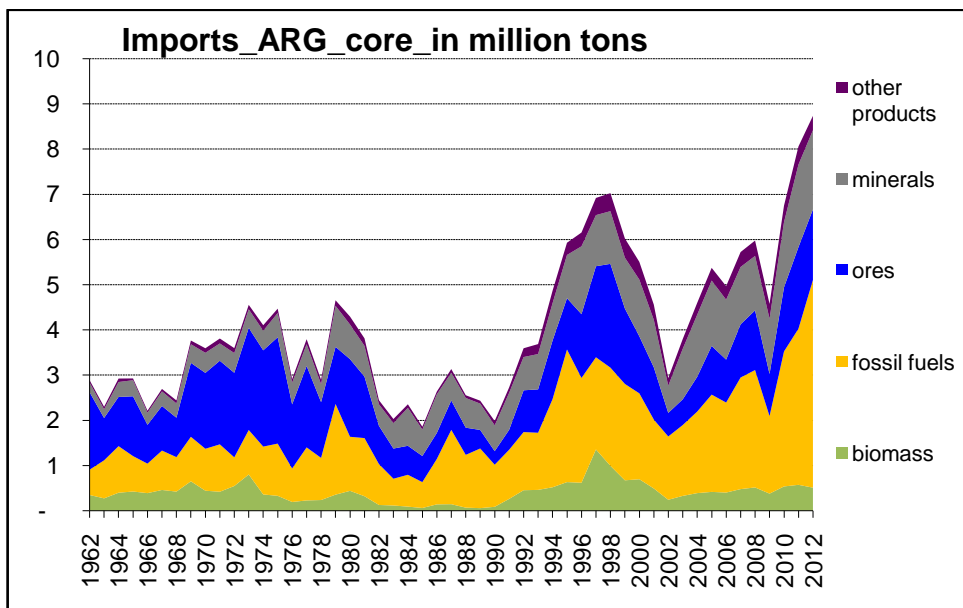


Figure 26_Argentinean Imports from the core, in million tons; 1962-2012.
 Source: Own calculation; based on UN-Comtrade database 2013.

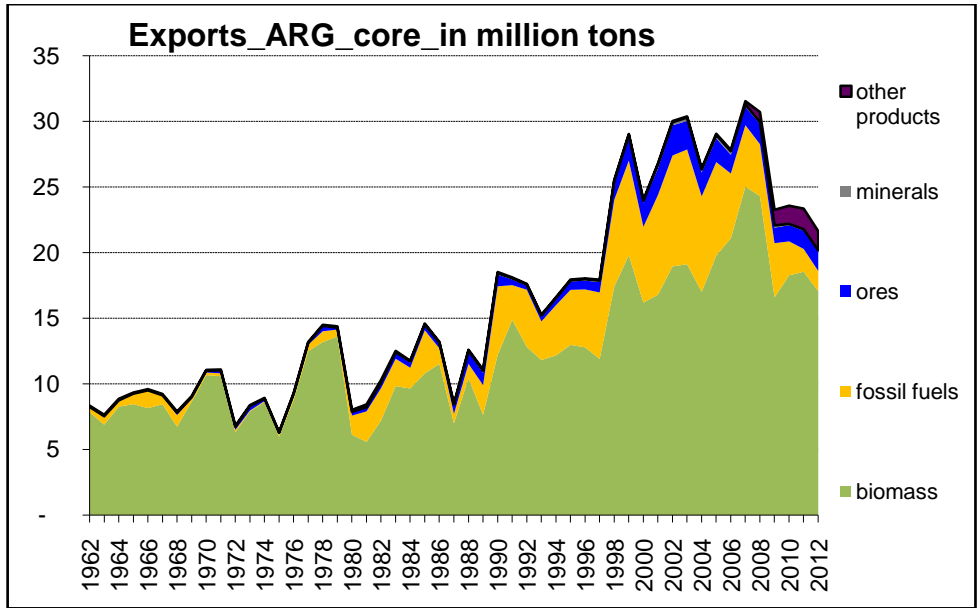


Figure 27 Argentinean Exports to the core, in million tons; 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

A2.2) Bolivia

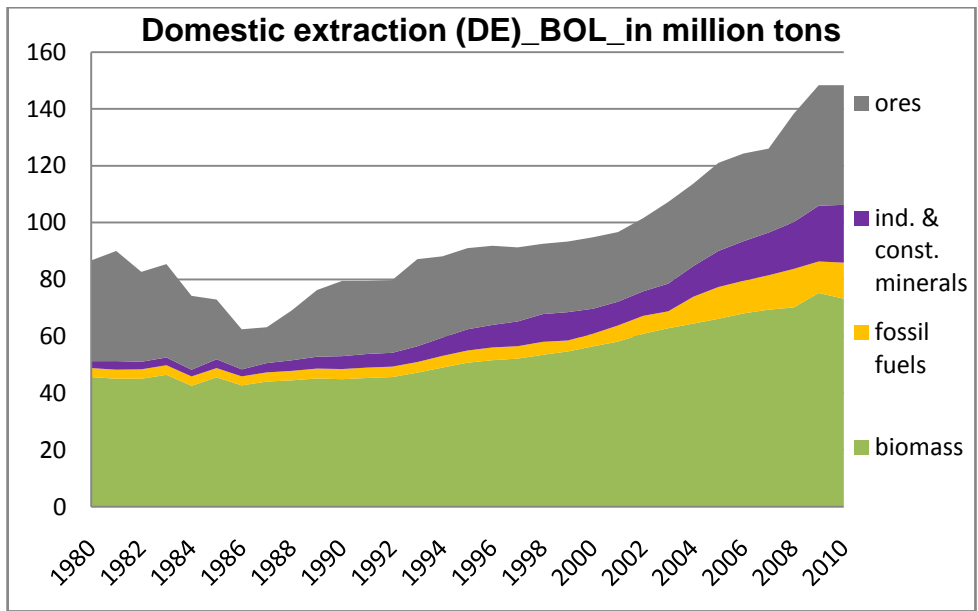


Figure 28 Domestic Extraction of Bolivia, in million tons; 1980-2010.

Source: Own illustration; based on SERI; Dittrich 2012.

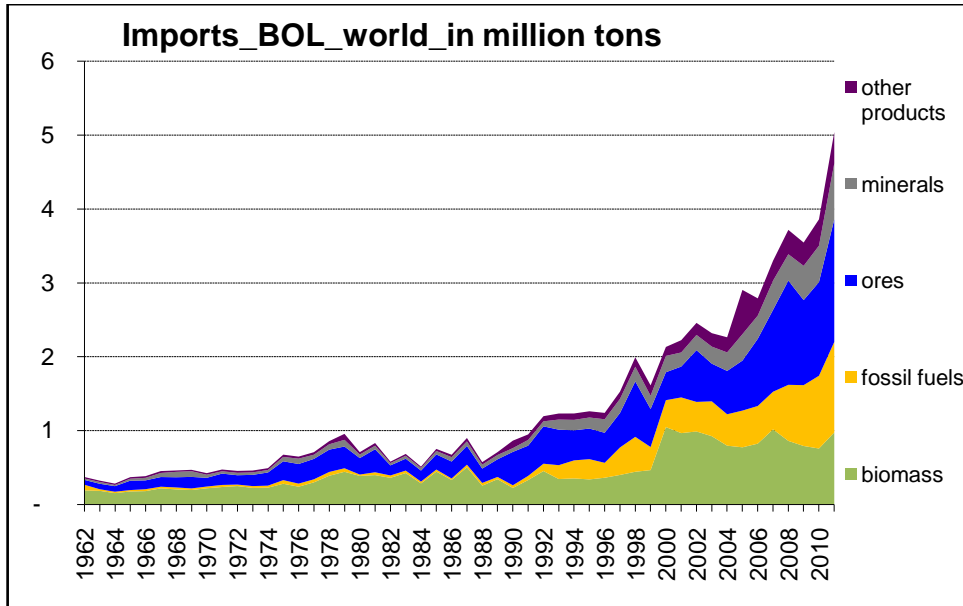


Figure 29_Bolivian Imports, in million tons; 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

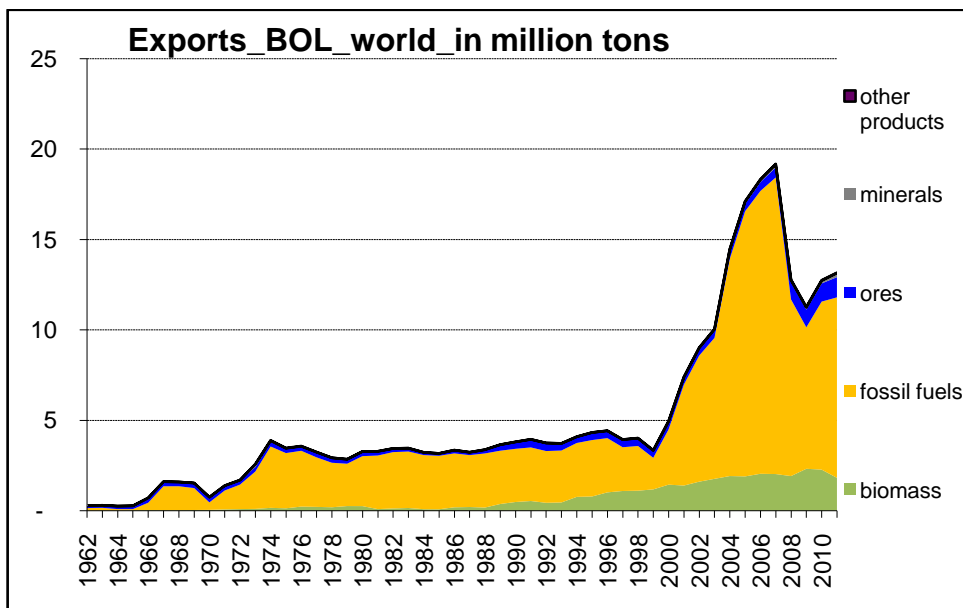


Figure 30_Bolivian Exports, in million tons; 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

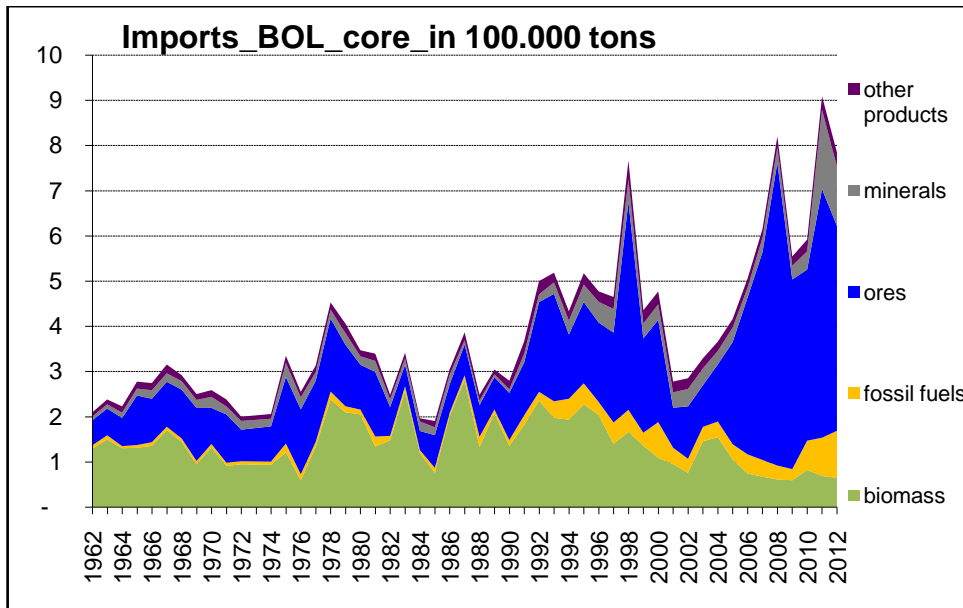


Figure 31_Bolivian Imports from the core, in 100.000 tons; 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

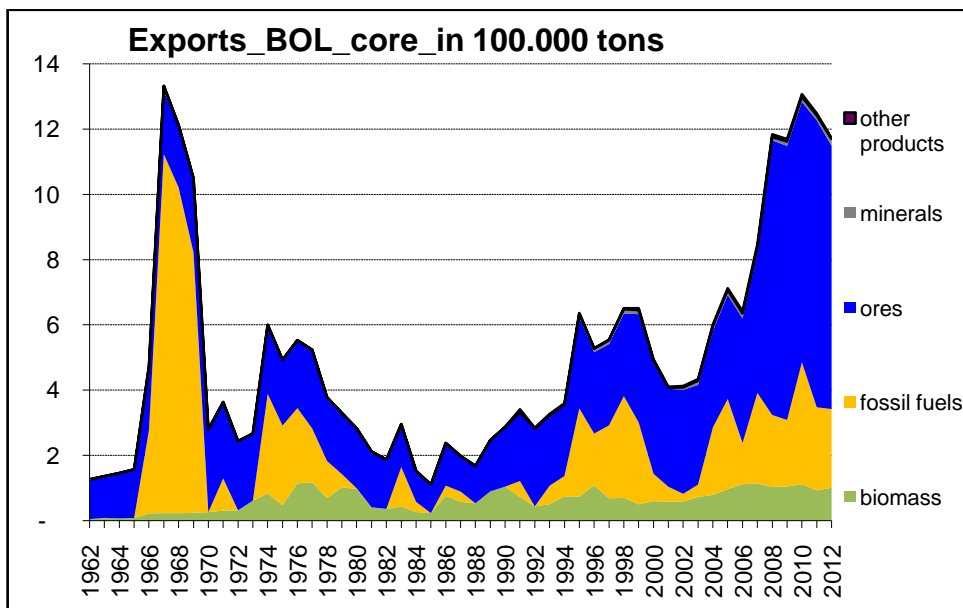


Figure 32_Bolivian Exports to the core, in 100.000 tons; 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

A2.3) Brazil

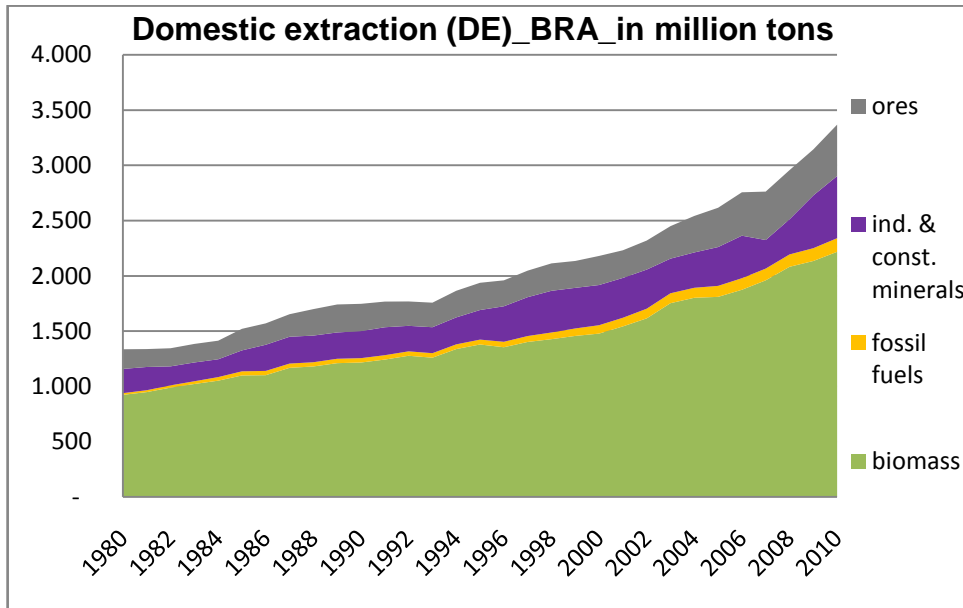


Figure 33_Domestic Extraction of Brazil, in million tons; 1980-2010.

Source: Own illustration; based on SERI; Dittrich 2012.

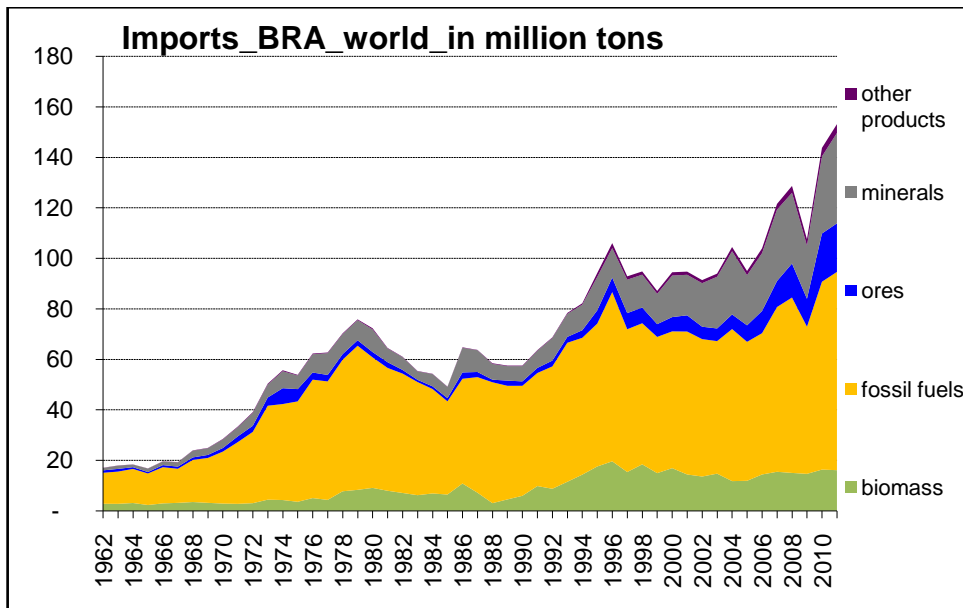


Figure 34_Brazilian Imports, in million tons; 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

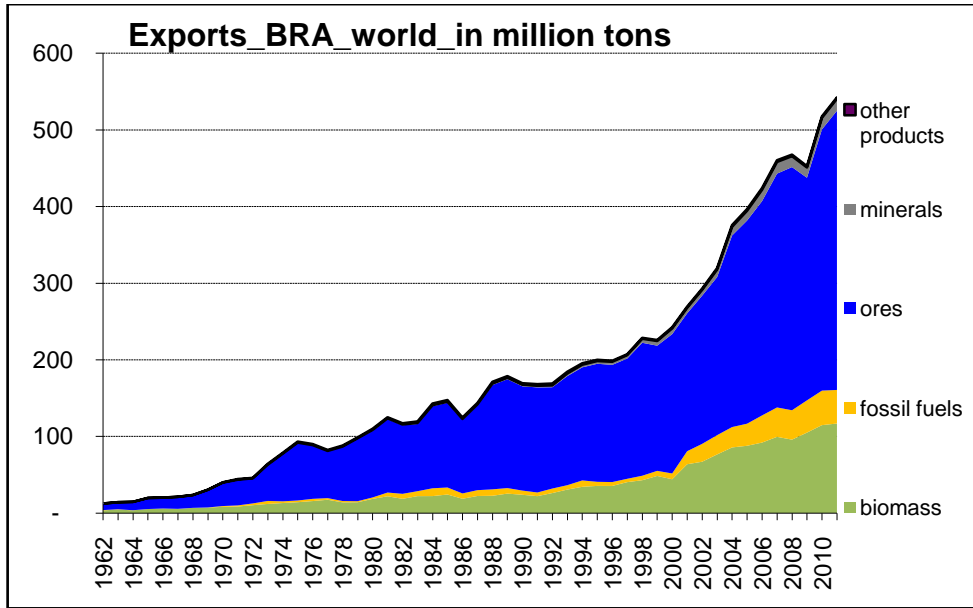


Figure 35_Brazilian Exports, in million tons; 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012.

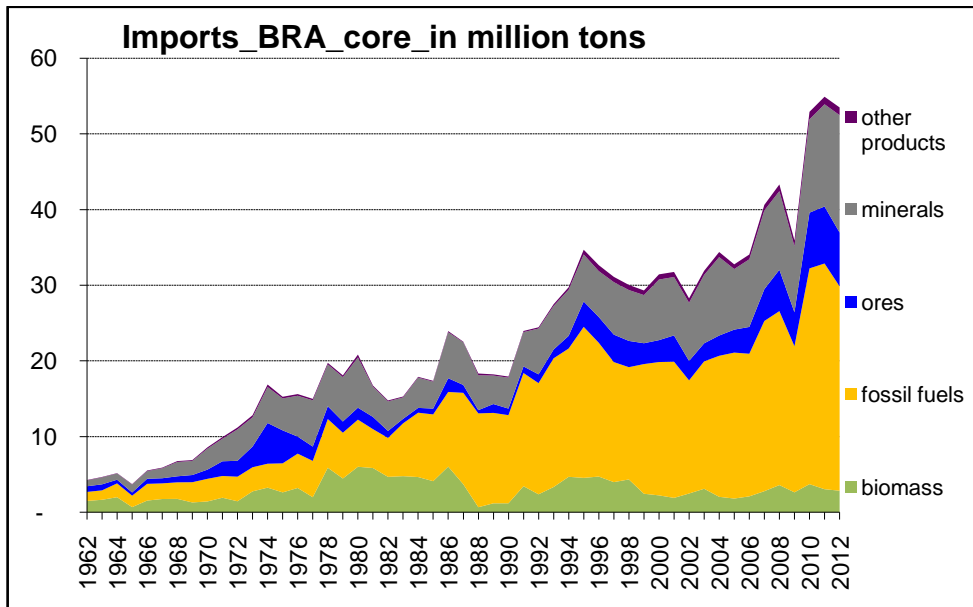


Figure 36_Brazilian Imports from the core, in million tons; 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

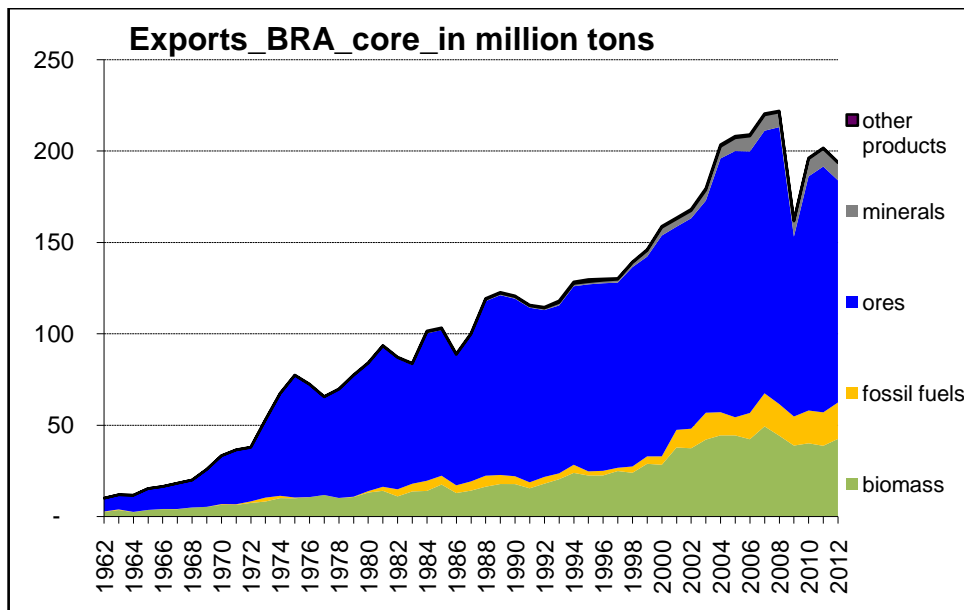


Figure 37_Brazilian Exports to the core, in million tons; 1962-2012.

Source: Own calculation; based on UN-Comtrade database 2013.

A3) Physical and Monetary Trade Balances per capita

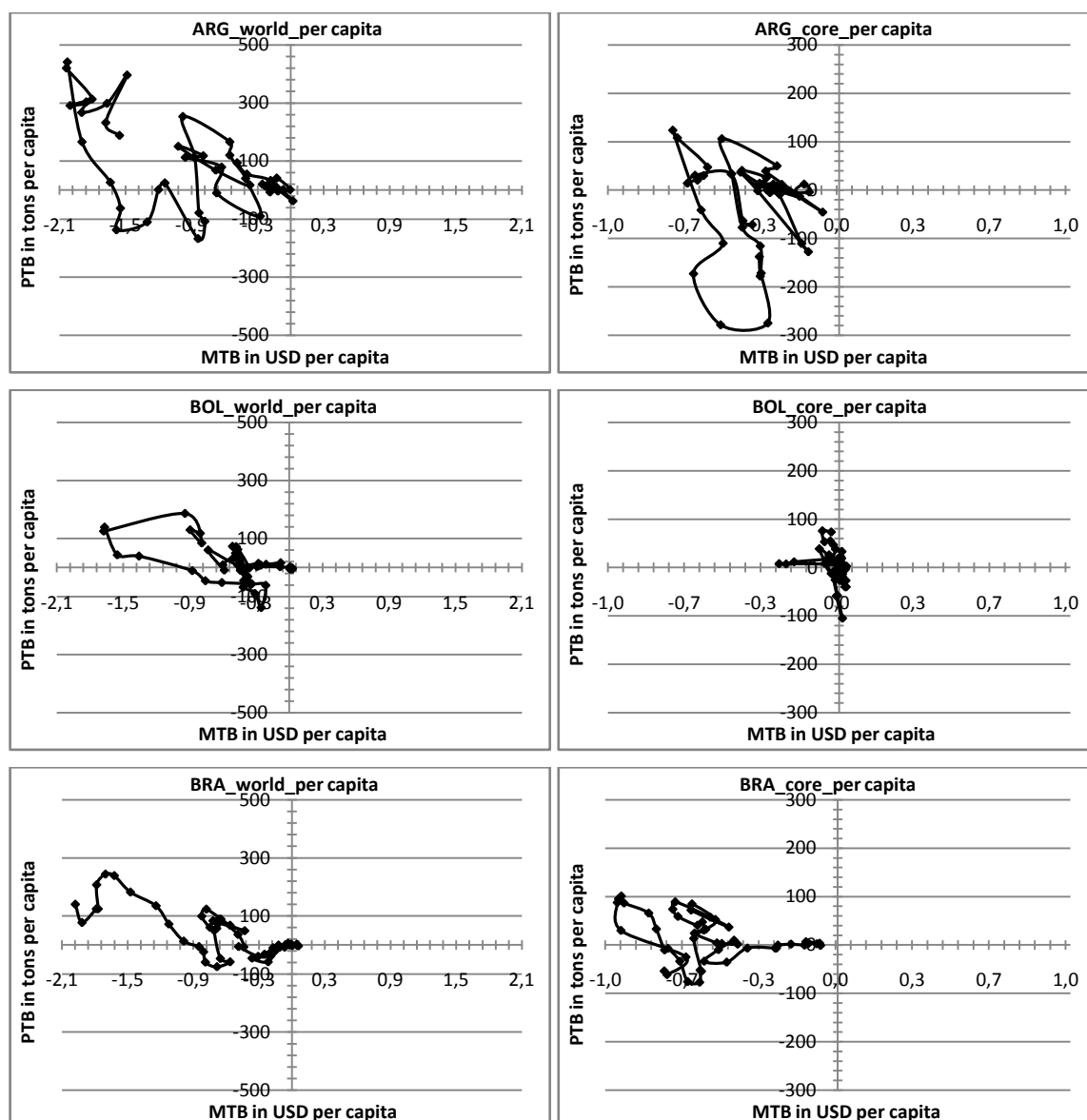


Figure 38 Physical and Monetary Trade Balances per capita in crossed scales, in tons and USD per capita, 1962-2011.

Source: Own calculation; based on UN-Comtrade database 2012/2013 and World Bank 2013.

Note: The ordinate represents the MTB scaled in billion USD. The abscissa represents the PTB scaled in million tons. In order to improve the comparability of the countries, graphs are scaled equally. The source of population data forms the World Development Indicators database.