

**CHARLES UNIVERSITY IN PRAGUE**

FACULTY OF SOCIAL SCIENCES

Institute of Economic Studies



BACHELOR THESIS

**Growing Role of Switzerland  
in Commodity Trade**

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Year of defence: **2014**

## **Declaration of Authorship**

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

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Prague, May 12, 2014

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Signature

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## **Bibliography Reference**

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## **Extent of the Thesis**

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# Abstract

This thesis assesses causes and consequences of Switzerland becoming the world's leading commodity hub. In both the replication and the extension of existing estimates, I find support for the hypothesis that Switzerland declares unusually higher (re-)export prices for commodities which are also on average under-priced as developing country exports to Switzerland. The transfer pricing manipulation process implies a potential capital loss for commodity exporting countries along with other movement of either illicit or illegal financial flows. The highest annual estimate of \$117 billion loss for developing countries trading with Switzerland suggests substantial issue in times of development aid turmoil. I attribute such grievous matters to Switzerland's low effort to meet international norms of international trade and trade transparency. The transfer pricing manipulation might also serve as a vehicle for money laundering, terrorist financing, corruption, or tax and tariff evasion and avoidance, as the data imply.

**JEL Classification** F14, F23, F39, F62, F63, O24

**Keywords** illicit financial flows, transfer pricing manipulation,  
transparency, commodities

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## Abstrakt

Tato práce shrnuje příčiny a následky růstu Švýcarska jako vedoucího světového centra pro komoditní trhy. V replikaci existujících odhadů i v mém rozšíření potvrzují hypotézu, že Švýcarsko za nestandardně vysoké ceny (re)exportuje komodity, které jsou rozvojovými zeměmi exportovány do Švýcarska naopak za ceny podprůměrně nízké. Z tohoto procesu, doprovázeného nezákonnou manipulací cen a nezákonnými finančními toky, vzniká kapitálová ztráta pro rozvojové vývozce komodit. Nejvyšší odhad roční ztráty, 117 miliard amerických dolarů pro rozvojové země jen v komoditním obchodování se Švýcarskem, naznačuje závažný problém v období selhání mezinárodní pomoci rozvojovým zemím. Tyto žalostné dopady přisuzují Švýcarsku a jeho neochotě zavést standardy mezinárodního obchodu a transparentnosti. Jak ukazují data, nezákonná manipulace cen může také sloužit k praní špinavých peněz, financování terorismu, korupci či daňovým a celním únikům.

<b>JEL klasifikace</b>	F14, F23, F39, F62, F63, O24
<b>Klíčová slova</b>	nezákonné finanční toky, nezákonná manipulace cen, transparentnost, komodity
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# Bachelor Thesis Proposal

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<b>Proposed topic</b>	Growing Role of Switzerland in Commodity Trade

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**Topic characteristics** Control of commodities becomes more important every year and I find it very important to study relationships between exporters and importers, structure of this trade, and recent, quickly changing development. This thesis has three main goals. Firstly, to replicate (Cobham *et al.* 2013) study, which focuses on Switzerland as the leading hub of global commodities trading and (re-)exporting. The study found support for the hypotheses of significant difference between prices of commodities imported to Switzerland and to other countries. And that Switzerland (re-)exports those commodities for prices above the average of other jurisdictions. This process causes potential economic loss for commodity exporting developing countries. Secondly, I will broaden the study, focusing on prior development and years 2011, 2012, depending on actual availability of data. I will also try to depict possible illicit nature of such behaviour (de Boyrie *et al.* 2007), particularly trade-based money laundering and terrorist financing (Zdanowicz 2009). The last aim of the thesis is to analyze development and major changes in the Swiss commodity trade of the most tradable and basic commodities in recent past. Further I will try to explain their causes and estimate economic impact on both Switzerland and particular, original exporters. I will concentrate on the developing countries again.

## Outline

1. Introduction
2. Background of the Study
3. Data and Methodology
4. Replication and Extension of the Study
5. Results and Discussion
6. Conclusion

## Core bibliography

1. BAKER, R. (2005): "Capitalism's Achilles Heel: Dirty money and how to renew the free-market system", Hoboken: John Wiley & Sons, Inc. ISBN: 978-0-471-64488-0
2. Berne Declaration (2011): "Commodities: Switzerland's most dangerous business", Zurich: Berne Declaration, ISBN: 978-3-905801-51-4
3. COBHAM, A. & JANSKÝ, P. & PRATS, A. (2013): "Swiss-ploitation? The Swiss Role in Commodity Trade", ISBN: 14-474-J1321
4. NITSCH, N. (2012): *Trade Mispricing and Illicit Flows*, in "Draining Development? Controlling Flows of Illicit Funds from Developing Countries" (ed. P. Reuter), pp. 309-334, Washington, DC: World Bank. ISBN: 978-0-8213-8869-3
5. ZDANOWICZ, J. (2009): "Trade-based money laundering and terrorist financing", *Review of Law and Economics* 5(2), pp. 854-878



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# Acronyms

<b>ALP</b>	Arm's-length Principle
<b>CIF</b>	Cost, Insurance, Freight
<b>CIT</b>	Corporate Income Tax
<b>CHF</b>	Swiss Frank
<b>EU</b>	European Union
<b>FDI</b>	Foreign Direct Investment
<b>FDFA</b>	Federal Department of Foreign Affairs
<b>FOB</b>	Free on Board
<b>GDP</b>	Gross Domestic Product
<b>GNI</b>	Gross National Income
<b>GTSA</b>	Geneva Trading and Shipping Association
<b>IFF</b>	Illicit Financial Flow
<b>IMF</b>	International Monetary Fund
<b>MNE</b>	Multinational Enterprise
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>SNB</b>	Swiss National Bank
<b>TPM</b>	Transfer Price Manipulation
<b>UN</b>	United Nations
<b>UNCTD</b>	United Nations Conference on Trade and Development
<b>USD</b>	United States Dollar
<b>USA</b>	United States of America
<b>WEF</b>	World Economic Forum

# Chapter 1

## Introduction

Switzerland has become the most influential trade financing centre of commodity trading in the past twenty years, controlling over one fourth of global movement of goods (GTSA 2014). In its Background Report (2013), the Swiss Federal Department of Foreign Affairs presents Switzerland as the most important centre of trade for a crude oil, despite no oil fields present in Switzerland. The Geneva Trading and Shipping Organisation (2014) states that Switzerland's share in trading and shipping of crude oil nears one third of world's volume. The commodity industry contributes by more than 3.5% to Switzerland's GDP, outstripping mechanical engineering and tourism. The sales revenues of merchanting traders totalled CHF 763 billion in 2011 which was more than Switzerland's gross national product of approximately CHF 580 billion (FDFA 2013).

The rise of Switzerland as an important commodity hub might seem suspicious and collusive from certain point of view. Today's commodity trade has been suspected of carrying the largest portion of illicit financial flows along with transfer pricing manipulation, money laundering, and other illicit or illegal activities. The NGO Berne Declaration consists with the FDFA but also stresses Switzerland's long lack of UN membership, infamous bank secrecy, and reckless behaviour in terms of both economic and socio-political context. Its political neutrality and business interests are often uneasy to manage.

In Chapter 2 I summarize the main studies researching the transfer pricing manipulation and illicit financial flows connected with the commodity trade. Unlike

mine, most of the research approaches have used detailed national data sets or relied on arm's-length principle inter-quartile methods. Rest of the chapter provides the Swiss view and reaction to the recent critique concerning the transfer pricing manipulation.

Chapter 3 presents replication of Cobham *et al.* (2013) study and further expansion by alternative approaches. The methods rely on bilateral trade data provided by the UN Comtrade database. I estimate both the untraceable volume of trade and the capital loss for the developing countries caused trading with Switzerland and its neighbours.

The results received by the original four models and three new, confirming the replicated study hypotheses and findings, are presented in Chapter 4. Commodity prices declared as exports to Switzerland are on average lower than those to other countries, being then (re-)exported for higher prices, compared with other jurisdictions declared (re-)export prices. The value of untraceable volume of trade between developing countries and Switzerland dramatically exceeds regular levels compared to the trade relations of developing countries and Swiss neighbours.

Caveats and weaknesses of the original approaches and advantages of the new ones are discussed in Chapter 5. Careful analysis of the data sets led me to exclude particular transactions causing considerable changes to the model estimates. Most importantly, the overall unfavourable estimates for developing world appeared to be consistent even after either adjusting the data sets or using additional models. Unfortunately for the developing world, both the replicated and the new approach estimates, presented in Appendix, suggest capital loss in billions of dollars a year caused by the transfer pricing manipulation and other illicit financial flows.

# Chapter 2

## Literature Review

This chapter summarizes research and study of transfer pricing manipulation, illicit financial flows, and income shifting across the globe, concentrating on the Swiss commodity trade with developing countries and contextualization of recently growing Swiss power in this sphere and its potential connection with illicit financial flows.

### 2.1 Multinational Enterprise Rise

Commodities are strategic goods and essential base for international trade and everything we trade with or consume. Overall rising demand for consumption provides new job opportunities along with possible rising tax revenues (FDFA 2013). Multinational enterprises are powerful and most flexible players in the global economy, especially in the commodity trade. Many MNEs control entire supply chains from extraction to distribution which mainly advantages large enterprises in terms of economies of scale, driving out smaller, often older companies based in the country of commodity's origin or distribution. The number of MNEs has risen 10-fold over 79,000 in the past three decades (UNCTAD 2008). MNEs are suspected to shift costs and profits back and forth between their subsidiaries in order to minimize taxes. This complicated game allows a company to book highest possible costs to depress profits and following taxes on profits. MNEs are very often ahead of tax authorities and always get along. Costs of one subsidiary may appear as revenue of another subsidiary which is located in tax haven (Berne Declaration 2011). Multi-

national companies now control around two thirds of the world trade. The problem for free market economy principles is that from 40 to 60 per cent of the world trade is carried out between the subsidiaries within the same company group. Therefore the prices are set by the corporations and not by the free market in majority of cases. Multinationals can easily adjust prices to minimize their revenues, inflate costs and thus reduce tax payments. This is called abusive transfer pricing or transfer mispricing (Berne Declaration 2011). These financial activities have been lately connected with illicit financial flows across the globe and now represent the majority of IFFs (Freitas & Kar 2012).

Even though there had been a long commodity trading tradition in Switzerland, the importance of the commodity industry has increased substantially in the last two decades. In the ranking of the largest companies in Switzerland by revenue, the commodity industry is most often represented among the twenty largest Swiss companies. Overall revenue of Vitol, Glencore International, and Trafigura exceeded half a trillion CHF in 2011 (FDFA 2013). The Glencore and Xstrata 2013 merger has led to the creation of one of the world's largest companies that are vertically integrated. Such a giant, the twelfth largest company in the world according to the 2013 Fortune Global 500, asked for approval by both the EU and China.

There are Swiss commodity companies that specialize exclusively in the commodity trading or the large multinationals which are involved at all stages across the value chain. Companies such as Mercuria, Gunvor, Litasco, Vitol, and Trafigura specialize in energy resources. Louis-Dreyfus or Cargill trade mainly agricultural commodities (FDFA 2013).

The commodity trade in Switzerland masses in three main areas: Lake Geneva region, Zug, and Lugano. Not only are they home to merchanting companies, but also to banks that specialize in commodity trade financing, product testing companies, and shipping companies (FDFA 2013). According to the GTSA (2014), 75% of all Russian oil is traded through Geneva, followed by half of the global trade in coffee and sugar. Further, there are some 400 commodity trading companies in the Lake Geneva region alone. GlencoreXstrata, based in the Zug region, leads the world's trade in zinc, coal, and copper. Zug based companies build and operate Europe's

larges oil and gas pipelines (FDFA 2013).

The Swiss commodity success would not be possible without financial industry. A highly developed and stable financial system is an essential factor in commodity trading. Up to 80% of the financing for commodity trading is provided by the banks in Switzerland. Without such debt financing through the banks, commodity traders could not raise the large amounts needed for the purchases, movement, and storage of commodities. French BNP Paribas, Cr dit Agricole, and other Swiss large and cantonal banks participate in the commodity trading which provides them with welcome opportunity for diversification (FDFA 2013).

## 2.2 Transfer Pricing Manipulation

Setting prices between two unrelated companies across international borders is called trade pricing. Whenever two related companies set different prices across borders, it is called transfer pricing. Generally, the exports are recorded according to the free on board basis and imports according to the cost, insurance, and freight. This causes import values to be higher in majority of cases. If there is any significant manipulation of the prices, the possibility of abusive transfer pricing arises. By over- and under-invoicing the MNEs try to arbitrage and take advantage of different governmental regulations (Eden 2012). This seemingly noteless manipulation is the vastest source of illicit flows of capital out of developing countries (Freitas & Kar 2012) giving opportunity for money laundering, corruption, stealing public assets, and capital shifting followed by tax and tariff evasion and avoidance. Trade mispricing might serve as a potential vehicle to move unrecorded capital out of or in any country. The IFFs are of course officially unobservable, hidden within the TPM process (Nitsch 2012).

This forgotten topic has come to light in recent years as MNEs are put under pressure as new governmental regulations are being applied. Sikka and Willmott (2010) state that "transfer pricing is not just an accounting technique, but also a method of resource allocation and avoidance of taxes that affects distribution of income, wealth, risks, and quality of life". Rising criticism of TPM arrives mainly

from governmental and non-governmental organizations. The Christian Aid has reported that transfer pricing is followed by secret deals, tax avoidance, cooking the books, and plots to rob the poor and keep the rich tax-free, especially in relationship between developed and developing countries (Eden 2012). Most of the developed countries now regulate the TPM using the arm's-length principle explained below, but when we study case of Switzerland we find out that companies do not have to document any prices they charge internally (Berne Declaration 2011). This fact followed by Swiss bank secrecy makes it very difficult to track the TPM. There is no coincidence for MNEs to operate mostly in developing countries where the weak and corrupt jurisdictions cannot fight back without help of powerful ally from the developed world. The worldwide rule to prevent the TPM is the arm's-length principle.

### **2.3 Arm's-length Principle**

According to the arm's-length principle, the transfer price traded within one MNE should be approximately the same as if two unrelated enterprises would negotiate a price for a certain product or service traded under similar circumstances with respect to the related-party transaction (Eden 2012). In addition, those contracts should meet similar standards as contracts between unrelated parties (Berne Declaration 2011). This rule, originally from the United States, has been applied as a general standard adopted by the OECD countries since 1979 (Eden 2012). Berne Declaration claim that this logical and seemingly clear rule is unfortunately having no effect. The ALP is in fact having many weaknesses. There are products made just by one manufacturer. It is impossible to estimate value of intangible assets. The ALP does not make much sense for people affiliated within both parties to pretend the contract is set independently (Berne Declaration 2011). On the other hand, Leite (2012) concludes that ALP is crucial for developing countries and the best option as a consistent approach to fight TPM.

Most of the transactions of international trade are not open-market transactions. In order to set appropriate pricing mechanism, the ALP was invented. Governments



on both sides of bilateral tax treaties try to simulate prices fair to everybody with goal to collect fair share of taxes. On the other hand, enterprises should avoid double taxation on profits in two different jurisdictions. In comparison with developing countries, many developed countries have gone further setting additional rules as advanced pricing arrangements, penalties for noncompliance, documentation requirements, and re-pricing methods (Leite 2012).

There is no guarantee of a fair application of the ALP by tax authorities, however. Usually the MNEs are blamed for their transfer pricing methods but they might also face discrimination favouring domestic enterprises. Building a system of mutual agreements setting the appropriate ALP prices is a slow, gradual process where tax authorities must find a compromise despite differences in broad circumstances they find themselves in (Leite 2012). Computation and implementation of a fair ALP price is a complicated challenge.

## 2.4 Motivation for Transfer Pricing Manipulation

Main motivation for MNEs is to manipulate prices to exploit differences in tax jurisdictions with different corporate income tax rates. By under-invoicing taxable outbound transfers from high-tax jurisdictions and over-invoicing them from low-tax jurisdiction they shift profits to low-tax countries. On the other hand, MNEs can over-invoice tax-deductible inbound transfer into a high-tax jurisdiction and under-invoice it into a low-tax jurisdiction. These actions give space for price manipulation of finished goods, royalty payments, licensing on one hand and transfers for payments for engineering, consulting services on the other, serving as examples from broad spectre of trade (Eden 2012).

Many developing countries attract MNEs declaring tax holidays. The MNE does not have to pay any CIT till it generates profit. No wonder why Glencore's mines in Zambia had not declared any profits for years (Berne Declaration 2011). Other examples of such controversial actions were common in China in 1980s and 90s. Other motivations for TPM are gaps in administration of trade taxes, foreign exchange restriction, and political risk. IFFs are also associated with illegal trade

with weapons, terrorist financing (Zdanowicz 2009), smuggling, money laundering, bribery, and corruption (Janský 2013). The data I examine contain many commodities declared in developing country for less than a thousandth of its future value as (re-)export from Switzerland. The TPM is very common in fields where there is no open market for certain commodities. The TPM is than simply to apply because the product is rarely or never traded between arm's-length parties (Eden 2012).

## 2.5 Transfer Pricing Manipulation Evidence

The largest number of empirical studies specializes on shifting profits from high-tax to low-tax jurisdiction (Eden 2012). There have been several studies investigating approximate losses developing countries suffer due to the price manipulation. Raymond Baker (2005) estimates abusive transfer pricing to hit USD 100-150 billion a year and mispricing and fake transactions to amount between USD 250-350 billion. Christian Aid (Hogg 2008) report the tax lost due to false invoicing and abusive transfer pricing reach USD 157 billion a year. Another estimate by Christian Aid (2009) focusing on tax revenue lost due to abusive transfer pricing amounts to USD 122 billion in one year only. Similar results of USD 99-107 billion come from Global Financial Integrity (Hollingshead 2010).

In recent years, there has been attention growing around TPM. TPM and IFFs have brought interest to many governmental and non-governmental organizations, including individuals from academic sphere. Most of the research has been done using U.S. data sets on U.S. MNEs operating in foreign countries. This attention is due to the fact that the ALP is part of a transfer pricing law in the United States, not just a recommendation as in most of the OECD countries. Grubert (2003) tests for evidence of income shifting using the firm-level data. He finds support of income shifting using regression of pre-tax profits against host country statutory tax rates. Unfortunately, the Swiss companies rarely share any information because they mostly do not have to. Among first researchers on IFFs were mostly NGOs as Transparency International, Global Financial Integrity Christian Aid, Tax justice Network, and academics in early 2000s, mostly working for these NGOs (Janský

2013). These studies investigate potential revenue losses using various methods. The most important consequence of their work is that they brought this topic to wider attention. The selected approaches mentioned below raise many questions involving questionable assumptions discussed by (Fuest & Riedel 2012) whose research raises number of additional issues.

A worldwide development organization Oxfam (2000) based their, as they claim, conservative estimates on global figures for FDI and the stock of capital flight. In combination with returns to investment, interest income, and estimated tax, they find the developing countries lose around USD 50 billion a year. Raymond Baker (2005), establisher and director of Global Financial Integrity, estimates at least USD 540 billion flows out of poor countries a year. His work, partly based on more than 500 confidential interviews, comprises of various methods using estimates for combination of tax evasion, drug trafficking, corruption, and fraud in international trade (Janský 2013).

Clausing (2009), using U.S. Bureau of Economic Analysis data, finds that countries hosting US MNEs having CIT one per cent below the U.S. rate are associated with a half per cent higher foreign affiliate profit rate. Another study by Freitas & Kar (2012) using the IMF Direction of Trade Statistics confirms that most illicit flows of capital are linked with transfer pricing manipulation. A large number of approaches to estimate TPM data are done using databases of trade at the transaction level, comparing imports, exports, re-imports, and re-exports prices depending on the jurisdiction they are located or traded in (Clausing 2003; Zdanowicz 2009; Eden & Rodriguez 2004). These studies compare reported intra-firm prices with the arm's-length prices to detect hidden TPM. The regression analysis is mostly used depending on the availability of data. These academic studies find a strong support that TPM works as a channel of illicit flows (Cobham *et al.* 2014). The methods try to find any significant differences between the reported intra-firm and ALP prices. The ALP price range is calculated combining 482 different regulations. Further, the lower and upper quartiles are removed leaving the inter-quartile range. If the MNEs transfer prices do not fall in the inter-quartile range, it becomes subject of suspicion. The filter analysis method used by Christian Aid's researcher McNair (2009)

uses a price filter analysis method to estimate revenue losses from trade mispricing, concentrating on high-risk areas.

The filter method is built on evaluating each transaction against an ALP price range. Lower and upper quartile prices are calculated for every commodity and the provided data are compared with the ALP prices. The deviations are amounts falling out of the inter-quartile price range. The price filter analysis method compares every transaction provided by the EU trade data and the US trade data leading to advantage of refraining often misreported data from developing countries which are often to be unreliable (Christian Aid 2009). There are several issues to deal with. The price filter analysis is in many ways limited. It generates the net amount of capital inflow to the EU and the USA, not the total amount, because most of the data compose of grouped records. This limitation may be an advantage, yielding more conservative estimates, or in other words, understating the amount caused by mispricing because both under- and overpriced transactions will offset each other, leading to reasonable capital inflow. When stating the range it must be clear which transactions occur internally and which are ALP transactions. The limited availability of data is a crucial issue here. In my case it is impossible to find out the internal prices of transactions within particular Swiss based enterprises until they provide the data. Many studies use data sets as U.S. Bureau of the Census data and U.S. Bureau of Labor Statistics but there is no equivalent in Switzerland where there are also no records on transit trade.

There have been a large number of critiques of trade mispricing approaches. Potential inadequacies of other studies may be used to my advantage as I use different approach. The data set groups data over yearly periods. The results of the approach explained below might not always lead to clear interpretation, as the assumptions are hard to verify (Cobham *et al.* 2014).

## 2.6 The Swiss View

Switzerland is number one in worldwide grains and oil seeds trade, first in European sugar market, and first in cotton market which is traditionally tied with London. The NGO Berne Declaration's publication (2011) places Switzerland as a leading commodity hub for oil, coffee, sugar, grains, and oil seeds. Most of these commodities never enter Switzerland and financial transactions behind them are difficult or impossible to track. The commodity business in Switzerland is estimated to employ around 10,000 employees in 500 companies, not including the shipping, transaction financing, inspections services, and product testing (FDFA 2013).

Switzerland faces intense international competition with other commencing or experienced players: Singapore, Dubai, Hong Kong, the United States, the United Kingdom, or the Netherlands. According to the FDFA (2013), Switzerland plays major role in global commodity trading due to several conditions: stable and predictable political, economic and legal environment; availability of well-trained personnel, high standard of living, sophisticated and stable financial system, and its long commodity trading tradition. There are other reasons why this expensive, land-locked country defeats other centres of commodity trade as Rotterdam, Hong Kong, Houston, or New York that serve also as ports or resource proximities (Cobham *et al.* 2014). Switzerland, at the centre of Europe, has a perfect location to communicate with other markets: the USA in the afternoon and China in the morning.

Switzerland has faced many money laundering cases coming to light over the past few years with image of being a prime destination for criminally acquired wealth (O'Dea 2013). Staying politically neutral places Switzerland in an uneasy position as much of its commodity business interests are in the Russian Federation and its allies or many unstable regions. Regrettably, the largest part of Swiss political class is blind to unethical business practices and risks for reputations connected with the commodity business. Many Swiss politicians are ruthless opportunists simultaneously a part of the the commodity business and the governing system. The real scandal is that such behaviour is not yet considered to be scandalous in Switzerland (Berne Declaration 2011).

The Swiss commodity market is no exception infamous for its suspicious transactions. The Federal Council and the Federal Department of Foreign Affairs are aware of both the reputational risks and international criticism of MNEs to reduce the tax base in commodity-exporting countries. In its Background Report: Commodities (2013), FDFA suggest higher specification of regulation, oversight, and taxation of the commodity trade. Further, FDFA encourage to apply the OECD transfer pricing guidelines for MNEs and UN guiding principles on natural resource issues and business and human rights.

The Federal Council also perceive the rising international competition in the commodity trade. Perhaps unexpectedly, the FDFA suggest the G20 initiatives to increase transparency of the commodity trade to become a competitive, transparent, and socially responsible merchanting centre. In the Federal Council's Background report on commodities (2014), seventeen proposed recommendations are discussed and assessed. One of the recommendations is implementing existing multilateral standards for the commodities industry. The report assesses Switzerland's present and future position favourable. According to the SNB (2013), the receipts from the merchanting of CHF 19 billion in 2013 fell by 3% on receipts from 2010 and 2011. Though, this drop is attributed to lower commodity prices.

# Chapter 3

## Data and Methodology

### 3.1 UN Comtrade Data

My study's goal is to independently replicate and extend Cobham *et al.* (2013) research and compare both findings. I concentrate on potential illicit financial flows in the Swiss commodity trade with emphasis on trade with developing countries. This approach is quite specific compared with other studies. Most of the recent studies have investigated potential trade mispricing and income shifting in merchandise trade in China, particularly Chinese exports. As mentioned above, other studies have investigated illicit nature of flows in the USA due to higher availability of data. The case of Switzerland-developing countries is different on many levels. There is a suspicion that MNEs under-price transaction prices in developing countries to avoid taxes and over-price (re-)exports from Switzerland to move money there. The Swiss (re-)export transaction prices may also be under-priced to bring assets back from Switzerland.

The data I use are independently obtained from the United Nations Commodity Trade Statistics Database (UN Comtrade). The database contains detailed imports and exports statistics collected from more than 300 countries or areas since 1962. It is considered the most comprehensive database of bilateral trade available and there is no adequate alternative available yet, especially in case of Switzerland.

These are the limitations of the entire database according to the UN Comtrade official web page:

- Some values of the reported commodity data are not provided at the six-digit level due to confidentiality. The information containing total value and volume is given on higher level category.
- Some countries do not always report data for each year or the data are provided later. The unavailable trade statistics might cause underestimation of value and volume of particular transaction.
- Commodity classifications are not provided directly by the UN Comtrade but by the country providing the data. This might also lead to gaps in the data statistics.
- No adjustments are made when the classification of data is updated and updates cause the database to contain data that has already been converted from one classification to another.
- Exports to one country might not equal imports from the partner country due to various factors including imports CIF, exports FOB, or other differences caused by timing etc.
- Partner countries for imports are mostly reported countries of commodity's origin but no direct trading relationship is guaranteed.

I use the most detailed category type of the Harmonized System, the six-digit level classification. I select 244 trade jurisdictions, estimated as most appropriate for the study. Further, I use the World Bank 2012 gross national income per capita classification. The groups are: low income, \$1,035 or less; lower middle income, \$1,036-4,085; upper middle income, \$4,086-12,615; and high income \$12,616 or more. The high income countries are divided between OECD members and non-members. I exclude free zones and neutral areas and focus on as many relevant jurisdictions as possible. The list of 2,596 most important and adequate commodities, expected to stress potential transfer mispricing, remains the same as in the previous study.



The UN Comtrade database consists of only physical trade declared by Swiss or foreign customs. Therefore most of my estimates are based on the transactions of commodities which enter or leave Swiss or foreign soil. This might cause very conservative findings. Other declared transactions of foreign countries might be a part of transit trade of Switzerland and other countries.

I do not assume the UN Comtrade limitations to cause any substantial bias to my results:

- I assume that the first limitation does not affect accuracy of the research due to selection of the commodity codes. The confidential information does not seem to cause significant lack of data.
- The second limitation might cause more conservative estimates due to possible lack of data in developing countries. Even so, the final results shall not be biased because for every importer's data to Switzerland there will be, for the most part, a trade statistics provided by Swiss authorities. The models depend on both foreign and Swiss data together.
- Taking into an account the points three and four, the data I investigate are quite new and the six-digit level classification is widely used. Therefore I contemplate no or little errors.
- There is almost always margin present comparing export and re-export value of transaction due to cost, insurance, freight, and "free on board" principle. Thus, difference does not have to prove any illicit shift evidence, depending on the reasonability of trade margin of course.

## 3.2 Methodology

The methods I use bring new alternative approach deviating from Hogg's filter analysis because there are no data available that could help me follow thorough filter analysis research for the case of Switzerland and its trade partners. The last questionable limitation of the data can be dealt with by establishing a benchmark, perhaps detecting differences signing potential capital loss trace and giving robustness to the models. In order to detect excessive trade margin or untraceable volume of trade I choose all Switzerland's neighbours: Austria, France, Germany, and Italy. I drop Lichtenstein because it shares many interests with Switzerland, including currency. Selection of these neighbours guarantees robustness of the estimate due to similar transportation cost, assuming that neighbours' trade with other countries is completely undistorted. This heroic assumption depresses findings in Swiss trade, comparing results that would be estimated with no zero-baseline, leading to a conservative bias of capital shift or untraced volume of trade. Choosing different commodity hub as Singapore, Hong Kong, or Qatar as a benchmark might cause a bias due to their locations and the limitations of data. Nevertheless, future study comparing these growing commodity hubs with Switzerland is expected. Another potential choice for future research might be Austria alone as a benchmark due to similar location, size, population, structure of economy, and other relevant criteria.

My search investigates both differences in the transaction prices and the untraceable volume of trade for every single chosen commodity. The transaction price difference is detected comparing (re-)export data of neighbours and Switzerland in relationship with particular trade partner original export price with focus on developing countries. The untraceable volume of trade is calculated as a difference between trade partner's declared exports to the neighbours or Switzerland and neighbours' and Switzerland's declared imports from the particular trade partner. Thus, I calculate both suspected excess untraceable volume of trade and excess trade margin that is immediately compared with the neighbour benchmark. The calculation is repeated for every chosen commodity twice: separately for the world and the neighbour benchmark.

The research consists of seven models specifically modified for the Swiss case. The data show extremes comparing original export and Swiss (re-)export transaction prices. These anomalies might be removed or accounted for as errors, but on the contrary, these are the transaction prices I am also interested in. As shown below, Swiss (re-)export prices are on average higher than its neighbours', and even more interestingly, commodity exporters to Switzerland receive less exporting to Switzerland than to other countries, stressing the assumption that both neighbours' and original exporter's market is undistorted. I acknowledge that this assumption might of course seem unreasonable from some points of view but I am limited by availability of data.

### 3.2.1 Models I, II, III, IV, V

The first five models independently replicate the Cobham *et al.* (2013) study. It is important to emphasize that I focus on net rather than gross figures since net figures provide more conservative estimates. Majority of taken approaches use gross figures. I do not possess data on the Swiss transit trade. Therefore, I must assume that the level of price distortion is identical in both the transit and the physical trade recorded by the Swiss customs. There is a potential for under-pricing physical (re-)exports from Switzerland to shift illicit capital out, but again, absence of the data leaves this area open to further research. Below I present notations to explain applied methods.

Let  $P_{ab}$  be the price per kilogram of exports for particular commodity, exported from country  $a$  to country  $b$ . Then  $Pr_{bc}$  is the price per kilogram of (re-)exports from country  $b$  to country  $c$  and  $Rv_{bc}$  is the volume in kilograms of these (re-)exports. The difference between original export price and following (re-)export price received is trade margin. The capital shift  $K_{ab}$  from country  $a$  to country  $b$ , assuming (re-)export prices undistorted, is computed as trade margin times trade volume:

$$K_{ab} = Q_{ab} \left( \frac{\sum_{c=1}^n Pr_{bc} Rv_{bc}}{\sum_{c=1}^n Rv_{bc}} - P_{ab} \right)$$

Now I calculate the excess price margin for country  $a$  trading with Switzerland ( $S$ ), compared with the average price margin of all other countries ( $W$ ) of the sample:

$$E_{Sa,W} = \left( \frac{\sum_{c=1}^n Pr_{Sc} Rv_{Sc}}{\sum_{c=1}^n Rv_{Sc}} - P_{aS} \right) - \frac{\sum_{b=1}^n (Q_{ab} (\frac{\sum_{c=1}^n Pr_{bc} Rv_{bc}}{\sum_{c=1}^n Rv_{bc}} - P_{ab}))}{\sum_{b=1}^n Q_{ab}}$$

In order to estimate Switzerland's excess price margin value, I calculate the price margins for its neighbours ( $N$ ). Thus, I cancel out either potential location or transportation costs. I also assume no distortion of trade is taking affect in the benchmark countries, otherwise presumably affecting both the capital loss and the untraceable volume of trade:

$$E_{Sa,N} = \left( \frac{\sum_{c=1}^n Pr_{Sc} Rv_{Sc}}{\sum_{c=1}^n Rv_{Sc}} - P_{aS} \right) - \frac{\sum_{b=A,F,G,I}^n (Q_{ab} (\frac{\sum_{c=1}^n Pr_{bc} Rv_{bc}}{\sum_{c=1}^n Rv_{bc}} - P_{ab}))}{\sum_{b=1}^n Q_{ab}}$$

With help of the calculated excess price margins, I can estimate the capital loss more effectively. Using declared exports from country  $a$  to Switzerland, I compare both Swiss and neighbours' estimates for the capital loss:

$$K_{aS,W} = Q_{aS} E_{Sa,W}$$

$$K_{aS,N} = Q_{aS} E_{Sa,N}$$

So far the estimates have relied on the data declared by both foreign and Swiss authorities. Now I take an alternative approach. I estimate the capital loss for particular exporters using only the non-Swiss (re-)export data to foreclose potential bias caused by the anomalous prices declared by Switzerland. If the Swiss declared prices are anomalous, I can simply use the average exports price received from all other countries. For robustness, I use the average exports prices received from the neighbours in the parallel estimation:

$$K_{aS,World} = Q_{aS} \left( \frac{\sum_{b=1}^n PQ_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS} \right)$$

$$K_{aS,Neighbours} = Q_{aS} \left( \frac{\sum_{b=A,F,G,I} PQ_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS} \right)$$

Finally I can build the first four models using both the non-Swiss and Swiss data and the fifth model depending just on non-Swiss (re-)export data in case of anomalous Swiss (re-)export prices. I define four dummy variables,  $D_{1000}$ ,  $D_{100}$ ,  $D_{10}$ ,  $D_5$ , excluding the given amount, depending on the type of model. For example, the dummy variable  $D_{1000}$  takes the value of zero if the declared Swiss (re-)export price for particular commodity is more than one thousand times higher than the original export price of country  $a$ , or one otherwise.

### MODEL I

In Model I, I estimate upper estimates for the capital shift. Firstly, I eliminate all the cases where the Swiss (re-)export data are more than one thousand times higher than the original export price, selecting all the countries. If the (re-)export price is less than one thousand higher, I treat the Swiss declared data as valid. Then, I repeat the procedure for the neighbours' benchmark:

$$K_{S,W} = \sum_{a=1}^n (D_{1000} Q_{aS} E_{Sa,W} + (1 - D_{1000}) Q_{aS} (\frac{\sum_{b=1}^n P Q_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS}))$$

$$K_{S,N} = \sum_{a=1}^n (D_{1000} Q_{aS} E_{Sa,N} + (1 - D_{1000}) Q_{aS} (\frac{\sum_{b=A,F,G,I} P Q_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS}))$$

### MODEL II

Model II follows the same method, only excluding all the (re-)export cases where the Swiss declared prices are more than one hundred times higher than the original ones. Again, this is done for both world and neighbours' benchmark separately:

$$K_{S,W} = \sum_{a=1}^n (D_{100} Q_{aS} E_{Sa,W} + (1 - D_{100}) Q_{aS} (\frac{\sum_{b=1}^n P Q_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS}))$$

$$K_{S,N} = \sum_{a=1}^n (D_{100} Q_{aS} E_{Sa,N} + (1 - D_{100}) Q_{aS} (\frac{\sum_{b=A,F,G,I} P Q_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS}))$$

### MODEL III

$$K_{S,W} = \sum_{a=1}^n (D_{10} Q_{aS} E_{Sa,W} + (1 - D_{10}) Q_{aS} (\frac{\sum_{b=1}^n P Q_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS}))$$

$$K_{S,N} = \sum_{a=1}^n (D_{10} Q_{aS} E_{Sa,N} + (1 - D_{10}) Q_{aS} (\frac{\sum_{b=A,F,G,I} P Q_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS}))$$

MODEL IV

Model IV is the most prospective model depending on both the foreign and Swiss (re-)export prices, being more than five times higher. I add this elaborated model to the original study because I assume even this ratio of foreign and Swiss export prices to be excessively high:

$$K_{S,W} = \sum_{a=1}^n (D_5 Q_{aS} E_{Sa,W} + (1 - D_5) Q_{aS} (\frac{\sum_{b=1}^n P Q_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS}))$$

$$K_{S,N} = \sum_{a=1}^n (D_5 Q_{aS} E_{Sa,N} + (1 - D_5) Q_{aS} (\frac{\sum_{b=A,F,G,I} P Q_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS}))$$

MODEL V

Model V relies on non-Swiss (re-)exports data only. It uses the world's average prices as if instead of the exports price declared for exports to Switzerland, each exporter would have received average declared prices to other trading partners. Therefore, Model V becomes an independent low-end estimate:

$$K_{aS,World} = \sum_{a=1}^n Q_{aS} (\frac{\sum_{b=1}^n P \cdot Q_{ab}}{\sum_{b=1}^n Q_{ab}} - P_{aS})$$

$$K_{aS,Neighbours} = \sum_{a=1}^n Q_{aS} (\frac{\sum_{b=A,F,G,I} P \cdot Q_{ab}}{\sum_{b=A,F,G,I} Q_{ab}} - P_{aS})$$

where  $a \neq b \neq S$ .

### 3.2.2 Models VI, VII

In Model VI I apply completely new approach depending on both foreign exports and Swiss imports data together. Model VII has the same structure as Model VI, only independently employing the neighbours' data. Contrary to the original study, Models VI and VII directly compare Switzerland and its neighbours which served as a benchmark in the previous five models. I also include all the transactions, no matter the Swiss price margin to compare the results with the other models.

Let  $U_{ba}$  be the proportionate difference between declared exports of the country  $a$  to the country  $b$  and declared imports of the country  $b$  from the country  $a$ , both in kilograms. Thus, the proportionate difference  $U_{ba}$  is expressed as follows:

$$U_{ba} = \frac{Q_{ab} - M_{ba}}{Q_{ab}}$$

where  $Q_{ab}$  are declared exports of country  $a$  and  $M_{ba}$  are declared imports of country  $b$ .

#### MODEL VI

Let  $V_{ab}$  be the value of exports from country  $a$  to country  $b$  and  $L_{Sa}$  be the capital loss caused by untraceable trade in Switzerland, expressed as:

$$L_{Sa} = \sum_{a=1}^n V_{aS} \left( \frac{Q_{aS} - M_{Sa}}{Q_{aS}} \right)$$

#### MODEL VII

Model VII applies neighbours' data in an analogical equation:

$$L_{A,F,G,Ia} = \sum_{a=1}^n \left( \sum_{b=A,F,G,I} V_{ab} \frac{Q_{ab} - M_{ba}}{Q_{ab}} \right)$$

Model VII sums the data of Austria, France, Germany, and Italy together to estimate potential capital loss for the rest of the world trading with these countries.

# Chapter 4

## Results

In this chapter I summarize and compare my results with the Cobham *et al.*(2013) findings. Further, I present results received using additional methods or alternative data sets.

### The Untraceable Trade

Table 1 presents the estimates of the untraceable volume of foreign exports to Switzerland, the amount of trade countries declare as exports to Switzerland which are never declared as imports there. Again, I have used Austria, France, Germany, and Italy to show dramatic differences between the Swiss and the benchmark's findings to ensure that the Swiss results are not a reflection of the data limitations.

The estimation of the aggregate amounts of the untraceable exports with respect to both Switzerland and neighbours is very consistent, inexact in order of millions compared with the original study. These findings are very encouraging, given the fact that the group of 244 countries was independently chosen. The untraceable exports to Switzerland climb up over USD 117 billion for the period of 2007-2010. That is almost 44% of all foreign exports. Dramatic 74% of developing country commodity exports are not recorded as imports in Switzerland. This figure is likely to reflect the opacity of Swiss transit trade and has dramatic consequences in my research. The percentage of developing country untraceable exports for high-income OECD members is even negative. The declared imports in neighbour countries exceed the declared exports there. This statistics might also indicate potential capital shift



from the developed higher tax jurisdictions to low tax jurisdictions as Switzerland.

The untraceable exports to Switzerland account for more than half a per cent of all world exports and near one per cent of all high-income non-OECD country exports. The only significant differences I observe between mine and Cobham *et al.* (2013) study are the values for high-income non-OECD members and upper-middle income countries. As mentioned above, I used the World Bank 2012 GNI classification because the original classification was not available. The obtained results perfectly reflect the new changes made by the World Bank. The most significant change in these two categories is newly including the Russian Federation, Chile, and Uruguay in the high-income countries. In case these economies are accounted for as upper-middle income countries, my findings are again consistent with the original research. I suspect that the opacity of transit trade between Switzerland and the Russian Federation might explain fall of the untraceable exports for developing countries by 15%, compared with the original 90%. In consequence, the ratio of the untraceable volume of trade between Switzerland and high-income non-OECD countries equals 98%. This result is very alarming and implies how opaque the commodity trade is. The high-income non-OECD members are also Honk Kong, Singapore, Saudi Arabia, and of course most of the tax havens.

Looking at the last columns of the Table 1, the values for the neighbours are overall negative. They record more imports than other countries declare as exports to the neighbours. This is entirely the opposite compared with the Swiss case. These findings might not be so surprising after taking into an account that for example Nigeria records the commodity as exports to Spain which declares it as exports to France but France records the commodity as import from Nigeria. Even so, comparing the volumes of untraceable trade of Switzerland with its neighbours indicates consistent Swiss anomalies confirming the opaqueness of Swiss trade.

### The Capital Loss

Table 2 presents the estimates of applying Models I-V on all declared exports to Switzerland. The gross amounts are again very precise compared with the original research. Model I, the upper estimate excluding Swiss anomalous (re-)export prices

one thousand times higher than the original export price, estimates the capital loss for all countries to climb up to USD 844 billion and up to USD 470 billion for the developing world. The differences between application of the whole world or neighbours data seem to be negligible, confirming robustness of the models. Likewise, when I lower the (re-)export price boundary to the limit of one hundred or less (Model II), the estimates are USD 572-593 billion for the whole world and USD 308-339 billion for the developing countries. Model III provides even lower capital loss of USD 209 billion for the world, still close to the USD 239 billion capital loss of the original research. The capital loss for the developing world, including all the countries in the model, still exceed one hundred billion for the four year period.

I have added a new lower estimate depending on both foreign and Swiss (re-)export data, excluding the anomalous prices five times higher than the original export price. This new Model IV still indicates USD 77-83 billion loss for the world for the four year period and conservative USD 17-28 billion for the developing world. Again, I take into an account the change in the World Bank ranking, shifting the Russian Federation to the high-income classification. The absolute lower estimate treats Swiss data as unreliable. Model IV depends on non-Swiss (re-)export data and estimates USD 28-121 billion loss for the developing world. The value of exports that are gradually excluded at the four levels of the Swiss price margin amounts between USD 40 billion loss at the highest level to more than USD 120 billion in Model IV. In each year, almost 1,000 Swiss export transactions are over one thousand times higher than the original export price. In Model IV, the correction includes around 4,000 transactions each year. The developing countries represent more than a half of the significant correction value.

Table 3 presents the results of the replication of the capital loss in exports to Switzerland. Alternatively, I use the physical imports data recorded by the Swiss customs. The estimates are consistent with the original research. They exceed 2 trillion in the Model I and outreach 2.5 trillion in Model IV in totals. The estimates of capital loss the developing countries suffer are smaller, caused by the reclassification of data. Even using the Swiss import data leads to almost USD 45 billion loss for the developing countries (Model I), as expected by the original hypothesis. As

I lower the critical bound at which the overpriced Swiss (re-)exports are excluded, the zero bound is hit. Therefore, Model IV, excluding any Swiss (re-)export transactions five times higher than the original price, seems to be the utmost boundary for the Swiss physical imports data concerning the developing countries. The Model V remains of course the same.

The large and negative findings for the high-income OECD countries capital loss in exports to Switzerland (Table 3) led me to thoroughly investigate the matter. After analysing the data by particular years and transactions (Table 5), I found reason to believe that 240120 and 240130 (tobacco unmanufactured and tobacco refuse) in 2010, declared as exports from the USA to Switzerland, were vastly overpriced. These two outliers cause significant changes to the 2010 estimates in Models I-IV. Model I presents total average of USD 64 billion capital loss for 2007-2009 to suddenly fall to negative 2.4 trillion in 2010. After excluding these two transactions from the 2010 data set, I obtained more reasonable values presented in Table 4. I leave the transactions in the preceding years to obtain more accurate gross estimates. Now the estimates of the capital loss for the high-income OECD members are positive in Models I and Model II. In Model IV, the overall estimates are negative again, reaching negative USD 57 billions. The estimates for the developing countries seem to be negligible in Models III and IV. This phenomenon is already explained above. Up to 74% of exports from developing countries are not recorded as imports by the Swiss customs. The difference between applying Swiss imports (Table 4) and other countries exports (Table 2) data is obvious. Therefore, I expect the developing countries suffer much larger capital loss than the estimates show.

Table 6 presents estimates of Model VI and Model VII in two different ways. The overall results are divided to two columns. I excluded the two suspicious commodity transactions to show the impact on both Model VI and Model VII. According to Model VI, there is USD 76 billion capital loss for the developing countries in the four year period. This finding is very close to other capital loss estimates for developing countries. This estimate is of course very conservative as it relies only on the data provided by the UN Comtrade database.

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Conversely, Model VII shows that the value of imports declared by the neighbours exceeds the declared exports there from the rest of the world. Again, this estimate follows findings from Table 1. The neighbours, contrary to Switzerland, declare more imports than is declared as exported there by the rest of the world in all income categories. Whereas Swiss estimates are negative only in trade with high-income OECD countries. This phenomenon might indicate capital shift out of developing world to Switzerland and also retrieval of capital back to the high-income OECD neighbours from Switzerland.

# Chapter 5

## Discussion

One of my independent replication's goals is to confirm or disconfirm results of Cobham *et al.* (2013) study. I have rebuilt the original models and extended the study by new alternative approaches. After analyzing the data, I have adjusted the data sets and introduced additional models. I have followed the most fundamental assumptions and structures of the models and the data in order to compare the studies in detail. At each step, I have given priority to more conservative approaches concerning both models and the data. I have tried to reflect weaknesses or impreciseness of the original study by extending it or by particular analysis and change of the data sets.

The results are generally consistent with the original study, especially in gross figures. I have made some changes choosing the 2012 World Bank classification which shifts the Russian Federation from upper-income developing country to the high income economy category. Taking into an account this change, the estimates are consistent with the original findings as well. Even the most conservative estimates indicate capital shifts out of developing countries.

Contrary to the original study, Model VII uses the neighbours import and (re-)export data to compare the estimates of capital loss with the Switzerland's results (Model VI). Up to now, the neighbours served only as a benchmark to make sure the Swiss data are not seriously limited. This new approach confirms dramatic differences between Switzerland's and neighbours' trade relations with developing countries. Further research is needed to search for suspicious or anomalous trans-

action prices in Model VII. Present absence of full neighbours' data does not allow me to make further progress.

As discussed in the previous study, the Swiss traders pay lower prices for commodities imported from the developing world than other traders and are able to re-sell them at higher price levels. This is no clear evidence of illicit capital shifting, of course. It is unlikely the Swiss traders have higher abilities than other traders from similar jurisdictions. Developing countries export to Switzerland for lower prices on average. It would be expected that other commodity centres would compete with or replace Switzerland in the market. On the contrary, Switzerland has strengthened its leading role of commodity trade in past years that the study does not include in the data analysis (FDFA 2013). Although Singapore, Netherlands, USA, Great Britain, or Hong Kong are all on the same level of competitiveness index and very close in other criteria concerning commodity trade (Schwab 2013). There may be some trading benefits reducing uncertainty of dealing with Swiss traders leading to higher (re-)export prices. However, if opacity plays no role, this does not explain lower prices of exports to Switzerland. Further, the data does not let me explain why countries continue trading with Switzerland which offers higher (re-)exports prices on average.

As the previous study had dedicated most of its concern to the transactions between the developing countries and Switzerland, I have investigated also trade with high-income countries. I found many anomalous transactions implying suspicious capital shifts using non-standard prices which may serve to move capital in or out of Switzerland. For instance, exporting 219 kilos of unmanufactured tobacco for USD 117 millions from the USA to Switzerland is more than bizarre. Such a transaction might serve for a movement of capital from Switzerland to the USA. As UN Comtrade database warns of potential errors, the data are provided by particular jurisdictions, the USA in this case.

As in the original study, large difficulty of the research is the availability of data. Even though I use the most detailed system that exists, the UN Comtrade database does not discriminate between trade at arm's length and related parties. Up to 74% of exports from developing countries is not recorded as imports in Switzerland.

Therefore the losses caused to the developing countries might be much larger. Cobham *et al.*(2013) do not provide any information on Swiss trade with high-income non-OECD countries whose 98% of exports to Switzerland is not declared as imports there.

The Cobham *et al.* (2013) study puts emphasis on describing gross figures for the whole four year period. I have decided to investigate the estimates for particular years. This approach presents anomalous transaction prices which were not found before.

Switzerland has strengthened its regime for combating money laundering and terrorist financing to keep in track with the EU and the USA. The Federal Council and the FDFA are aware of the reputational risks the opacity of the commodity trade brings. If Switzerland follows the international standards and simultaneously retains its current position, it has further potential to grow even stronger. Nevertheless, I find a reason to believe that the proposed legal recommendations will take little effect. The SNB measures the transit trade as an export of service and therefore eludes the official statistics of the Swiss Federal Customs Administration (Berne declaration 2011). The major issue of transfer pricing manipulation and opaque activities of MNEs are yet not dealt with.

# Chapter 6

## Conclusions

In this paper I have independently replicated and extended Cobham *et al.* (2013) study which investigates transfer pricing manipulation in the Swiss commodity trade. My results, using both the original and new approaches, are consistent with the original study and confirm systematic differences in declared prices for commodity exports to and from Switzerland.

According to the UN Comtrade database, dramatic 74% of exports from developing countries and 98% exports from high-income non-OECD countries are not recorded as imports in Switzerland because of absent Swiss statistics on transit trade. These results illustrate the opacity of the Swiss commodity trade with other tax havens and exploited developing countries. On average, 44% of all exports are not declared by the Swiss customs as physical trade imports. The Swiss neighbours declare more imports than the original exports there in every income category.

All the estimates of replicated models confirm a capital shift from developing countries to Switzerland. The annual loss of USD 117 billion for developing countries is the highest estimate obtained. I assume even higher values for annual capital shifts due to data limitations. The results indicate annual capital shift of USD 544 billion to high-income OECD countries from Switzerland; suggesting use of transfer pricing manipulation to retrieve capital back to high-income OECD countries. This rather large value led me to thoroughly investigate the data. I have analyzed and adjusted the data set excluding excessively overpriced transactions to find out that overall capital loss for high-income OECD countries is positive as well, but further



research with transaction-level data is needed here. Choosing Austria, Hong Kong, or Singapore as benchmarks might be a subject of future research as well. The new model findings confirm the original hypotheses in case of both developed and developing countries.

My contribution, along with confirmation of the original findings, is a creation of new approaches. The new model estimates of overall USD 76 billion loss for developing countries in 2007-2010 also confirm the original findings. As the new approach estimates based on the Swiss customs import data imply, Swiss commodity (re-)export for five times higher price than the original indicates reasonable margin leading to almost zero capital loss for developing countries. Nevertheless, employing the exporting country data estimates the most conservative capital loss for developing countries up to USD 28 billion even at this level.

The Swiss traders pay lower prices for commodities imported from developing countries than other traders and are able to re-sell them at higher price levels. I explain large portion of such a trading success by the opacity of financing the trade rather than by higher abilities of Swiss traders.

Switzerland is aware of the reputational risks the opacity of the commodity trade brings. Switzerland has strengthened its regime for combating money laundering and terrorist financing in the recent years. However, such actions have not solved the issues of transfer pricing manipulation and following illicit financial flows. If Switzerland wants to improve its reputation not only in the commodity trade, it should introduce strict rules concerning transparency of payments and commodity flows along with company structures. The rules and following sanctions must concern the Swiss based companies but also their subsidiaries. If Switzerland introduces laws recommended by the EU and the USA and retains its dominant position, it is likely to grow even stronger in the commodity sector due to favourable background surpassing the competitors in almost all trade criteria.

# Chapter 7

## References

- BAKER, R. (2005): "Capitalism's Achilles Heel: Dirty money and how to renew the free-market system", Hoboken: John Wiley & Sons, Inc. ISBN: 978-0-471-64488-0
- Berne Declaration (2011): "Commodities: Switzerland's most dangerous business", Zurich: Berne Declaration, ISBN: 978-3-905801-51-4
- CLAUSING, K. (2003): "Tax-motivated transfer pricing and US intrafirm tradeprices", *Journal of Public Economics* 87(9-10), pp.2207–2223.
- CLAUSING, K. (2009): "Multinational Firm Tax Avoidance and Tax Policy", *National Tax Journal*, pp.703-725
- COBHAM, A. & JANSKÝ, P. & PRATS, A. (2013): "Swiss-ploitation? The Swiss Role in Commodity Trade", a Christian Aid paper available at: <http://www.christianaid.org.uk/images/caw-swissploitation-may-2013.pdf> (accessed 7 May 2014), ISBN: 14-474-J1321
- COBHAM, A. & JANSKÝ, P. & PRATS, A. (2014): "Estimating Illicit Flows of Capital via Trade Mispricing: A Forensic Analysis of Data on Switzerland", Center for Global Development
- EDEN, L. & RODRIGUEZ, P. (2004): "How weak are the signals? International price indices and multinational enterprises", *Journal of International Business Studies* 35, pp. 61-74
- EDEN, L. (2012): *Transfer Price Manipulation*, in "Draining Development? Controlling Flows of Illicit Funds from Developing Countries" (ed. P. Reuter), pp. 205-234, Washington, DC: World Bank. ISBN: 978-0-8213-8869-3
- Federal Council (2014): "Background report on commodities", available at <http://www.seco.admin.ch/aktuell/00277/01164/01980/index.html?lang=en&msg-id=52429> (accessed 7 May 2014)
- Federal Department of Foreign Affairs (2013): "Background Report: Commodities", available at <http://www.news.admin.ch/NSBSubscriber/message/attachments/30136.pdf> (accessed 7 May 2014)
- FUEST, C. & RIEDEL, N. (2012): *Tax Evasion and Tax Avoidance: The Role of International Profit Shifting*, in "Draining Development? Controlling Flows of Illicit Funds from Developing Countries" (ed. P. Reuter), pp. 109-142, Washington, DC: World Bank. ISBN: 978-0-8213-8869-3

- FREITAS, S. & KAR, D. (2012): "Illicit Financial Flows from Developing Countries: 2001-2010", Washington, DC, Global Financial Integrity
- Geneva Trading and Shipping Organisation (2014): "Swiss Commodity Trading Hub", available at <http://www.gtsa.ch/geneva-global-trading-hub/geneva-global-trading-hub> (accessed 7 May 2014)
- GRUBERT, H. (2003): "Intangible Income, Intercompany Transactions, Income Shifting and the Choice of Location", *National Tax Journal* 56 (1, part 2): pp. 221-242
- HOGG, A. and Christian Aid Staff (2008): "Death and Taxes: The True Toll of Tax Dodging: A Christian Aid Report", Christian Aid, ISBN: 9780904379716
- HOGG, A. & MCNAIR, D. & PAK, S. (2009): "False Profits: Robbing the Poor to Keep the Rich Tax-free", a Christian Aid paper available at <https://www.christianaid.org.uk/Images/false-profits.pdf> (accessed 7 May 2014)
- HOLLINGSHEAD, A. (2010): "The Implied Tax Revenue Loss from Trade Mispricing", Washington, DC: Global Financial Integrity
- JANSKÝ, P. (2013): "Illicit Financial Flows and the 2013 Commitment to Development Index", Washington, DC: Center for Global Development, ISBN: 202-416-4000
- LEITE, C. (2012): *The Role of Transfer Pricing in Illicit Financial Flows*, in "Draining Development? Controlling Flows of Illicit Funds from Developing Countries" (ed. P. Reuter), pp. 235-264, Washington, DC: World Bank. ISBN: 978-0-8213-8869-3
- NITSCH, N. (2012): *Trade Mispricing and Illicit Flows*, in "Draining Development? Controlling Flows of Illicit Funds from Developing Countries" (ed. P. Reuter), pp. 309-334, Washington, DC: World Bank. ISBN: 978-0-8213-8869-3
- O'DEA, C. (2013): "Switzerland awash with money laundering cases", available at <http://www.swissinfo.ch/eng/swiss`news/Switzerland`awash`with`money`laundering`cases.html?cid=34793634> (accessed 7 May 2014)
- Oxfam International (2000): "Tax Havens: Releasing the hidden billions for poverty eradication", available at <http://policy-practice.oxfam.org.uk/publications/tax-havens-releasing-the-hiddenbillions-for-poverty-eradication-114611> (accessed 7 May 2014), Oxfam International
- SCHWAB, K. (2013): "The Global Competitiveness Report 2012-2013", available at <http://www3.weforum.org/docs/WEF`GlobalCompetitivenessReport`2012-13.pdf>, World Economic Forum
- SIKKA, P. N. & WILLMOTT, H. (2010): "The Dark Side of Transfer Pricing: Its Role in Tax Avoidance and Wealth Retentiveness", *Critical Perspectives on Accounting* 21(4), pp. 342-356
- Swiss National Bank (2013): "Swiss Balance of Payments (quarterly estimates) 3rd quarter 2013", available at <http://snbchf.snbchfcom.netdna-cdn.com/wp-content/uploads/2014/01/Swiss-Balance-of-Payments-2013-Q3.pdf> (accessed 7 May 2014)
- United Nations Conference on Trade and Development (2008): "World Investment Report 2008: Transnational Corporations, and the Infrastructure Challenge", Geneva
- ZDANOWICZ, J. (2009): "Trade-based money laundering and terrorist financing", *Review of Law and Economics* 5(2), pp. 854-878

# Chapter 8

## Appendix

Table 1: Scale of untraceable trade, 2007-2010 (US\$ billion)

	Untraceable Exports to Switzerland	Total Exports to Switzerland	Untraceable Share	World Exports	Untraceable Swiss Share	Untraceable Exports to Neighbours	Total Exports to Neighbours	Untrace. Share
<b>TOTAL</b>	117.2	266.9	43.91%	32363.1	0.36%	-619.3	3460.1	-17.90%
High OECD	-11.4	113.8	-9.99%	13952.6	-0.08%	-45.6	2094.4	-2.18%
High non-OECD	61.3	62.3	98.35%	6441.2	0.95%	-180.8	404.2	-44.73%
Upper-middle	50.6	71.4	70.92%	8162.4	0.62%	-293.7	793.5	-37.01%
Lower-middle	15.8	18.5	85.68%	3726.0	0.42%	-84.2	164.8	-51.06%
Low	0.9	1.0	89.63%	79.2	1.10%	-14.6	3.2	-459.55%
Developing totals	67.3	90.8	74.12%	11967.6	0.56%	-392.5	961.5	-40.82%

Source: calculations on UN Comtrade data 2007-2010, for 244 countries/trade jurisdictions, 2596 commodity codes, May 2014

Table 2: Aggregate estimates of capital loss in all declared exports to Switzerland, 2007-2010 (US\$ billion)

MODEL	Model I	Model II	Model III	Model IV	Model V
Exclusions	<i>Swiss export price &gt; 1000*original</i>	<i>Swiss export price &gt; 100*original</i>	<i>Swiss export price &gt; 10*original</i>	<i>Swiss export price &gt; 5*original</i>	<i>Swiss export prices treated as unreliable</i>
Benchmark	World Neighbours	World Neighbours	World Neighbours	World Neighbours	World Neighbours
<b>TOTAL</b>	844.4 818.2	593.0 572.3	208.7 193.0	82.6 77.3	-38.7 98.2
High OECD	306.3 318.5	187.5 200.8	74.2 84.9	44.3 54.9	-69.8 -31.0
High non-OECD	68.0 65.3	66.1 63.6	19.3 14.4	10.0 5.2	2.7 7.9
Upper-middle	421.6 415.5	294.8 289.8	87.5 83.0	18.3 7.3	19.1 81.1
Lower-middle	45.9 17.7	42.1 16.9	26.4 9.7	9.0 9.0	1.6 14.6
Low	2.6 1.2	2.5 1.2	1.3 1.0	1.1 0.9	7.7 25.6
Non-defined	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
Developing totals	470.1 434.4	339.4 308.0	115.2 93.7	28.3 17.2	28.4 121.3

Source: calculations on UN Comtrade data, for 244 countries/trade jurisdictions, 2596 commodity codes, May 2014

Table 3: Aggregate estimates of capital loss in exports to Switzerland, 2007-2010 (physical imports only, US\$ billion)

MODEL	Model I	Model II	Model III	Model IV	Model V
Exclusions	<i>Swiss export price &gt; 1000*original</i>	<i>Swiss export price &gt; 100*original</i>	<i>Swiss export price &gt; 10*original</i>	<i>Swiss export price &gt; 5*original</i>	<i>Swiss export prices treated as unreliable</i>
Benchmark	World Neighbours	World Neighbours	World Neighbours	World Neighbours	World Neighbours
<b>TOTAL</b>	-2248.6 -2251.5	-2342.8 -2344.9	-2475.2 -2485.4	-2517.8 -2527.7	-38.7 98.2
High OECD	-2295.4 -2294.1	-2381.1 -2380.0	-2482.4 -2488.6	-2516.9 -2522.6	-69.8 -31.0
High non-OECD	57.4 63.2	36.1 41.8	7.6 11.2	2.1 5.3	2.7 7.9
Upper-middle	31.2 31.1	24.0 23.7	8.6 7.4	2.2 0.8	19.1 81.1
Lower-middle	12.1 8.3	11.4 7.6	-2.4 -6.2	-3.6 -7.4	1.6 14.6
Low	1.4 0.9	1.4 2.0	0.5 1.2	0.4 1.2	7.7 25.6
Non-defined	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
Developing totals	44.7 40.3	36.8 33.4	6.7 2.5	-1.1 -5.4	28.4 121.3

Source: calculations on UN Comtrade data, for 244 countries/trade jurisdictions, 2596 commodity codes, May 2014

Table 4: Aggregate estimates of capital loss in exports to Switzerland, 2007-2010 (physical imports only, US\$ billion)

MODEL	Model I		Model II		Model III		Model IV		Model V	
Exclusions	<i>Swiss export price &gt; 1000*original</i>		<i>Swiss export price &gt; 100*original</i>		<i>Swiss export price &gt; 10*original</i>		<i>Swiss export price &gt; 5*original</i>		<i>Swiss export prices treated as unreliable</i>	
Benchmark	World	Neighbours	World	Neighbours	World	Neighbours	World	Neighbours	World	Neighbours
<b>TOTAL</b>	222.2	219.3	128.0	125.9	-4.4	-14.6	-47.0	-56.9	-38.7	98.2
High OECD	175.4	176.7	89.7	90.8	-11.6	-17.8	-46.1	-51.8	-69.8	-31.0
High non-OECD	57.4	63.2	36.1	41.8	7.6	11.2	2.1	5.3	2.7	7.9
Upper-middle	31.2	31.1	24.0	23.7	8.6	7.4	2.2	0.8	19.1	81.1
Lower-middle	12.1	8.3	11.4	7.6	-2.4	-6.2	-3.6	-7.4	1.6	14.6
Low	1.4	0.9	1.4	2.0	0.5	1.2	0.4	1.2	7.7	25.6
Non-defined	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Developing totals	44.7	40.3	36.8	33.4	6.7	2.5	-1.1	-5.4	28.4	121.3

Source: calculations on UN Comtrade data 2007-2010, for 244 countries/trade jurisdictions, 2596 commodity codes, May 2014



Table 5: Aggregate estimates of capital loss in exports to Switzerland, 2007-2010 (physical imports only, US\$ billion)

MODEL		Model I		Model II		Model III		Model IV	
Exclusions		<i>Swiss export price &gt; 1000*original</i>		<i>Swiss export price &gt; 100*original</i>		<i>Swiss export price &gt; 10*original</i>		<i>Swiss export price &gt; 5*original</i>	
Group		World	Neighbours	World	Neighbours	World	Neighbours	World	Neighbours
2007	World	60.4	60.2	35.2	34.9	4.4	2.4	-7.8	-9.9
	High OECD	40.9	42.9	23.2	25.2	3.7	4.3	-7.7	-7.0
2008	World	63.7	62.6	28.1	26.9	6.0	-0.6	-4.0	-10.7
	HighOECD	55.3	56.9	19.7	21.4	1.3	-2.1	-3.9	-7.2
2009	World	68.2	74.4	46.7	54.1	6.4	11.5	0.1	4.8
	High OECD	55.4	60.9	34.6	40.1	7.2	10.5	2.0	5.0
2010	World	-2441.0	-2448.7	-2452.9	-2460.8	-2492.0	-2498.7	-2506.1	-2511.9
	High OECD	-2446.9	-2455.0	-2458.6	-2466.7	-2494.5	-2501.4	-2507.3	-2513.3
2010	World (adjusted)	29.8	22.1	17.9	10.0	-21.2	-27.9	-35.3	-41.1
	High OECD (adjusted)	23.9	15.8	12.2	4.1	-23.7	-30.6	-36.5	-42.5
<b>TOTALS</b>		-2248.6	-2251.5	-2342.8	-2344.9	-2475.2	-2485.4	-2517.8	-2527.7
<b>TOTALS (adjusted)</b>		222.2	219.3	128.0	125.9	-4.4	-14.6	-47.0	-56.9

Source: calculations on UN Comtrade data 2007-2010, for 244 countries/trade jurisdictions, 2596 commodity codes, data set, May 2014

Table 6: Aggregate estimates of capital loss in all declared exports to Switzerland, 2007-2010 (US\$ billion)

	2007	2008	2009	2010 (adjusted)	2010	TOTAL (adjusted)	TOTAL
<b>Model VI TOTAL</b>	15.7	-38.6	11.2	-18.0	-2488.8	-29.7	-2500.5
High OECD	-14.0	-76.1	-13.4	-44.5	-2515.3	-148.0	-2618.8
High non-OECD	14.7	11.6	7.2	8.3	8.3	41.9	41.9
Upper-middle	11.0	20.3	11.4	11.0	11.0	53.7	53.7
Lower-middle	2.8	3.9	4.6	5.5	5.5	16.8	16.8
Low	1.2	1.7	1.3	1.7	1.7	5.9	5.9
Non-defined	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Developing totals	15.0	25.8	17.3	18.2	18.2	76.4	76.4
<b>Model VII TOTAL</b>	-10264.7	-5802.4	-2951.6	-4859.7	-4861.4	-23878.3	-23880.0
High OECD	-310.3	-337.4	-181.4	-210.3	-212.0	-1039.5	-1041.2
High non-OECD	-9732.9	-4861.7	-25.1	-14.9	-14.9	-14634.6	-14634.6
Upper-middle	-55.1	-43.5	-13.7	-22.0	-22.0	-134.4	-134.4
Lower-middle	-36.5	-442.5	-2731.4	-4612.4	-4612.4	-7822.7	-7822.7
Low	-129.9	-117.2	0.1	0.0	0.0	-247.0	-247.0
Non-defined	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Developing totals	-221.5	-603.2	-2745.0	-4634.4	-4634.4	-8204.1	-8204.1

Source: calculations on UN Comtrade data 2007-2010, for 244 countries/trade jurisdictions, 2596 commodity codes, data set, May 2014