Misreporting Trade Statistics And Unrecorded Capital Flows:

Estimates, Causes and Remedies

EXPORT-IMPORT BANK OF INDIA

MISREPORTING TRADE STATISTICS AND UNRECORDED CAPITAL FLOWS: ESTIMATES, CAUSES AND REMEDIES

This study which has been supported by the Export-Import Bank of India (India Exim Bank) has been undertaken by Dr. Sugata Marjit, Distinguished Professor, Indian Institute of Foreign Trade, Kolkata, as the lead researcher.

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Dr. Sugata Marjit

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EXECUTIVE SUMMARY

The trade statistics, as reported in India, generally show significant divergence in relation to the trade statistics reported by its trading partners beyond officially recorded transport and other transaction costs. This point was first raised in a paper by Marjit, Dasgupta and Mitra (2000) in the Indian context, pointing out that post-reform depreciation of rupee might have initially increased reporting of export earnings as parallel market premium came down, rather than reflecting a significant rise in the actual volume of exports. Hence, official statistics needs to be relooked. A substantial literature has continued to follow, but unfortunately much less in India by the Indian scholars and much more globally, mainly in the context of China. But the content of this project is substantially and fundamentally different from published or unpublished studies on various counts, as listed below.

1. For the first time the problem is explored in the context of a group of countries or regions which are important exclusively from India's external trade and capital flow perspectives.
2. Information regarding causes and consequences of misreporting have been gathered from the traders and other stakeholders at the ground level through scientifically developed questionnaires and tried to relate the extent of micro-misreporting to macro-outcome. This is missing in the entire literature.
3. The study proposed novel ways of correcting the aggregate Balance of Trade (BOT) and capital flow data for better policy formulation, a task long awaited, but not attempted on a larger scale.
4. Analytical decision model for misreporting, descriptive statistical information and data, sophisticated econometric evaluation of the time series and broad explanatory regression analysis, all have been carried out in the same study.
5. The study highlighted that unrecorded capital flows can be related to the non-traded segment of the economy. This is beyond what literature has perceived so far.
6. New data generation and explicit policy takeaways are key features of the study.

Such misreporting of trade transactions is a plausible reflection of unrecorded or informal capital flows. However, there may also exist other channels of such capital flows independent of the trade channel. The study on misreporting trade statistics and unrecorded capital flows is therefore critical in the context of appropriate policy making and tries to mend the empirical analysis drawn based on measurement errors. These two are the first of three major contributions being made in this report. The third objective requires the trade balance to be properly measured for better policy making and proper measurement of GDP. So, the study proposes some simple yet meaningful adjustments which will result in more accurate measure of trade surplus or deficit. There are also other issues which will unfold in the course of this work. However, at the very outset the contribution of the work in terms of new methods and policies should be stated clearly. One must note that the problem of matching mirror data and informal flows continues to haunt the global economy and world bodies (Marjit, 2019).

This is the first work on collecting information from the traders at the ground level regarding how exactly export and import data can be misreported and the purpose of misreporting. Massive gap in the reported statistics of source and destination counties, a fact admitted by policy practitioners and experts and being researched all across the globe (Marjit, 2019), is hardly looked into at the micro level. Even documenting such facts is essential for framing or abolition of policies.

For the first time the mirror trade and investment data for India and some of its major trading partners, primarily developed countries are being meticulously analyzed to identify unrecorded capital flows. Unfortunately, even world organizations such as the International Monetary Fund (IMF), World Bank, United Nations Conference on Trade and Development (UNCTAD) etc. do not provide mirror data on capital flows over a long time series. The reported statistics of developed countries on trade and investment data might also have discrepancies. Therefore, assumed good governance in the developed countries may not fully explain the origin of these unrecorded flows. The devised method in the report of locating “recorded” versus “unrecorded” segments of source and destination statistics could be a very useful strategy to control unrecorded capital flight and/or develop bilateral governance systems. Identification of such directional movements constitutes a new contribution of the report.

At the aggregate level the study explores the idea that unrecorded capital flows in or out of country is not only influenced by the traded sector but also various channels through which currency is converted and transacted globally. The entire literature on mirror data analysis so far puts sole emphasis on the traded sector transactions since export-import mirror data are available over a long time series. But this misses a critical aspect which is related to the non-traded sector in any economy. Booming non-traded sector can both pull and push

capital flows through illegal channels. Sometimes, the role of trade account transactions in determining unrecorded capital flows should not be over-emphasized as the non traded component can also be important for unrecorded capital flows. The study tries to explore this avenue for further research into the causes and consequences of such anomalies.

The main report is divided into seven chapters starting with the introduction. The second chapter is the findings from the field work in four major cities, Chennai, Delhi, Kolkata and Mumbai. The third is the analysis of descriptive statistics on misreporting of trade data. Subsequently the study tries to provide a better measure of Balance of Trade (BOT) with the help of bilateral mirror data. The fourth chapter deals with similar issues related to mirror data involving capital flows. The fifth chapter is a time series econometric analysis of the relationship between export import mis-matches. The sixth chapter is a regression analysis of what explains the deviations between the reported and actual data in terms of some critical aggregate explanatory variables. The seventh chapter provides key policy insight and concludes with a concluding chapter.

Field Work

The ground level survey by interviewing the traders mainly involved in leather, toy, copper, and agro Industries, among others, reveal the following details. It should be remembered that industry specific characteristic may not matter much in case of general regulatory problems. A summary of observations is presented below.

Table 1: Summary of Observations

No	Target and Questions	Answers	Remarks
1.	Industry interviewed	Leather Manufacturing, Toy Industries, Handicraft, Textile, Cosmetics, Edible oil and fats, Copper Industry and Agro Industry.	Around 500 people interviewed.
2.	General reasons behind data mismatch	(i) To get tax benefit. (ii) To receive government incentive. (iii) To avoid custom duties. (iv) To make profit through hawala transaction. (v) To minimize cost of import.	Other reasons of misreporting include procedural hurdles, bureaucratic delays and, dishonest business practices etc.

No	Target and Questions	Answers	Remarks
3.	Does Changing rules and regulation help reduce misreporting?	Uncertain	Change in rules and regulation could increase misreporting too. An example is the situation during COVID-19, where there are changes which in some cases, led to rise in misreporting.
4.	Extent of Misreporting	For some the extent of misreporting is around 5% while it is around 5% to 10% for others. Only Chennai responded that there is minimal misreporting in the region of 1% to 2%.	Interestingly aggregated data does exhibit misreporting upper bound to be around 10% with major developed regions over the last decade.
5.	Is illegal money channeled abroad through trade misreporting	Yes, the illegal money is always sent abroad through trade misreporting.	
6.	Could any Rule, Law, Norm be the main reason behind this?	(i) Import duties (ii) Defective claim benefit. (iii) Duty drawback	Digitalisation of custom procedures has reduced misreporting, however dishonest businessmen take advantage of the new norms.
7.	Is misreporting done in destination countries also?	Yes	The scope of misreporting is lesser in the developed countries.

In context of the trade statistics, the study deals with major trade partners of India, basically developed countries. As in the mirror data exercise the destination country's data is taken as the "true" figure as has been done in the literature since governance issues are less complex and more transparent in these countries. A well-known data set on global good governance

has been used to make sure that destination countries which are ranked quite high in that evaluation are chosen. China has been excluded for the time being specifically on this count, though it is a major trading partner of India.

Five trading partners of India have been considered such as United States of America (USA), United Kingdom (UK), Japan, European Union (EU) and Singapore. The trading partners are selected such that the countries are mostly corruption free as reported in the freedom house index. Also, these countries have signigicant trade shares (both export and import respectively) with India, that is, USA (16.69%, 7.28%), UK (2.71%, 1.434%), EU (14.54%, 9.09%), Japan (1.48%,2.66%), and Singapore (3.32%, 3.11%). These five countries together explain 38.73% and 23.55% of India's export and import data respectively. This set will be later elaborated in the study.

The time series analysis from 1980 through 2019 indicates India's misreporting of its trade statistics. Such misreporting explains the prevalence of unrecorded capital flows in the traded sector. In the case of exports, India's highest rate of over-reporting and under- reporting took place with Singapore in 2019 and 1983 respectively. The corresponding lowest rates were with the US in 2017 and with EU in 2008. In the case of imports, India's highest rate of over-reporting and under-reporting took place again with Singapore in 2019 and 1991 respectively. The corresponding lowest rates were with Singapore in 1980 and with the US in 1990. The series of India's rate of misreporting imports from the UK and Singapore, and misreporting exports to the US, EU and Japan have multiple structural breaks in 1996 and 2011.

The study also discusses the relationship between the share of the non-traded sector in GDP and the mismatch of capital flows as a new method to check whether there is any relationship between unrecorded capital flows and general health of the economy beyond the traded sector. Due to lack of data made available by the world organizations and technically the GDP data all across failing to incorporate the mismatch, a detailed econometric analysis couldn't be done. However, the present study has been supported by adequate time series analysis using adjusted misreported trade data with proper rectification strategies. This is a new approach that could be adopted.

In this connection, the 'Mirror Data' analysis of capital flows (Foreign Institutional Investment) for India and some of its trading partners also identifies the existence of unrecorded capital flows. The data suggests that India over reports its capital outflows to US; whereas it under reports capital outflows to UK, Japan, Mauritius, Germany, Italy and France. Also, India over

reports its capital inflows from US, UK and Japan; and under reports it from Mauritius, Germany, Italy and France.

Empirical Study

The empirical study uses Vector Autoregressive Model (VAR) to explore a possibility of existence of short run relationship between import misreporting and export misreporting using quarterly data. Results indicate that Export Misreporting Granger causes Import Misreporting (except in case of UK and Singapore). This is obtained with standard analysis of Granger Causality as well as with Impulse Response Function method. Such observation is quite critical in order to target policies to monitor unrecorded flows in terms of trade channel. The study tries to explain the deviation of "True (Actual)" Balance of Trade (BOT) from "Reported" Balance of Trade (BOT) in terms of some aggregate parameters and derive useful results. Similar exercise is done also in the context of capital flows.

Chapter

INTRODUCTION

This is the first work on collecting information from the traders at the ground level regarding how exactly export and import data can be misreported and the purpose of misreporting. Massive gap in the reported statistics of source and destination counties, a fact admitted by policy practitioners and experts and being researched across the globe (Marjit, 2019 IMF Annual Statistical Forum), is hardly looked into at the micro level. Even documenting such facts is essential for framing or abolition of policies.

For the first time the mirror trade and investment data for India and some of its major trading partners in the form of developed countries are being meticulously analyzed to identify unrecorded capital flows. Unfortunately, even world organizations such as the IMF, World Bank, UNCTAD etc. do not provide mirror data on capital flows over a long time series. The reported statistics of developed countries on trade and investment data might also have discrepancies. Therefore, assumed good governance in the developed countries may not fully explain the origin of these unrecorded flows. This implies that the reported statistics of developed countries on trade and investment data might also be polluted. Therefore, the origin of unrecorded capital flows may not be fully explained using the data reported by developed countries. In this report we have devised methodologies to locate “recorded” versus “unrecorded” segments of source and destination statistics. These could be very useful strategies to control unrecorded capital flight and/or develop bilateral governance systems. Identification of such directional movements constitutes a new contribution of the report.

At the aggregate level the study explores the idea that unrecorded capital flows in or out of country is not only influenced by the traded sector but also various channels through which currency is converted and transacted globally. The entire literature on mirror data analysis so far puts sole emphasis on the traded sector transactions since export-import mirror data are available over a long time series. But this misses a critical aspect which is related to the non-

traded sector in any economy. Booming non-traded sector[1] can both pull and push capital flows through illegal channels. Trade account transactions should not be overemphasized to track the unrecorded flows. Unrecorded capital flows are not just the result of misreporting export and import data (that is, trade account transactions). So, trade account transactions should not be overemphasized to locate the unrecorded capital flows. The other causes, which includes income from hidden sources and other illegitimate transactions (that is, the non-traded sector) which might be a part of national income such as informal sector income must be investigated to determine unrecorded capital flows. This study attempts to explore this avenue for further research into the causes and consequences of such anomalies.

The main report is divided into seven chapters starting with the introduction. The second chapter is the findings from the field work in four major cities, Chennai, Delhi, Kolkata and Mumbai. The third is the analysis of descriptive statistics on misreporting of trade data. Subsequently the study tries to provide a better measure of Balance of Trade (BOT) with the help of bilateral mirror data. The fourth chapter deals with similar issues related to mirror data involving capital flows. The fifth chapter is a time series econometric analysis of the relationship between export import mis-matches. The sixth chapter is a regression analysis of what explains the deviations between the reported and actual data in terms of some critical aggregate explanatory variables. The seventh chapter provides a conclusion and a few key policy insights.

[1] Non-traded sector is defined as: 1- openness index of a country. Independent of international trade, a part of national income such as tax evaded income or income from other hidden sources might be a part of national income such as informal sector income and can be a part of unrecorded capital flows that may not be captured via the misreporting through trade account.

Chapter

FIELD SURVEY

Micro assessment was supposed to be done through physical survey of traders and stake holders. Online and other remote contact means were used due to the pandemic. Yet, substantial information, examples, and commentaries of stake holders in cities of Kolkata, Mumbai, Chennai and Delhi were gathered. Given the nature of the problem it was difficult to extract information from the traders as they perceived the exercise as a means to extract their private information by “the authorities” and to use those against them. Since the whole exercise is about hidden trade and investment, this problem was anticipated to some extent. Fortunately, persuasion and common experiences of many helped on focusing on significant issues for the study. The exercise enabled identification of some of these ground level problems.

The primary survey was conducted by interviewing the traders involved in leather, toy, petrochemical, various Micro, Small and Medium Enterprises (MSMEs), handicrafts, textile, cosmetics, copper and agro-industries. The interview has been carried out with more than 500 respondents. This process has been quite tedious, with the respondents being reluctant in disclosing the modus operandi of their industries. None of them revealed the exact name of their companies, exact location and sometimes got back to us without their names. The details of the gathered information of the field survey are as follows.

Part 1

A) Sectors and Industries covered

For this project interviews were conducted for around 500 professionals (125 from each city) from Kolkata, Mumbai, Delhi and Chennai, who were mainly linked with the manufacturing, petrochemical, energy and the Fast-Moving Consumer Goods (FMCG) sector. The interviewees were mainly from leather manufacturing, toy industries, handicraft, textile, cosmetics, edible oil and fats, copper and agro industry.

B) Respondents

The survey was conducted with exporters and/or importers and Forex dealers.

C) Source/Destination Country

The interviewees exported their goods to countries like USA, countries in EU (like Denmark, Germany, Cyprus, Spain, Italy, Sweden, Romania, Switzerland, France), Asian countries (like Japan, Singapore, Afghanistan, Vietnam, China, Malaysia, Taiwan and the Indian Subcontinent), Middle Eastern countries (like Iran, Israel, Egypt, Turkey, UAE), Kenya and select West African countries. They imported their goods primarily from China, Korea, and other South Asian countries (like Bangladesh and Sri Lanka).

D) Annual Trade Turnover (In US$)

Most of the Interviewees are not extremely comfortable to give us their Annual Trade Turnover Figure, However, the reported amount varied between US$ 100,000 and US$ 67,000 annually. This might have been underreported.

Part 2

Questions asked as part of the Survey and Key Responses Summarised

1. From which year have you started your business?

Ans: Most of the interviewees started their businesses between the year 1946 and 2016.

2. To (From) which country do you export (import)?

Ans: The interviewees exported their goods to countries like USA, countries in EU (like Denmark, Germany, Cyprus, Spain, Italy, Sweden, Romania, Switzerland, France), Asian countries (like Japan, Singapore, Afghanistan, Vietnam, China, Malaysia, Taiwan and the Indian Subcontinent), Middle Eastern countries (like Iran, Israel, Egypt, Turkey, UAE), Kenya and select West African countries. They imported their goods primarily from China, Korea, and other South Asian countries (like Bangladesh and Sri Lanka).

3. What do you think as the general reasons behind such data-mismatch/ under-reporting?

Ans: According to the interviewees in all the 4 cities, the main reasons behind the data-mismatch/ under-reporting could be to benefit from tax saving, receive government

incentives, avoid custom duties and due to certain hawala transactions. They are of the view that high import duties and the other banking charges are the main, and sometimes sole, reason behind these kinds of activities. This mostly happens in case of developing countries with a high rate of import duty. Other reasons for data-mismatch or mis-reporting could be certain malpractices such as invisible export/import[2] or fake or filler export/import[3] by a few unscrupulous players.

Moreover, according to the respondents, different countries also have different agencies monitoring the data and separate parameters or data points which lead to inconsistent reporting of data at the global level. It was opined that mismatches and under/over invoicing could also occur due to industry specific rules and regulations, including improper accounting standards, certain logistic issues, prevalent tax structures and systemic problems, among others.

It is also felt that several steps have been taken by the Government, since 2015-16, to curb misreporting of export import figures and prevalent malpractices of trade.

4. Extent of such misreporting as percentage of turnover of transactions?

Ans: For some of the interviewees the misreporting amounts to around 5% of the yearly turnover. For others this amounted to around 5% to 10% in case of both exports and the imports.

Unlike Kolkata and Mumbai most of the respondents in Delhi reported that they have no idea about the extent/ percentage of misreporting happening in the country. They are of the view that misreporting percentage varies from country to country. The percentage of misreporting is higher for countries like Russia, Turkey, Syria etc. where the import tariffs are exceedingly high. Countries like Venezuela, Cuba etc. which are ruled by dictators have extremely high custom duty on everything. It was thus, opined that any person in India trading with countries like the ones mentioned above will have a higher extent of misreporting than for businesses with advanced countries like the United Kingdom, United States or countries in the European Union etc., which have a more robust and transparent reporting system than other countries. Chennai was an exception among the 4 cities, wherein respondents felt that the percentage of misreporting against the total turnover is very negligible/minimal, viz. around 1-2%.

[2] As a result of non-declaration of containers and as a result non invoicing of trade

[3] Which involves filling up of container spaces with another undeclared product(s) along with the declared item and partial submission of invoices to save on custom duties.

It was also highlighted that with the introduction of online filing and the new HS coding system, the incidence and scope of misreporting has considerably reduced, compared to earlier years.

5. Do regulations, taxes, procedural delays, and other factors force traders to misreport?

Ans: Government regulations, prevailing tax structures, time taken for shipment of goods, and procedural delays, were reported as factors that occasionally force traders to misreport. Unforeseen events such the COVID-19 pandemic and resultant lockdowns and imposition of stringent measures and unexpected restrictions on export and import of certain goods/items could also result in data misreporting. It was also felt that the lure/ attraction to benefit from prevailing government incentives (including duty drawbacks) on exports of certain items, and poor enforcement encourages unscrupulous players to mis-report exports.

In Chennai, the respondents unanimously mentioned that structural problems are a major reason for misreporting in the short term, the effect of which, however, gets nullified over a longer period.

6. Is it possible that part of export earnings is parked overseas for financing imported inputs later?

Ans: The interviewees when asked about the possibility of parking export earnings overseas for financing imported inputs later, they unanimously answered that it is possible, but is mostly allowed (legally) for a fixed short term period of 1-year. It was felt that the current provision of one year is sufficient for its intended purpose, and the government need not increase the time frame of this enabling provision.

In this context, the problem of misreporting arises with companies which have a very weak management and poor reporting/ accounting structures and especially in countries which are considered as tax havens. In certain such countries it is extremely easy to open a bank account and even acquire citizenship which often facilitates two way remittance and parking of unaccounted money through fictitious/ under or over-valued transactions. It was also mentioned that some dishonest players also try to manipulate/ mis-report data to take undue advantage of advance licensing (or the Advance Authorisation Scheme), which allows exporters duty free import of certain inputs, besides packaging material, fuel, oil, catalyst which is consumed / utilized in the process of production of the export product.

This answer reflects an interesting aspect of mirror data mismatch and capital flows, wherein under-invoiced export earning entering a country is an unrecorded capital inflow, but when parked overseas, it is effectively considered as an outflow.

7. Does exchange rate fluctuation matter?

Ans: The interviewees unanimously answered that exchange rate fluctuations obviously matter a lot in all trade transactions. Exporters and importers try to make possible gains from currency arbitrage and prevailing interest rates by delaying payments .

8. Whether illegal money is channelled abroad through trade misreporting?

Ans: The interviewees unanimously felt that the illegal money is channelled abroad through trade misreporting, most often through hawala transactions in collusion with a few dishonest officers and overseas business partners who are often related to each other.

According to the respondents in Delhi it is possible due to the inconsistencies in regulation and reporting of export-import in the tax heavens and schemes such as the permanent residency scheme existing in a few countries.

The respondents from Chennai said that the volume channelled abroad through misreporting is not a significant chunk.

9. Does misreporting help access to finance for exporters due to the difficulty they face in accessing finance/ forex through legal channels?

Ans: The importers mostly said yes, and the exporters said that the exporters do receive a certain amount as advance from their clients to undertake production activities. However, stringent regulations to access forex compel exporters to either underreport export or overreport imports. They also said that the amount received through trade misreporting does help in financing production requirement. Easy access to forex as and when needed would eliminate these reasons to misreport.

10. To what extent changing rules, regulations will help to reduce such misreporting?

Ans: There is a consensus that since India is a labour-abundant country, this scope of inaccuracy will be more than in a developed country which is more technologically sophisticated and not labour intensive. It was also opined that if all countries adopt duty

free trade and ease regulations than this problem of misreporting could perhaps be solved to a great extent. However, removal of regulations would lead to increase in competition and possibly reduction in return from export-import business.

According to the respondents, changing rules will help reduce misreporting to a great extent, though varying across sectors. It can act as a steppingstone which will lead to improvement slowly and gradually. At present, increased digitalization, online record keeping and process of legitimate documentation, and simplification of a few regulations have greatly reduced the possibility of manipulation and misreporting.

Some respondents in Chennai said that changing rules and regulation will have partial or marginal effect on misreporting, while highlighting that the main concerns are issues related to logistics. It was felt by respondents that stronger rules and regulations would help to bring in more transparency while some also opined that less complicated rules would help in significantly reducing misreporting.

11. Is any law/ rule/ norm the main reason behind mis-reporting? How?

Ans: Interviewees are of the view that the following rules and laws maybe the main reasons behind misreporting.

a) Evasion of Import Duties is considered as the main reason for misreporting.

b) The rule of allowing an exporter 5% of yearly turnover as defective claim gives rise to chances of misreporting up to 5% of yearly turnover by that exporter. This rule has reduced misreporting on one hand, as previously there was no restriction on defective claim and therefore no restriction on misreporting. On the other hand, it has allowed for this 5% misreporting by the exporters. This rule was intended to protect the exporters from unforeseen circumstances of defective goods. But few dishonest businessmen exploit this opportunity to gain from it.

c) Since 2015-16 the realization of government incentive was done by exporters in two stages. An exporter receives 5 % duty drawback (that is, refund of customs duties, taxes and fees paid during the production of an exportable good), and 2.75% additional focus license (duty free import of 5% of turnover) on realization of the full payment. Therefore, exporters fail to acquire the complete benefit of over-reporting. Importers can make a deal with exporters either for site payment (instant payment) or for payment after a gap of say 3 months. In case of the latter option the 2.75% of focus license will be realized after 3 months. Therefore, the exporters fail to get the benefit instantly.

Respondents are of the view that tariffs and difference in tariffs lead to under/over reporting. There are also lots of non-tariff barriers which contribute to these reporting mismatches.

12. Do you think Customs' computation of assessable value for realization of FOB amount from exporters vary with the consignment value declared in the Commercial Invoice?

Ans: Some respondents answered this question in the affirmative, but opined that with computerisation/ digitalisation of the procedure of customs assessing the valuation of goods exported, the instances and scope of misreporting has come down.

Some also opined that with the easy availability of market value online today and the need for the exporters to provide EVD (Export Value Declaration), the scope of mis-reporting or variation in assessable value is minimal.

13. Do you think Customs' computation of assessable value for calculation of import duty varies with the consignment value declared in the Commercial Invoice?

Ans: To this question, the respondents felt that cases were different with different countries and in the context of India, varied in case of most products. With the availability of HS Code book and market value of all products, instances of variation in assessable value for calculation of import duty with the consignment value declared in the commercial invoice is less in the present day.

14. Do you think misreporting is also done by exporters and importers in the destination country?

Ans: Respondents felt that the scope of misreporting is much lesser in developed countries as compared to developing countries. Importers might want to reduce the invoice value to avoid custom duty or lower landing cost while exporters would want maximum value. This leads to scope for manipulation of documents at importer's end.

Manipulation of the Certificate of Origin (COO) in order to take benefit of reduced import duty on imports emanating from preferential trading partners, with whom India might have signed a FTA, is also another challenge pointed out by the respondents.

Apart from the conventional channels of misreporting export and import there are ways in which people illegally export and import goods. This also generates a huge amount of black money and results in outflow of a high amount. Smuggling of gold, drugs and arms are the main illegal trade channels in countries across the world.

Chapter

DESCRIPTIVE STATISTICS

3.1 Analysis of Statistical Facts on Trade Misreporting

In India's misreporting study on trade statistics, five trade-partners are considered, the US, the UK, EU, Japan, and Singapore[4]. The trading partners are selected such that the countries are mostly corruption free as reported in the freedom house index[5]. Also, India's trade share percentages with these trading partners are relatively high. The percentage shares of India's exports in 2019 to the US, the UK, EU, Japan and Singapore are 16.69%, 2.71%, 14.53%, 1.48% and 3.32% respectively. These five countries together explain 38.73% of India's export data. Similarly, the percentage share of its imports from the trade-partners in 2019 are 7.28%, 1.43%, 9.09%, 2.65% and 3.10% respectively. That is, it explains 23.55% of India's import data. This analysis is based on time series, 1980 through 2019, collected from IMF DOTS[6]. For the purpose of analysis in this study, India's true values of exports and imports represent those reported by its respective trade-partners, while their reported values are those that Indian traders declare. Obviously, the gaps between reported and true values of the respective series represent the incidence of misreporting.

Let's define:

M^{Mis} = (India's import from a trade-partner as reported by India) - (the trade-partner's export to India as reported by the trade-partner *1.06[7])

X^{Mis} = (India's export to a trade-partner as reported by India)- (the trade-partner's import from India as reported by the trade-partner/1.06)

[4] See Appendix 1.
[5] Singapore is 50 per cent (that is, partly free) in the freedom house index.
[6] https://data.imf.org/?sk=9D6028D4-F14A-464C-A2F2-59B2CD424B85&sId=1409151240976
[7] Following the new estimate for Direction of Trade Statistics in IMF Working Paper 18/16 (Marini et al., 2018), the value of exports is equal to the value of imports from a partner divided by 1.06; and the value of imports is equal to the value of exports multiplied by 1.06.

where M^{Mis} is India's import misreporting; X^{Mis} is India's export misreporting.

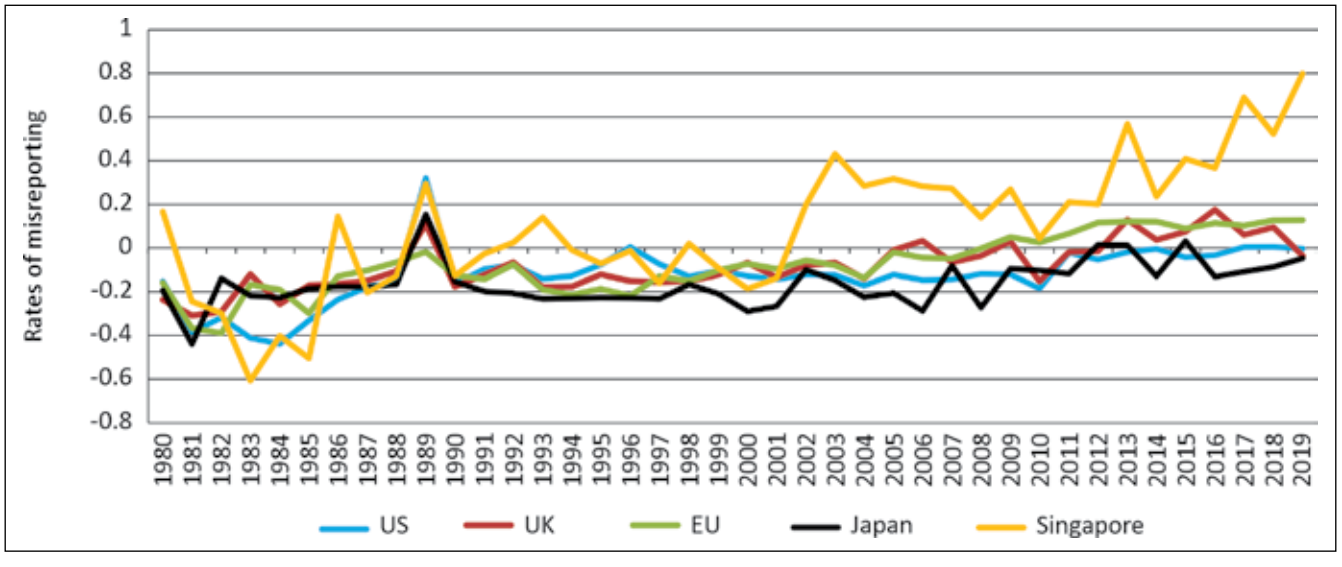
Rate of import misreporting (M^R)={(M^{Mis})/ (the trade-partner's export to India as reported by the trade-partner * 1.06)}

Rate of export misreporting (X^R)={(X^{Mis}*1.06)/ (the trade-partner's import from India as reported by the trade-partner)}[8]

For all countries together, in the case of exports, India's highest rate of over-reporting and under- reporting took place with Singapore, namely, 0.7985 and -0.60704 in 2019 and 1983 respectively. The corresponding lowest rates were 0.0040 with the US in 2017 and -0.00237 with EU in 2008. However, India has the second highest rate of under-reporting exports with the US (-0.43815) in 1984.

In the case of imports, India's highest rate of over-reporting and under-reporting took place again with Singapore, namely, 0.2246 and -0.7077 in 2019 and 1991 respectively. The corresponding lowest rates were 0.0030 with Singapore in 1980 and -0.00028 with the US in 1990. Again, India has the second highest rate of under-reporting imports with the UK (-0.42075) in 1981. India's under-reporting of exports with the US reduced from 2015, and that with Japan from 2016. However, in 2017 and 2018 India over reported its exports with the US. For five countries together, the following diagrams **(Figure 1** and **Figure 2)** bring out India's incidence of misreporting.

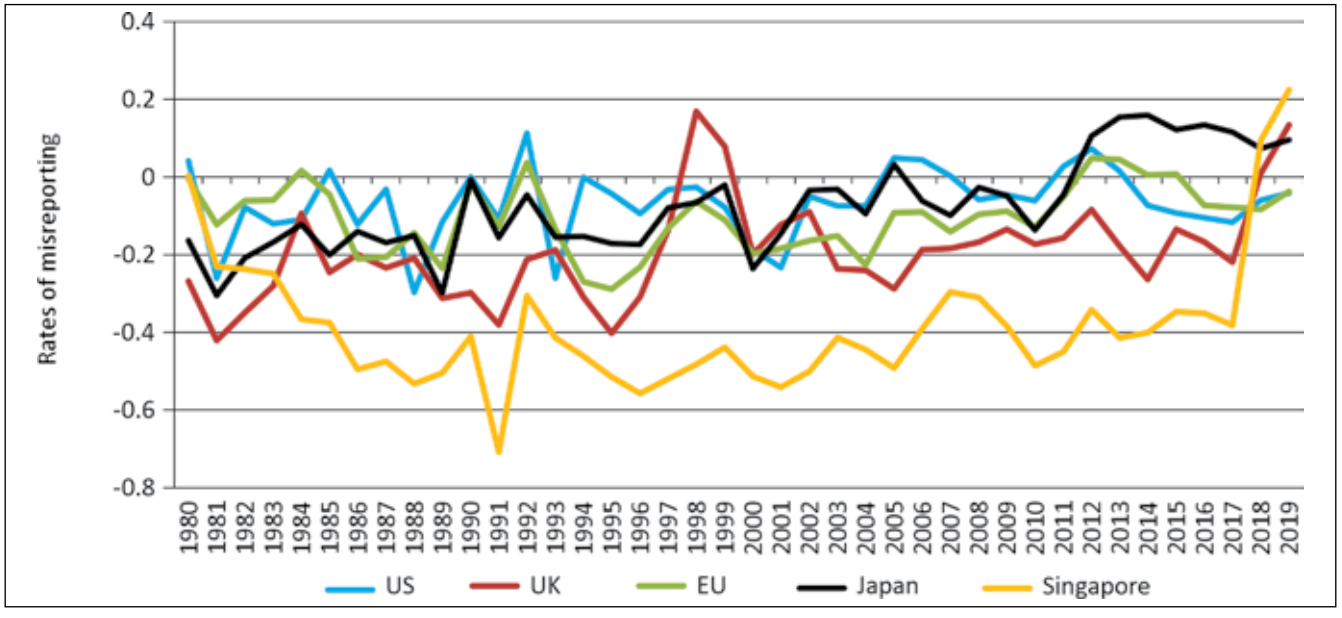
Figure 1: Rates of India's Misreporting of its Exports to the Five Major Trading Partners



Source: Direction of Trade Statistics (DOTS), IMF

[8] Marini, M., Dippelsman, R. J., & Stanger, M. (2018). New estimates for direction of trade statistics. IMF Working Papers, 2018/016, International Monetary Fund, pp.8-12.

Figure 2: Rates of India's Misreporting of its Imports from the Five Major Trading Partners



Source: Direction of Trade Statistics (DOTS), IMF

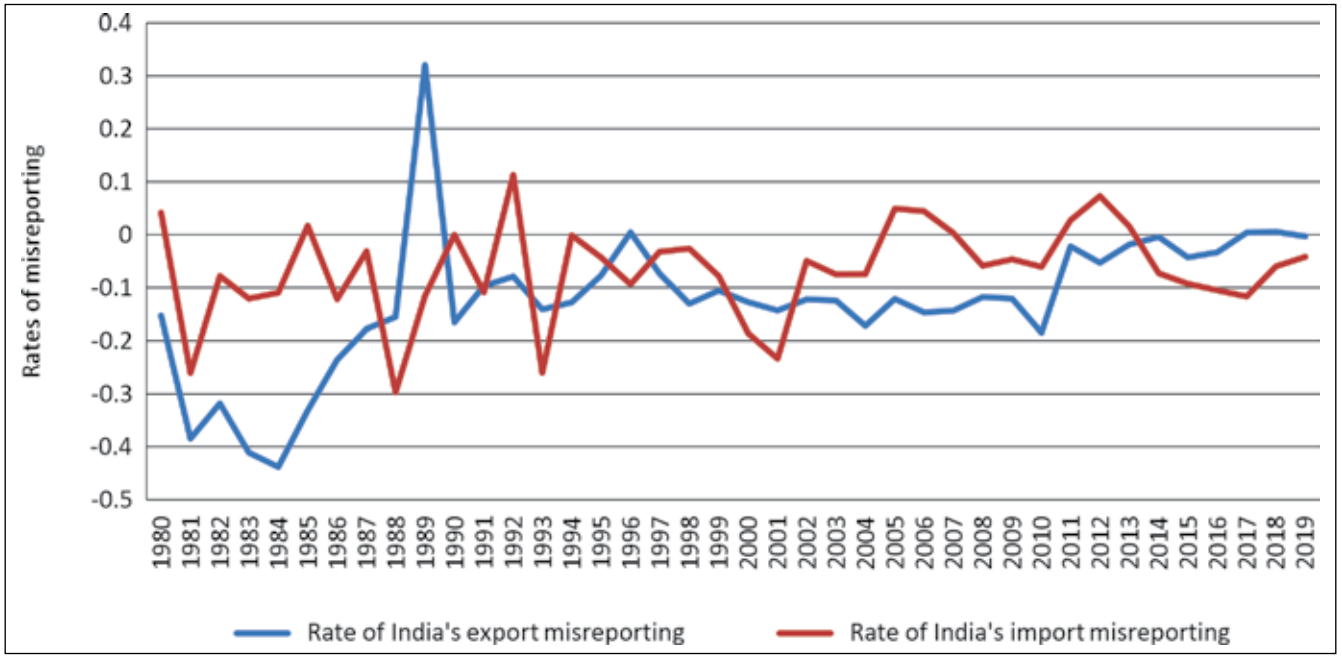
Incidence of misreporting in the Indo-US trade

In most years, misreporting took place in the Indo-US trade. The highest rate of under-reporting exports took place in 1984 (-0.43) and its lowest rate was in 2019 (-0.0033). For under-reporting imports, the highest and lowest rates were -0.296 in 1988 and -0.00028 in 1990. For 1980, 1985, 1992, 2005, 2006, 2007, 2012, and 2013 the under-reporting of exports is synchronized with over-reporting of imports. Again, for the years 1989, 1996, 2017, and 2018 similar rhythms of over-reporting exports and under-reporting imports are noticed. The average rate and standard deviation of India's misreporting exports are worked out at -0.124 and 0.132 and those of India's misreporting imports at -0.066 and 0.090, respectively. These measures signify that the extent of export misreporting exceeded that of import misreporting. The value of correlation coefficient, viz., 0.164, points to a positive, though weak, relation between them. India's true exports come on average at (16751.206) with a standard deviation of (16487.846); whereas the reported exports come on average at (15637.39) with a standard deviation of (16307.5238). This indicates a gap of 1113.82 units[9] between the average values. Similarly, the average value of India's true import is worked out at 10150.58 and standard deviation at 10455.179. The average value and standard deviation of India's reported imports are worked out at 9666.83 and 10056.533 respectively. The result is a gap of 483.75 units between the average values of imports. The series of India's rate of misreporting exports to the US has multiple structural breaks in 1996 and 2011 which

[9] Units in this context represents US$

are significant at p= 0.0389. Here, the estimated time trend for 1980-95 shows a positive slope, namely, 0.021. This indicates fall in India's rates of under-reporting exports. In 1996-2010 the slope is negative, namely -0.006, such that the rates of under-reporting rise. Again, the estimated time trend for 2011-19 shows a positive slope, that is, 0.004. India's rates of under-reporting exports thereby fall in this range. India's misreporting of exports and imports in Indo-US trade are illustrated graphically in **Figure 3** below[10].

Figure 3: Misreporting Rates in Indo-US trade



Source: Direction of Trade Statistics (DOTS), IMF

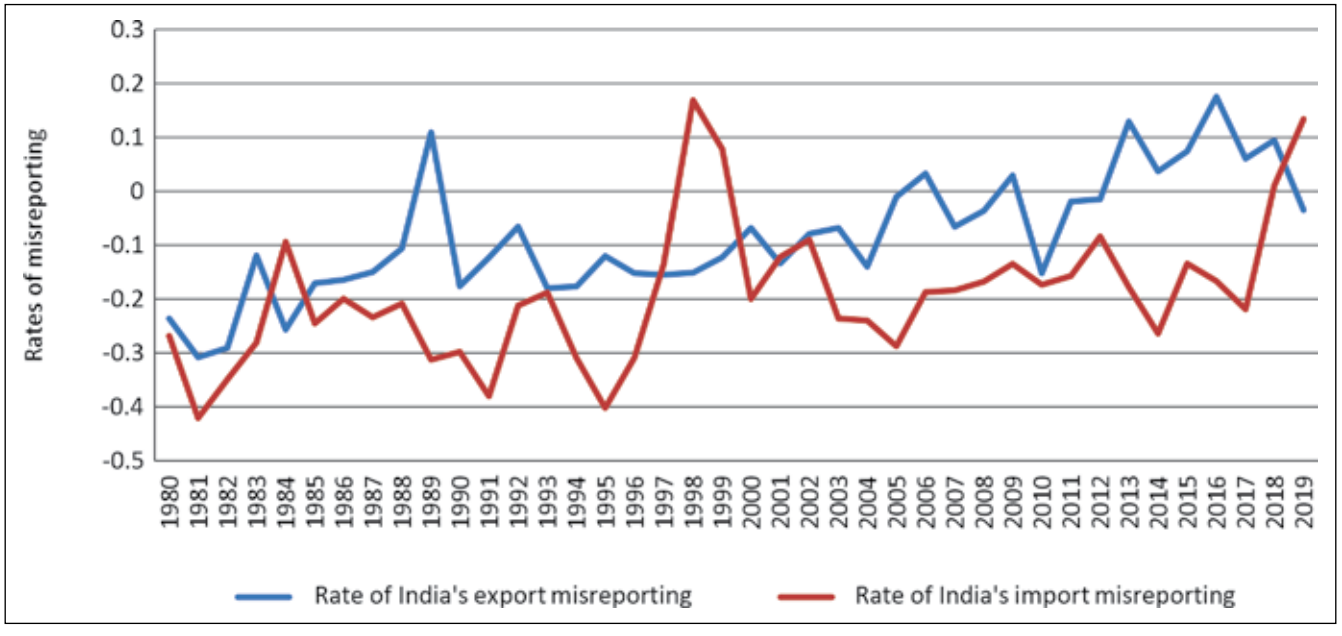
Incidence of misreporting in the Indo-UK trade

Misreporting in trade is prominent in most of the years for Indo-UK trade. The highest rate of under-reporting exports, namely, -0.308 took place in 1981 and its lowest rate, namely, -0.0104 was in 2005. The highest and lowest rates of under-reporting imports were -0.4207 in 1981 and -0.089 in 2002. For 1998, 1999, and 2019 the under-reporting of exports is synchronized with over-reporting of imports. Again, for the years 1989, 2006, 2009, 2013, 2014, 2015, 2016, and 2017 similar pattern of over-reporting exports and under-reporting imports are noticed. The average rate and standard deviation of India's misreporting exports are worked out at -0.0826 and 0.114 and those of India's misreporting imports at -0.192 and 0.1288, respectively. These measures signify that the extent of export misreporting is lesser than that of import misreporting. The value of correlation coefficient, namely 0.2396, points to a positive relation between them. India's true exports come on average at (3907.076)

[10] See Appendix 2. & Appendix 3.

with a standard deviation of (3182.796); whereas the reported exports come on average at (3,840.22) with a standard deviation of (3385.727). This indicates a gap of 66.85 units between the average values. Similarly, the average value of India's true import is worked out at 3790.531 and standard deviation at 2214.599. The average value and standard deviation of India's reported imports are worked out at 3,145.97 and 2019.607 respectively. The result is a gap of 644.57 units between the average values of imports. The series of India's rate of misreporting imports from the UK has multiple structural breaks in 1996 and 2011, but those breaks are less significant, only at p= 0.1193. India's misreporting of exports and imports with UK are depicted in **Figure 4** below[11].

Figure 4: Misreporting Rates in Indo-UK trade



Source: Direction of Trade Statistics (DOTS), IMF

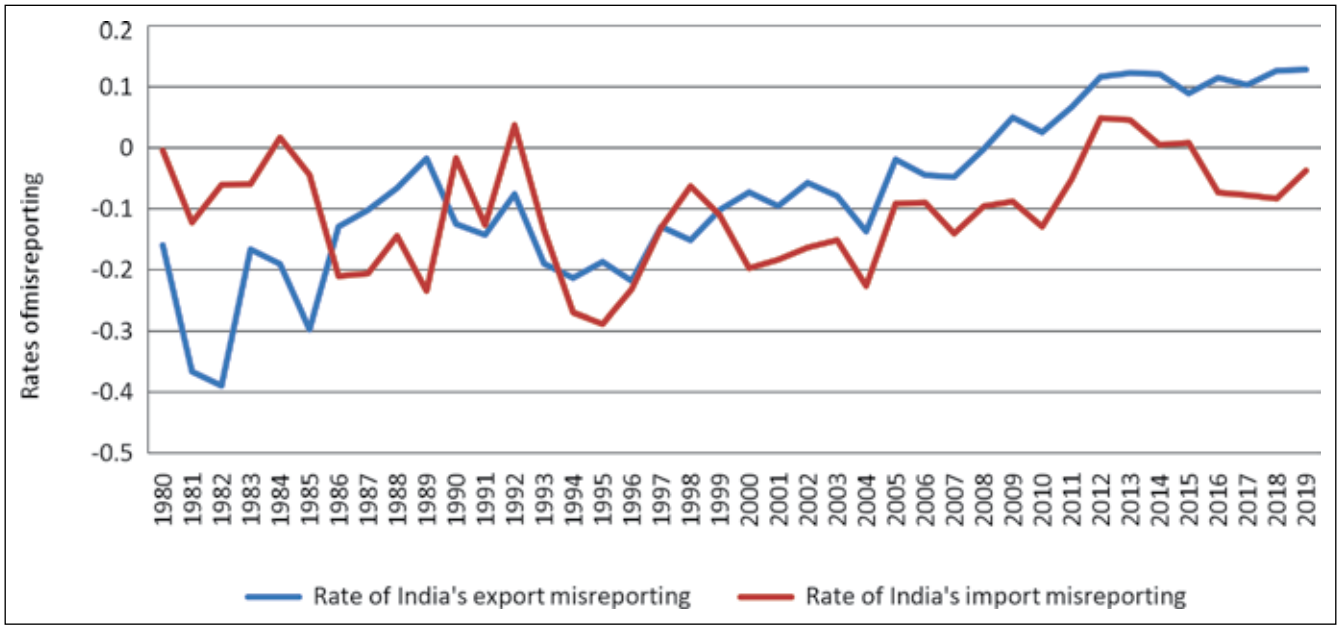
Incidence of misreporting in the Indo-EU trade

Misreporting in Indo-EU trade is prominent in most of the years. The highest rate of under-reporting exports, namely, -0.3895 took place in 1982 and its lowest rate, namely, -0.00237 was in 2008. The highest and lowest rates of under-reporting imports were -0.2886 in 1995 and -0.0044 in 1980. For 1984, and 1992 the under-reporting of exports is synchronized with over-reporting of imports. Again, for the years 2009, 2010, 2011, 2016, 2017, 2018, and 2019 similar pattern of over-reporting exports and under-reporting imports are noticed. The average rate and standard deviation of India's misreporting exports are worked out at -0.0728 and 0.134 and those of India's misreporting imports at -0.1045 and 0.0876,

[11] See Appendix 4. & Appendix 5.

respectively. These measures signify that the extent of export misreporting is lesser than that of import misreporting. The value of correlation coefficient, namely, 0.3405, points to a positive, though moderate, relation between them. India's true exports come on average at (16317.289) with a standard deviation of (14702.8636); whereas the reported exports come on average at (16,758.22) with a standard deviation of (16529.366). This indicates a gap of -440.9308 units between the average values. Similarly, the average value of India's true import is worked out at 19864.4945 and standard deviation at 17106.6585. The average value and standard deviation of India's reported imports are worked out at 18317.62 and 16619.3328 respectively. The result is a gap of 1546.8745 units between the average values of imports. The series of India's rate of misreporting imports from EU has multiple structural breaks significant at p=0.0023. In this case, the estimated time trend for 1980-95 shows a negative slope, namely, -0.0103 in the negative territory. This indicates a rise in India's rates of under-reporting imports. In 1996-10 the slope is positive, namely 0.004, such that the rates of under-reporting fall. Again, the estimated time trend for 2011-19 shows a negative slope that is, -0.011. India's rates of under-reporting imports thereby rise. Also, India's rate of misreporting its exports to EU has multiple structural breaks in 1996 and 2011, but those breaks are less significant, only at p= 0.1294. It should be noted that the same series exhibits single structural break in 1996, and its significance level is at p= 0.1208. **Figure 5** identifies India's misreporting of exports and imports with EU[12].

Figure 5: Misreporting Rates in Indo-EU trade



Source: Direction of Trade Statistics (DOTS), IMF

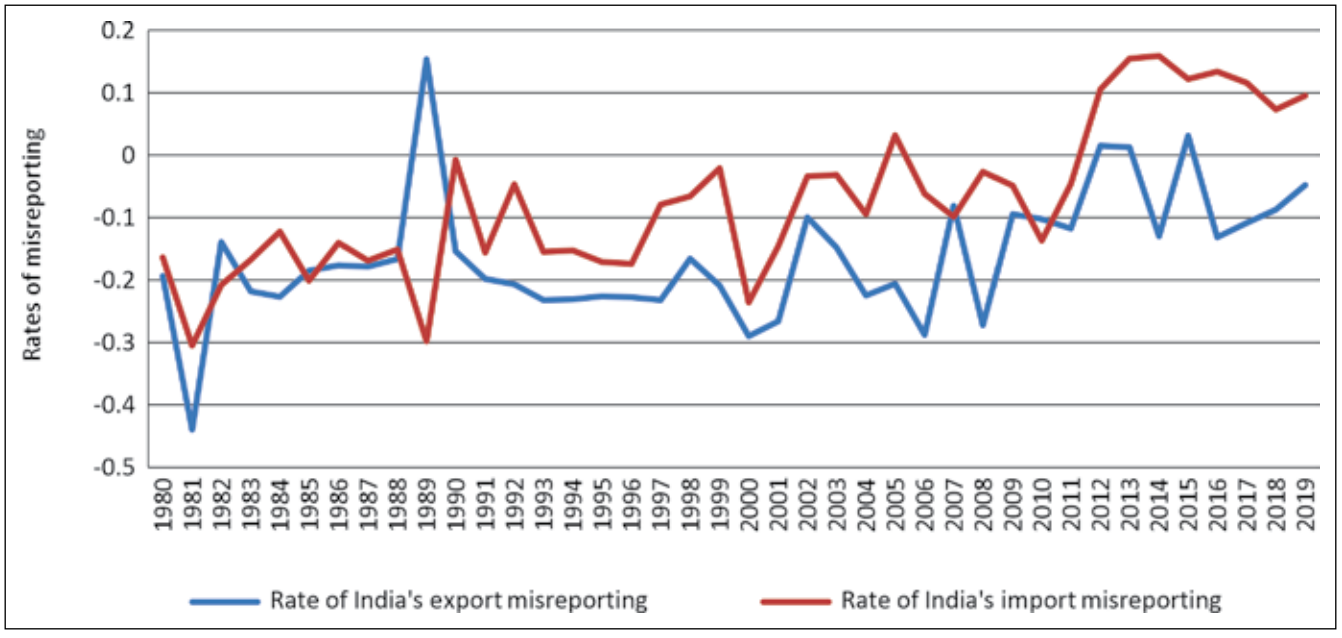
[12] See Appendix 6. & Appendix 7.

Incidence of misreporting in the Indo-Japan trade

Misreporting in trade between India and Japan is prominent in most of the years. The highest rate of under-reporting exports, namely, -0.439 took place in 1981 and its lowest rate, namely, -0.0478 was in 2019. The highest and lowest rates of under-reporting imports were -0.3048 in 1981 and -0.0073 in 1990.For 2005, 2014, 2016, 2017, 2018, and 2019 the under-reporting of exports is synchronized with over-reporting of imports. Again, for the year 1989 similar pattern of over-reporting exports and under-reporting imports are noticed. The average rate and standard deviation of India's misreporting exports are worked out at -0.162081394 and 0.103670206 and those of India's misreporting imports at -0.073039397 and 0.122418096, respectively. These measures signify that the extent of export misreporting exceeded that of import misreporting. The value of correlation coefficient, namely, 0.431470538, points to a positive moderate relation between them. India's true exports come on average at (3039.062029) with a standard deviation of (1761.520321); whereas the reported exports come on average at (2,628.35) with a standard deviation of (1724.306682). This indicates a gap of 410.71 units between the average values. Similarly, the average value of India's true import is worked out at 4530.790323 and standard deviation at 3602.075253. The average value and standard deviation of India's reported imports are worked out at 4,509.65 and 4002.705653 respectively. The result is a gap of 21.14 units between the average values of imports. The series of India's rate of misreporting its imports from Japan has multiple structural breaks in 1996 and 2011 significant at p=0.0672. In this case, the estimated time trend for 1980-95, 1996-10, and 2011-19 show positive slopes, that is, 0.005, 0.004 and 0.006 respectively. These indicate fall in India's rates of under-reporting its imports. Also, India's rate of misreporting its exports to Japan has multiple structural breaks in 1996 and 2011, but those breaks are less significant, only at p= 0.2005. It should be noted that the same series exhibits single structural break in 2011, and its significance level is at p= 0.2056. India's misreporting of exports and imports with Japan are depicted in **Figure 6** below[13].

[13] See Appendix 8. & Appendix 9.

Figure 6: Misreporting Rates in Indo-Japan trade



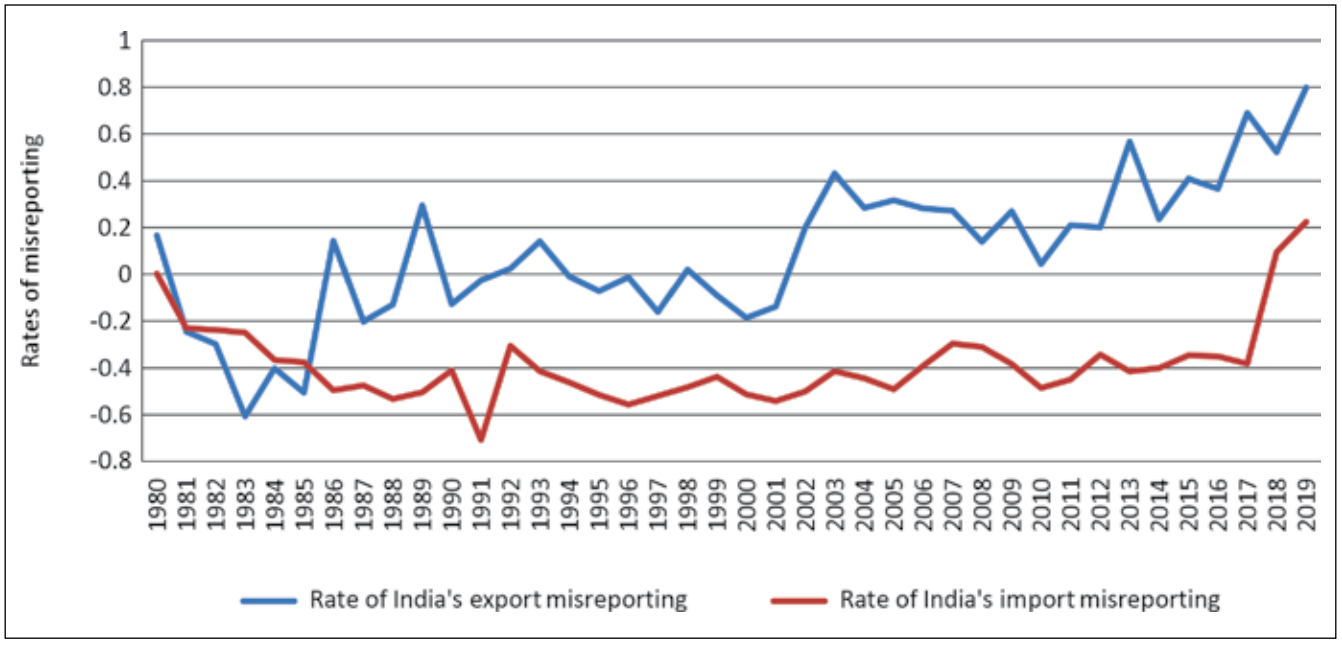
Source: Direction of Trade Statistics (DOTS), IMF

Incidence of misreporting in the Indo-Singapore trade

In most years, misreporting took place in trade between India and Singapore. The highest rate of under-reporting exports took place in 1983 (-0.60704) and its lowest rate was in 1994 (-0.0094). For under-reporting imports, the highest and lowest rates were -0.7077 in 1991 and -0.2302 in 1981. For 1986, 1989, 1992, 1993, 1998, and from 2002 till 2017 the over-reporting of exports is synchronized with under-reporting of imports. The average rate and standard deviation of India's misreporting exports are worked out at 0.095412091 and 0.307856123 and those of India's misreporting imports at -0.385195259 and 0.173359877, respectively. These measures signify that the extent of export misreporting exceeded that of import misreporting. The value of correlation coefficient, namely, 0.31307038, points to a positive moderate relation between them. India's true exports come on average at (3116.359815) with a standard deviation of (3640.390862); whereas the reported exports come on average at (4,037.37) with a standard deviation of (4856.864882). This indicates a gap of -921.01 units between the average values. Similarly, the average value of India's true import is worked out at 5264.461975 and standard deviation at 5041.362383. The average value and standard deviation of India's reported imports are worked out at 3,489.75 and 3921.152018 respectively. The result is a gap of 1,774.71 units between the average values of imports. The series of India's rate of misreporting imports from Singapore has multiple structural breaks in 1996 and 2011 significant at p=0.000. Here, the estimated time trend for 1980-95 shows a negative slope, namely, -0.023 in the negative territory. This indicates

a rise in India's rate of under-reporting imports. In 1996-2010 and 2011-19, the estimated time trends show positive slopes, that is, 0.011 and 0.068 respectively. India's rates of under-reporting imports thereby fall[14]. India's misreporting of exports and imports in Indo-Singapore trade are illustrated graphically in **Figure 7** below[15].

Figure 7: Misreporting Rates in Indo-Singapore trade



Source: Direction of Trade Statistics (DOTS), IMF

3.2 Suggestive Measures for True Balance of Trade & Balance of Trade Misreporting

So far, the study has taken the partner country reported statistics as reflecting correct information vis á vis the reported information in India. However, the freedom house index shows that the developed countries are also not fully efficient and corruption free in reporting the bilateral trade statistics. A higher score of the index indicates greater efficiency of a country in reporting its trade data. Therefore, two suggestive methods have been devised here for the calculation of true (actual) values of exports, imports and thereby true (actual) balance of trade.

[14] See Appendix 10. & Appendix 11.
[15] In view of Singapore, we may happen to receive some important information from field survey in Chennai.

Those are: (a) assigning equal weights to the reported trade data of India and its trading partners; and (b) assigning weights to the reported trade statistics of India and its trading partners according to the scores of the countries in the freedom house index. The gap between the True Weighted BOT and Simple Reported BOT gives the extent of BOT misreporting. However, it should be noted here that India's misreporting of imports results in revenue loss for the government. The True (equal weights) data in case of India-US trade reflects an annual average revenue loss of US$ 48.4 million on account of import misreporting[16].

In the previous section (that is, 3.1) the study examined India's rate of trade misreporting with its partner countries, namely the US, the UK, EU, Japan, and Singapore. The present section simply provides suggestive methodologies in measuring India's absolute values (that is, true values) of trade misreporting and its balance of trade (BOT) with its respective partner countries[17]. The gaps between India's true and reported values of BOT are also illustrated graphically.

a) Assigning Equal Weights

For instance, in the case of India-US trade,

True (Actual) export= (India's reported export to US+US reported import from India)/2

True (Actual) import= (India's reported import from US+US reported export to India)/2

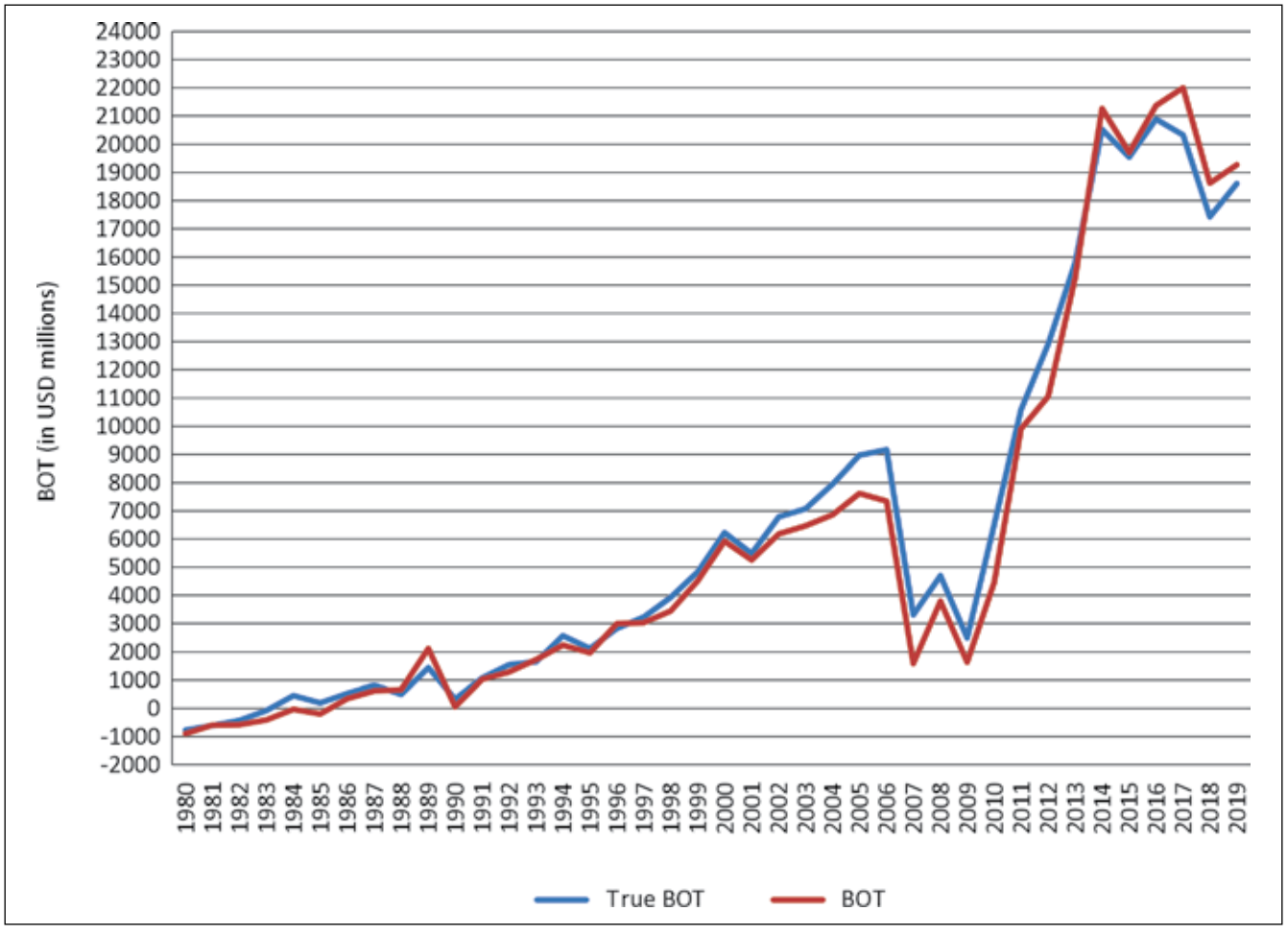
True (equal weights) BOT [Actual BOT] = True export –True import

BOT= India's reported export-India's reported import

The graphs of the True (equal weights) BOT [Actual BOT] and Reported BOT (or simply, BOT) of India in case of trade with its significant trading partners (the US, the UK, the EU, Japan and Singapore) are depicted below.

[16] See Appendix 71.
[17] See the calculation of Rates of Trade Misreporting in Appendix 69 & Appendix 70.

Figure 8: True (equal weights) and Reported BOT in Indo–US trade

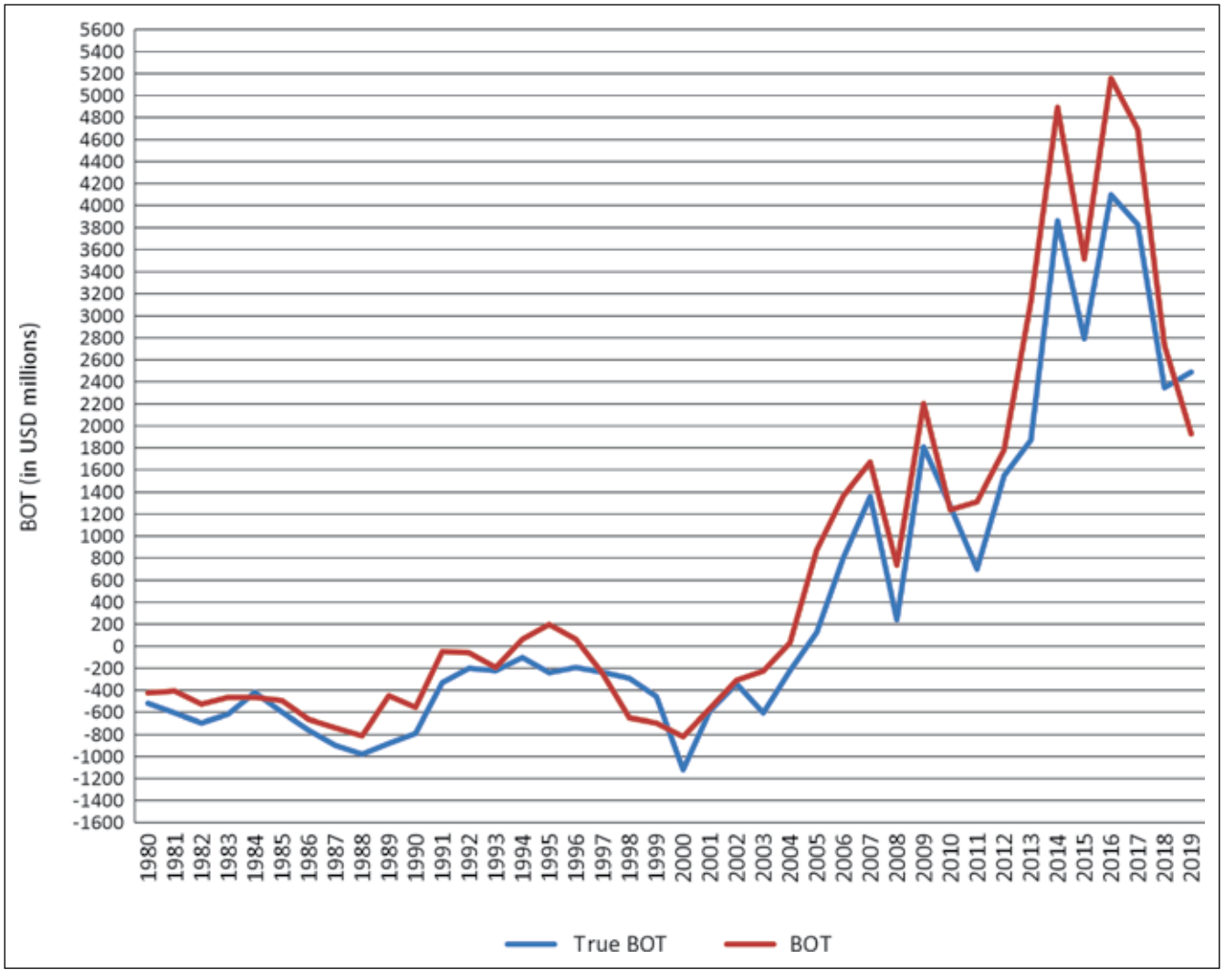


Source: Direction of Trade Statistics (DOTS), IMF

The True (equal weights) and Reported BOT in case of Indo-US trade depict a similar pattern of movement over the years **(Figure 8)**. The gap between the True (equal weights) and Reported BOT is positive and highest (**2058.34**) in 2010 and it is negative and lowest in absolute value (**-0.79**) in 1981. The gap between the True (equal weights) and Reported BOT in case of India-US trade is positive and increasing during 1982-1984, and 2003-2006; whereas it is negative and increasing in its absolute values during 2015- 2017. Again, the gap between the True (equal weights) and Reported BOT is positive and reducing from 1998 through 2001; whereas it is negative and reducing in its absolute values from 2017 through 2019. However, from 2000 till 2013 the Reported BOT is below the True (equal weights) BOT (that is, India under reports the BOT); whereas during 2014 till 2019, the Reported BOT is greater than the True (equal weights) BOT (that is, India over reports the BOT). The mean values of True (equal weights) BOT and Reported BOT are **6285.59** and **5,970.56** respectively. This indicates a gap of **315.03** between the True (equal weights) and Reported BOTs[18].

[18] See Appendix 40

Figure 9: True (equal weights) and Reported BOT in Indo–UK trade

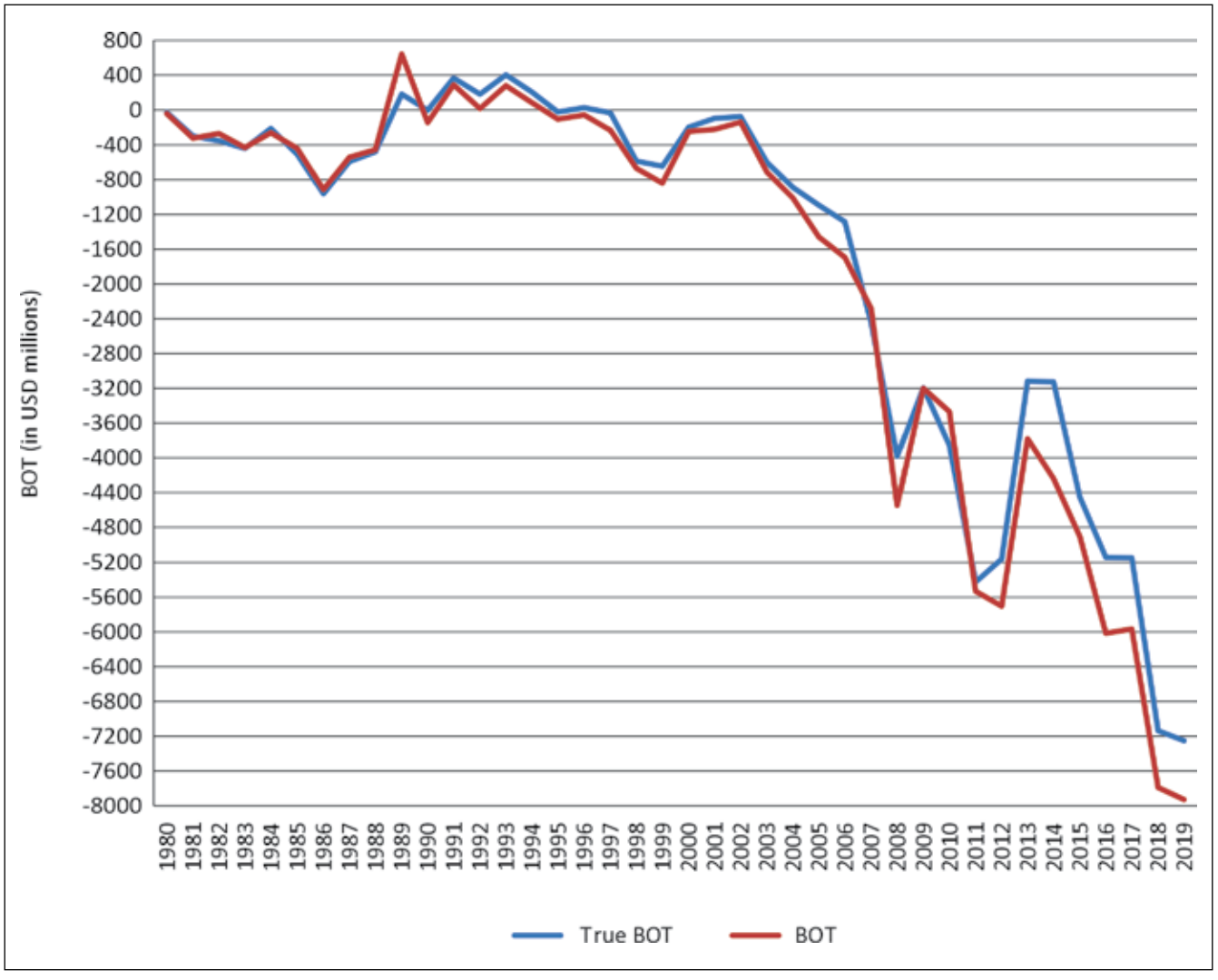


Source: Direction of Trade Statistics (DOTS), IMF

The trends of True (equal weights) and Reported BOT in case of India-UK trade is mostly similar from 2003 onwards **(Figure 9)**. The gap between the True (equal weights) and Reported BOT is negative and has highest magnitude value (-**1254.72**) in 2013 and it is positive and has lowest absolute value (**8.20**) in 1997. In case of India-UK trade this gap is negative and falling in its absolute values during 1981-1983, and 2016-2018. However, the gap is negative and increasing in its magnitudes from 1986 through 1989. During 1983-1984 the True (equal weights) BOT increases whereas the Reported BOT is almost constant. From 2003 till 2018 (except in 2010), the Reported BOT is consistently greater than the True (equal weights) BOT (that is, India over reports the BOT). The mean values of True (equal weights) BOT and Reported BOT are **405.40** and **694.26** respectively. This indicates a difference of, namely, -**288.86** between the True (equal weights) and Reported BOTs[19].

[19] See Appendix 41

Figure 10: True (equal weights) and Reported BOT in Indo–Japan trade

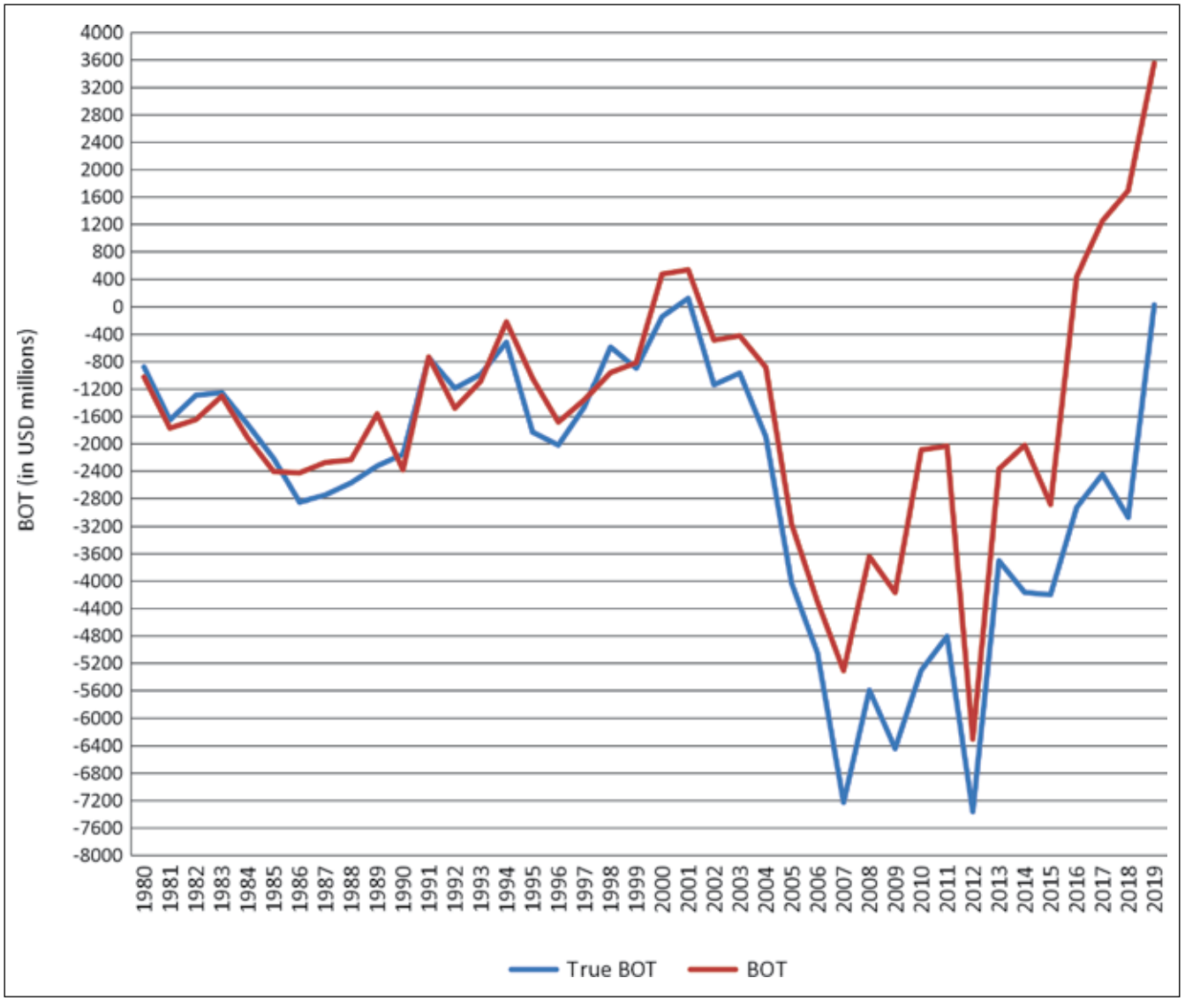


Source: Direction of Trade Statistics (DOTS), IMF

The True (equal weights) and Reported BOT in case of Indo-Japan trade depict a similar pattern of movement over the years **(Figure 10)**. The gap between the True (equal weights) and Reported BOT is positive and highest (1111.21) in 2014 and it is positive and lowest (3.21) in 2009. During 2002-2006, and 2012-2014 this gap is positive and increasing. Again, the gap between the True (equal weights) and Reported BOT is positive and reducing from 1993 through 1995; whereas it is negative and reducing in absolute values from 1985 through 1988. The Reported BOT graph is below the True (equal weights) BOT graph in most of the years (that is, India under reports the BOT). The mean values of True (equal weights) BOT and Reported BOT are -1686.51 and -1,881.30 respectively, which indicates a gap of 194.78 between the respective values[20].

[20] See Appendix 42

Figure 11: True (equal weights) and Reported BOT in Indo–EU trade

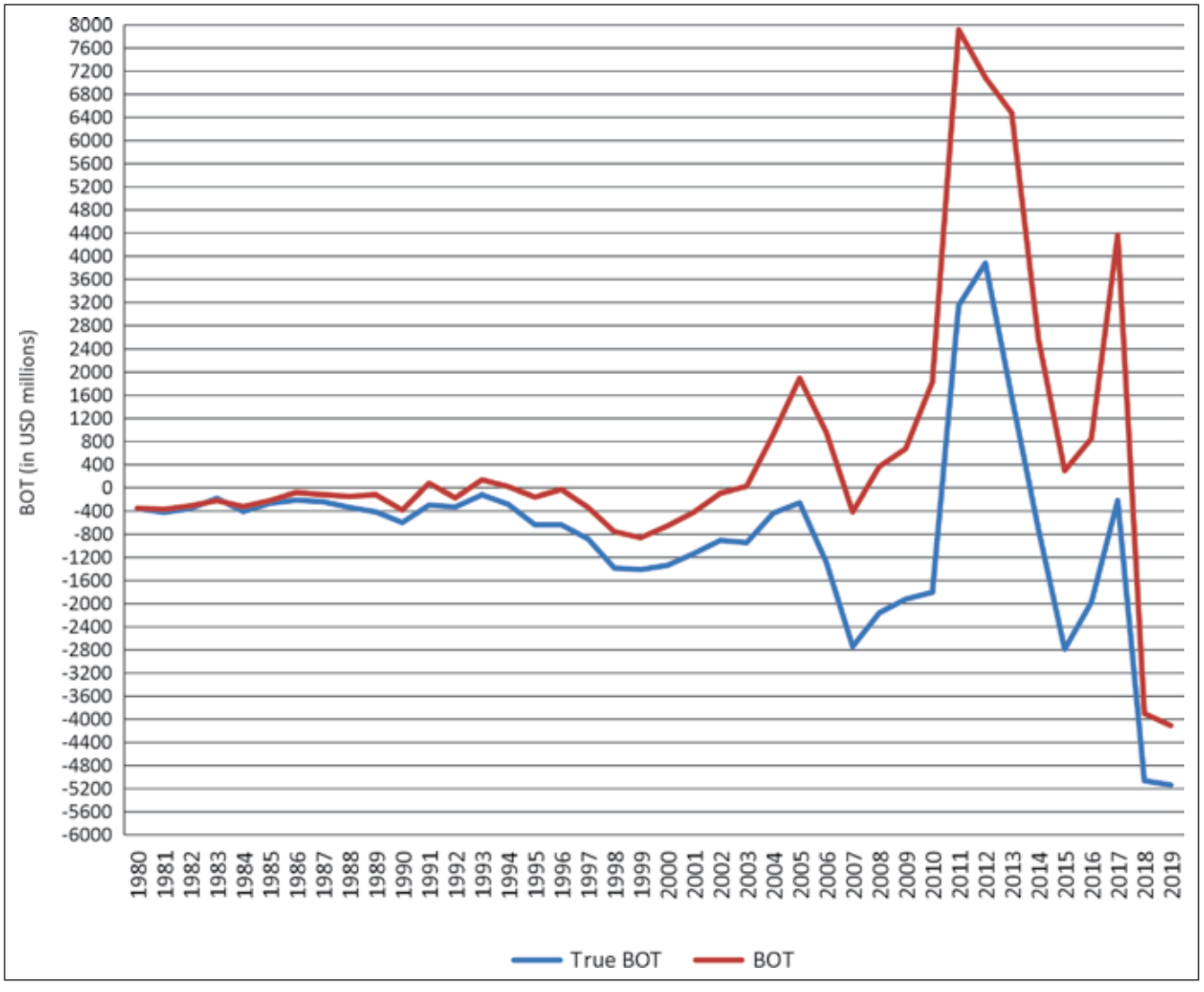


Source: Direction of Trade Statistics (DOTS), IMF

The movements of the True (equal weights) and Reported BOT of India-EU trade are similar over the years. The gap between the True (equal weights) and Reported BOT is negative and highest in magnitude (-4,765.49) in 2018 and it is negative and lowest in magnitude (-9.93) in 1991 **(Figure 11)**. This gap is negative and increasing in absolute values during 2007-2010, 2012-2014, and 2016-2018. However, from 2000 through 2019 the Reported BOT graph is located above the True (equal weights) BOT graph, which indicates that India over reports the BOT. The mean values of True (equal weights) BOT and Reported BOT are -2553.3 and -1,559.40 respectively, implying a difference of -993.90 between the respective values[21].

[21] See Appendix 43

Figure 12: True (equal weights) and Reported BOT in Indo–Singapore trade

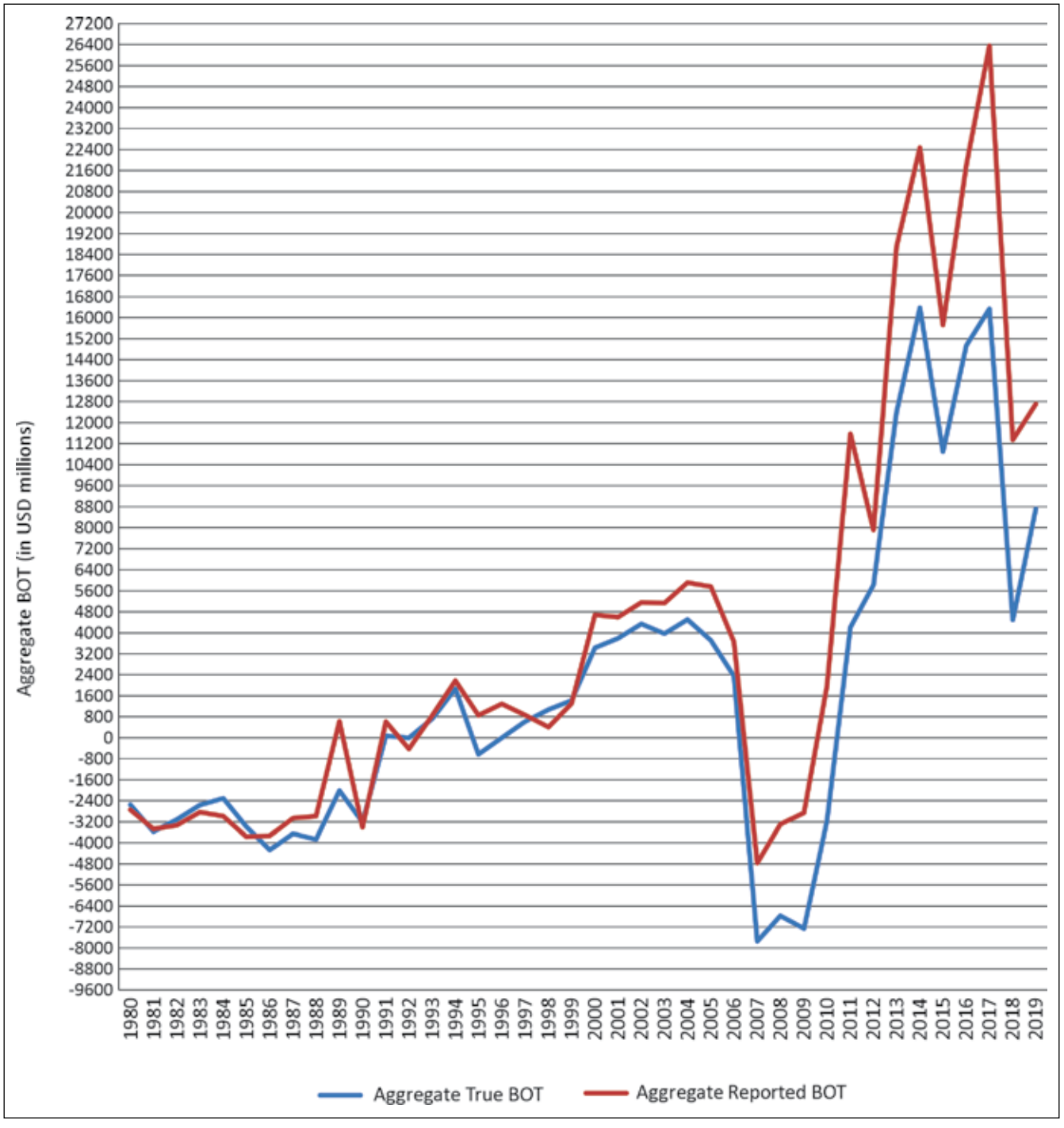


Source: Direction of Trade Statistics (DOTS), IMF

The True (equal weights) and Reported BOT of India-Singapore trade shows similar pattern of movement over the years. The gap between the True (equal weights) and Reported BOT is negative and highest in absolute value (**-4,913.66**) in 2013 and it is negative and lowest in absolute value (**-8.34**) in 1980 **(Figure 12)**. In case of India-Singapore trade, this gap is negative and increasing in magnitude during 1992-1996, and 1999-2011; whereas it is negative and falling in magnitude from 2013 through 2016. However, for all the years (except 1983) the Reported BOT graph is located above the True (equal weights) BOT graph, which indicates that India over reports the BOT. The mean values of True (equal weights) BOT and Reported BOT are **-800.24** and **547.62** respectively. This indicates a gap of **-1,347.86** between the True (equal weights) and Reported BOTs[22].

[22] See Appendix 44

Figure 13: India's Aggregate True (equal weights) and Reported BOT



Source: Direction of Trade Statistics (DOTS), IMF

The trends of India's Aggregate True (equal weights) BOT and Aggregate Reported BOT are similar over the years. The gap between the True (equal weights) and Reported BOT is negative and highest in magnitude (**-10015.66**) in 2017 and it is negative and lowest in magnitude (**-110.21**) in 1981 **(Figure 13)**. In case of India's aggregate trade with its trading partners (the US, the UK, the EU, Japan and Singapore), this gap is negative and increasing

in absolute values during 1986-1989, 2002-2005, and 2007-2011; whereas it is positive and increasing from 1982 through 1984. The Reported BOT is above the True (equal weights) BOT graph in most of years, and consistently from 2000 through 2019. This indicates that India mostly over reports its BOT. The mean values of Aggregate True (equal weights) BOT and Aggregate Reported BOT are 1650.94 and **3,771.74** respectively, implying a difference of **-2,120.80** between the respective values[23].

b. Assigning Weights following the Freedom House Index score

In case of India-US trade,

The Freedom house index shows India's score as (67) and US score as (83).

Then, India's weight= 67/150; US weight=83/150

[Or, it can be said that India's weight is (67/83) times of US weight. Now if US's weight is (w), then India's weight is (67/83*w), then

w+((67/83)*w)=1

w=83/150]

Therefore, India's weight= 67/150; US weight= 83/150

True (weighted) export= [((67/150)*India's reported export to US)+((83/150)*US reported import from India)]

True (weighted) import= [((67/150)*India's reported import from US)+((83/150)*US reported export to India)]

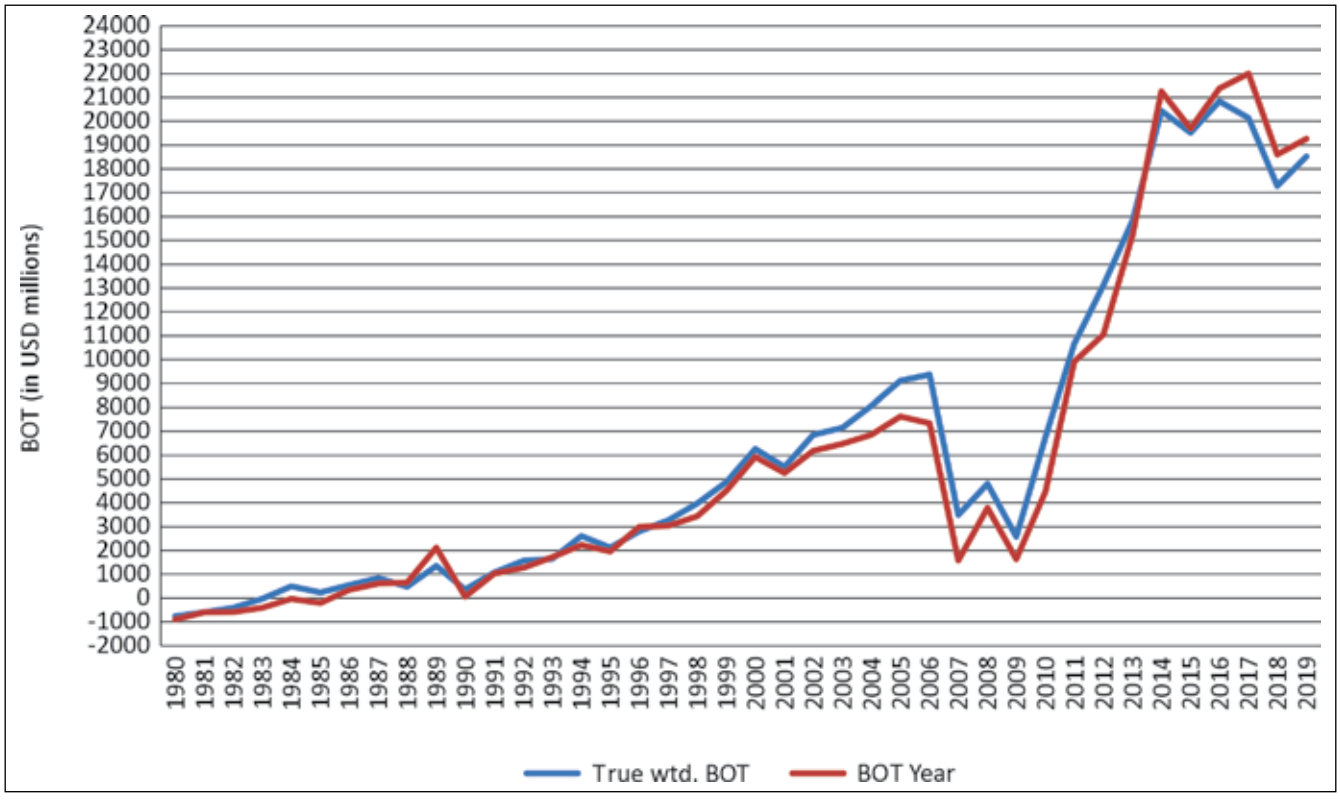
True (weighted) BOT [Actual BOT]=True (weighted) export –True (weighted) import

BOT= India's reported export-India's reported import

The graphs of the True (weighted) BOT [Actual BOT] and Reported BOT (or simply, BOT) of India in case of trade with its major trading partners (the US, the UK, the EU, Japan and Singapore) are shown below. It may be noted here that the trends and pattern of movements of the graphs depicting True (weighted) and Reported BOT are broadly same as that in case of True (equal weights) and Reported BOT discussed above.

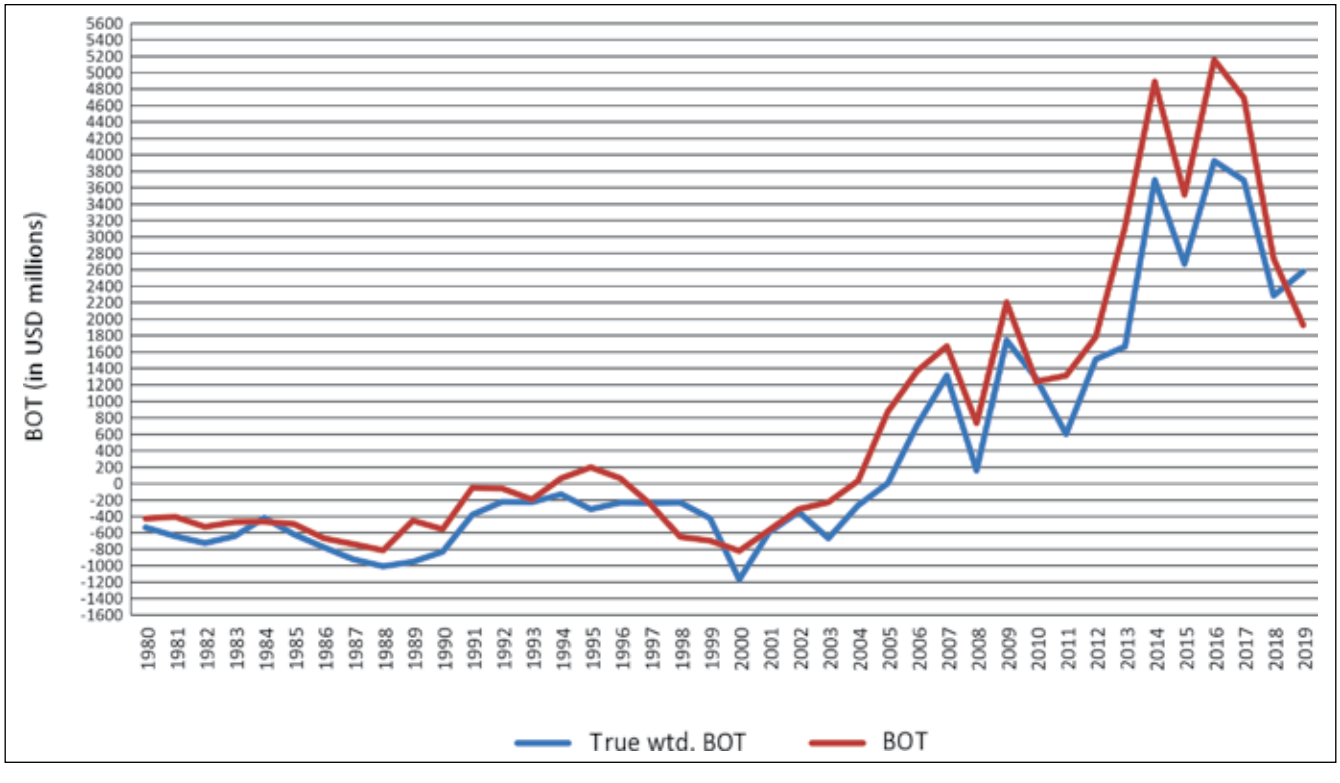
[23] See Appendix 67

Figure 14: True (weighted) and Reported BOT in Indo–US trade



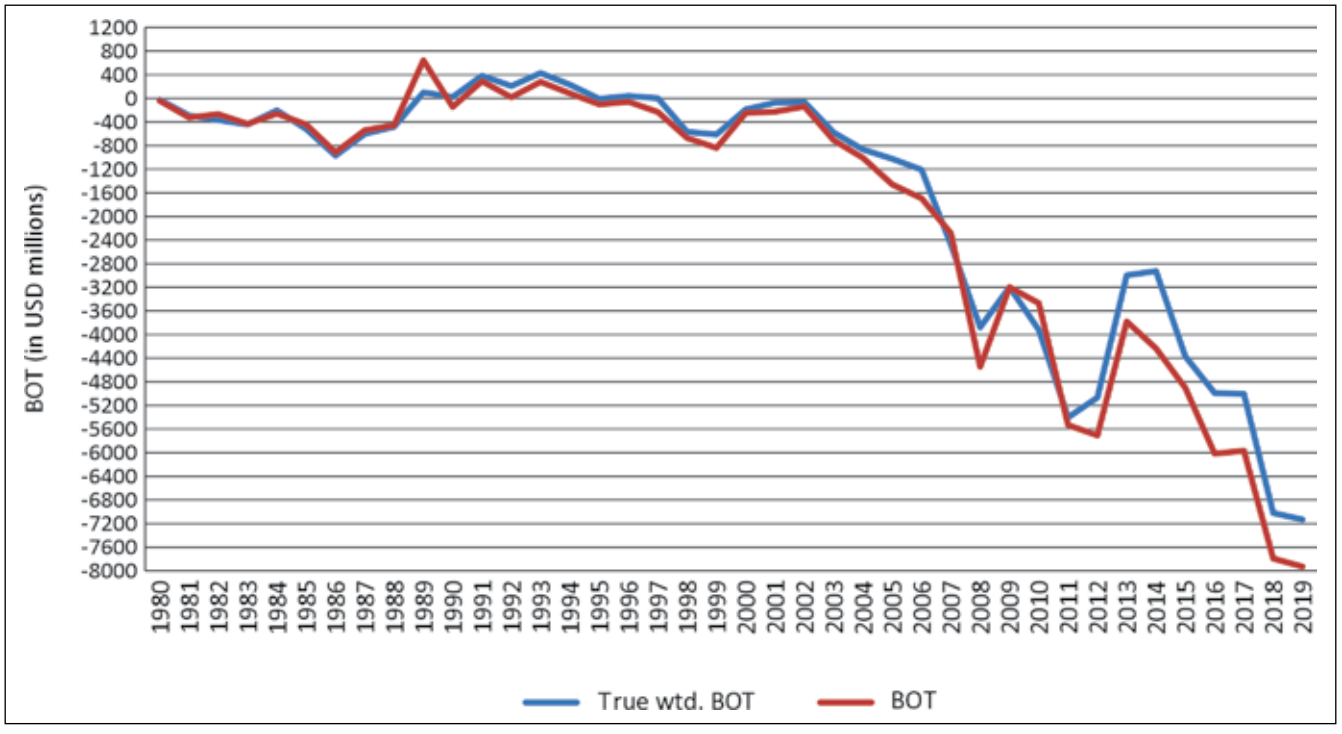
Source: Direction of Trade Statistics (DOTS), IMF

Figure 15: True (weighted) and Reported BOT in Indo–UK trade



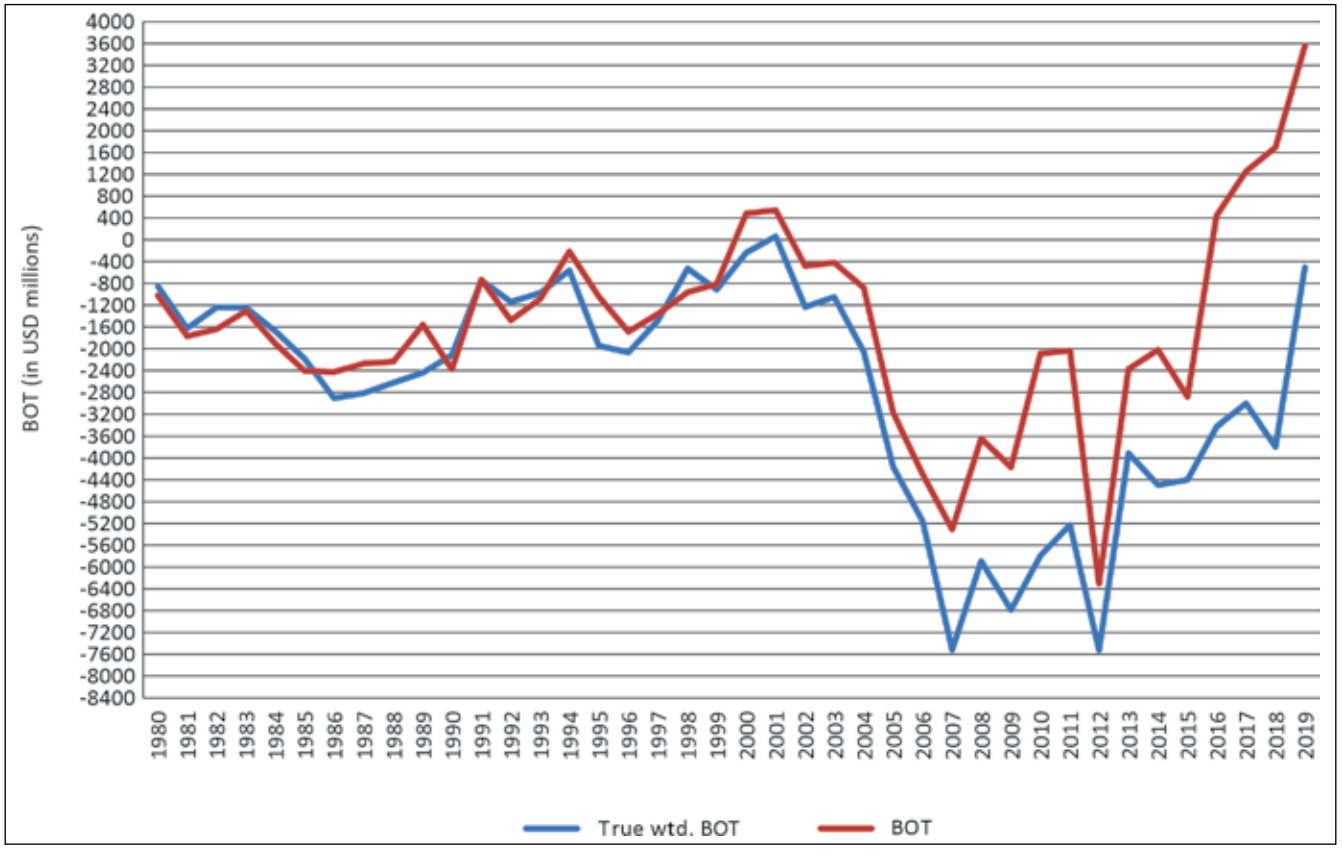
Source: Direction of Trade Statistics (DOTS), IMF

Figure 16: True (weighted) and Reported BOT in Indo–Japan trade



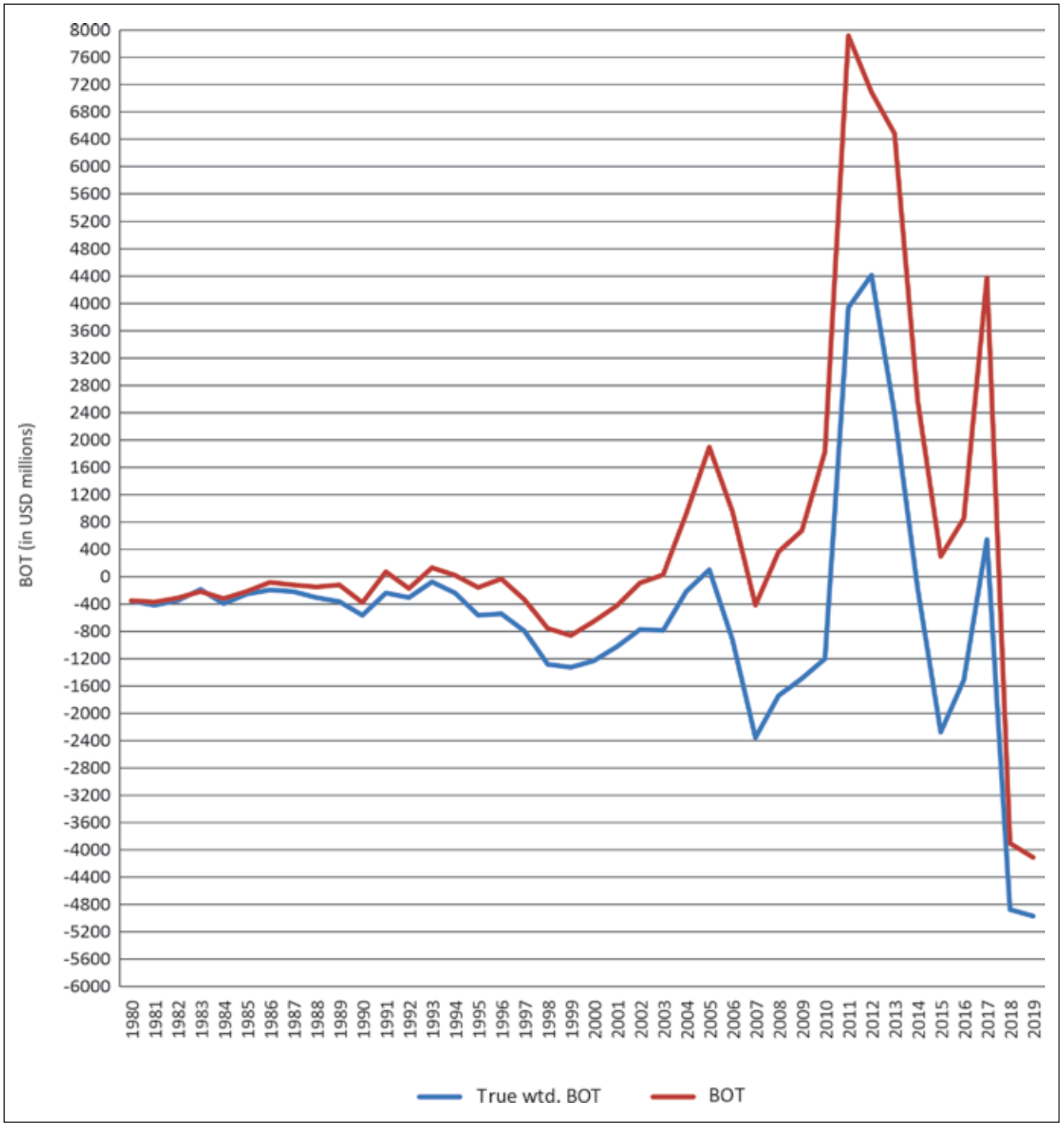
Source: Direction of Trade Statistics (DOTS), IMF

Figure 17: True (weighted) and Reported BOT in Indo–EU trade



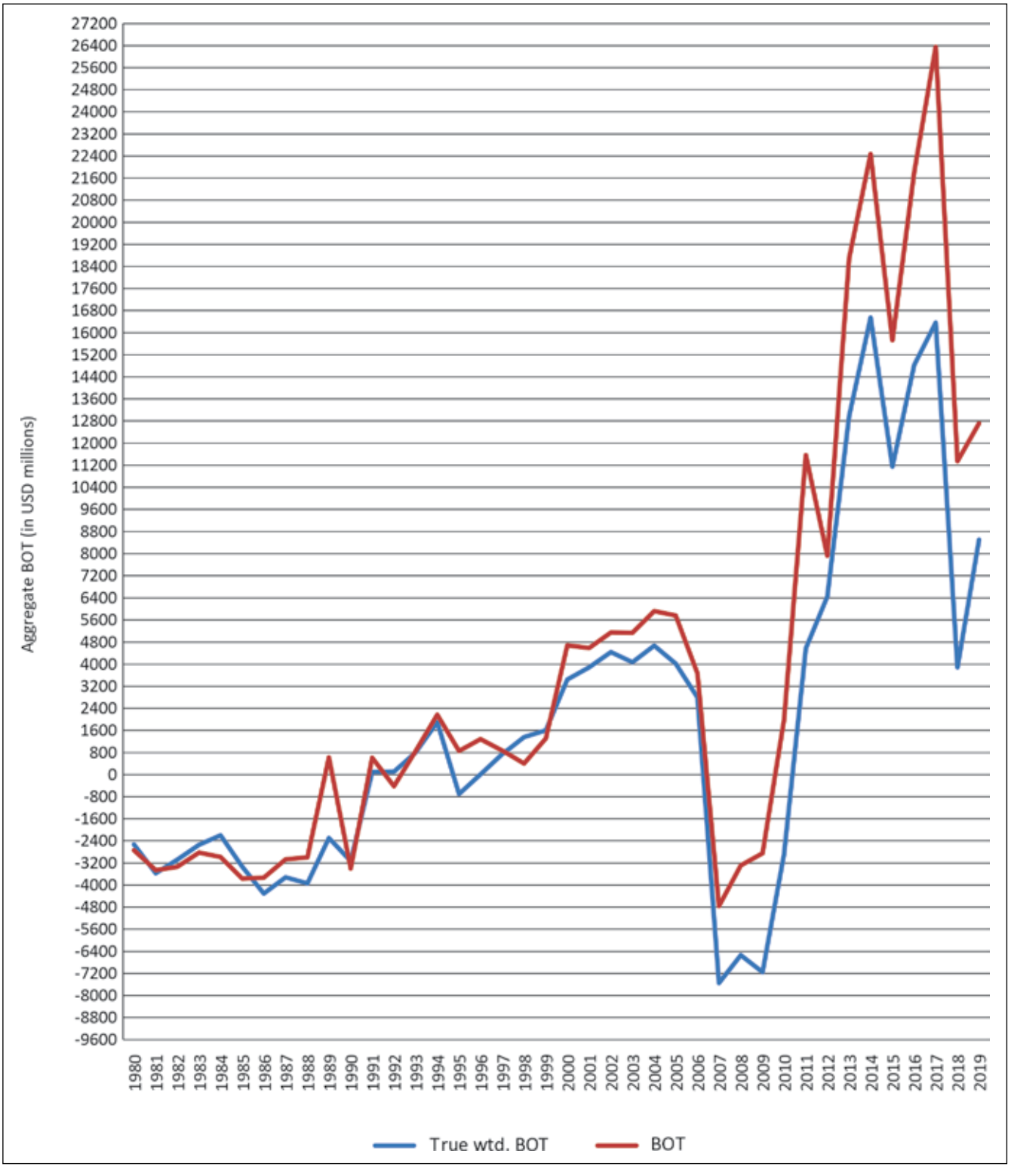
Source: Direction of Trade Statistics (DOTS), IMF

Figure 18: True (weighted) and Reported BOT in Indo–Singapore trade



Source: Direction of Trade Statistics (DOTS), IMF

Figure 19: India's Aggregate True (weighted) BOT & Aggregate Reported BOT

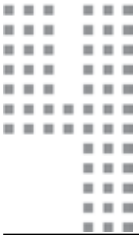


Source: Direction of Trade Statistics (DOTS), IMF

Although the rhythm of the graphs representing True (equal weights) and True (weighted) BOT of India are same, their mean values are different. The mean values of True (weighted) and Reported BOT in case of India-US trade are 6319.19 and 5,970.56 respectively, depicting a gap of 348.64. Similarly, in case of trade between India-UK the respective values are 358.46 and 694.26 respectively, identifying a gap of -335.80 between them. Again, the True (weighted) and Reported BOT for India-Japan trade has mean values (-1651.86) and (-1,881.30) respectively. This shows a gap of 229.44. For India-EU trade data, the respective mean values are -2704.28 and -1,559.40 respectively, implying a gap of -1,144.87. The mean values of True (weighted) and Reported BOT in case of India-Singapore trade are -577.55 and 547.62 respectively, identifying a gap of -1,125.17. However, India's Aggregate True (weighted) and Aggregate Reported BOT have mean values 1743.972594 and 3,771.74 respectively. This shows a gap of -2,027.76 between the respective values[24].

[24] See Appendix 68.

Chapter



MIRROR DATA ANALYSIS OF CAPITAL FLOWS

4.1 Analysis of Statistical Facts on Misreporting Capital Flows

The study has devised a unique way to disentangle the explanation of unrecorded capital flows from trade in goods and services in the aggregate data available from the IMF. The share of the non-traded sector in GDP (which is also known as Non-traded to GDP ratio)[25] is considered as an inducement for illegitimate flows. Independent of international trade, a part of national income such as tax evaded income or income from other hidden sources might be a part of national income such as informal sector income and can be a part of unrecorded capital flows that may not be captured via the misreporting through trade account. With limited mirror data on inter country capital flows for around ten years a full-fledged time series led exercise cannot be undertaken but it can create a reasonable impression of how the non-traded to GDP ratio is related to such transactions. Even the correlation with the non-traded part tells us something about illegitimate transactions beyond the trade route.

In the analysis of India misreporting its capital inflows and outflows, the investment partners selected are mostly developed countries (that is, the US, the UK, the EU, Japan, and Mauritius[26]), such that India's total foreign investment with these countries from 2010 till 2019 sums up to 72.42%[27]. India's total foreign investment with the developed countries from 2010 through 2019, (that is, the US, the UK, the EU, and Japan) is 53.41%. This pattern of selection helps to keep the consistency with the analysis of trade misreporting data. Unfortunately, due to lack of mirror data for Singapore, the study omits the analysis for Singapore. But still the share of other countries in total flows is substantial. As assumed

[25] The Non-traded to GDP ratio is that portion of India´s GDP which is other than the traded part. In case of India-US, the Non- traded to GDP ratio is calculated as: 1- {(India's export to US + India's import from US)/India's GDP}.
[26] Mauritius though being a developing country, but an important investment destination is selected to analyze the capital flow. India's percentage of foreign investment to and from Mauritius (from 2010-2019) is 19%.
[27] See Appendix 38.

earlier in the study and partly confirmed by the observations of the stakeholders in the field work so far, developed countries have better governance and their reported data are less likely to be inaccurate. That is why the study has been using their reported data as the true value and as the benchmark for cross checking the reported data from India.

In this study, specifically seven investment partners are considered, the US, the UK, Japan, Mauritius, Germany, France, and Italy. Here, Germany, France and Italy are considered to be representative of the EU. The percentage shares of India's foreign investment outflows in 2019 to the US, the UK, Japan, Germany, France, Italy, and Mauritius are 14.01%, 6.96%, 0.13%, 0.63%, 0.13%, 0.14% and 11.68% respectively. Similarly, the percentage shares of India's foreign investment inflow from these countries in 2019 are 17.08%, 16.12%, 7.43%, 4.54%, 1.93%, 0.52% and 14.32% respectively[28].

This analysis is based on Foreign Institutional Investment (FII) data from 2010 through 2019, collected from IMF DOTS[29]. Here, FII includes direct investment, net equity positions and net debt instruments positions. However, the inward and outward FII data is referred to as capital inflow and outflow respectively. India's true values of capital (inflow and outflow) represent those reported by its respective trade-partners, while their reported values are those that India declares. Obviously, the gaps between reported and true values of the respective series represent the incidence of misreporting capital inflow and outflow. Analysis in this study suggests a fair relationship between India's rate of misreporting capital (inflow and outflow) and the Non-traded to GDP ratio[30].

Let's define:

I^{Mis}= (India's capital inflow from a trade-partner as reported by India) - (the trade-partner's capital outflow to India as reported by the trade-partner)

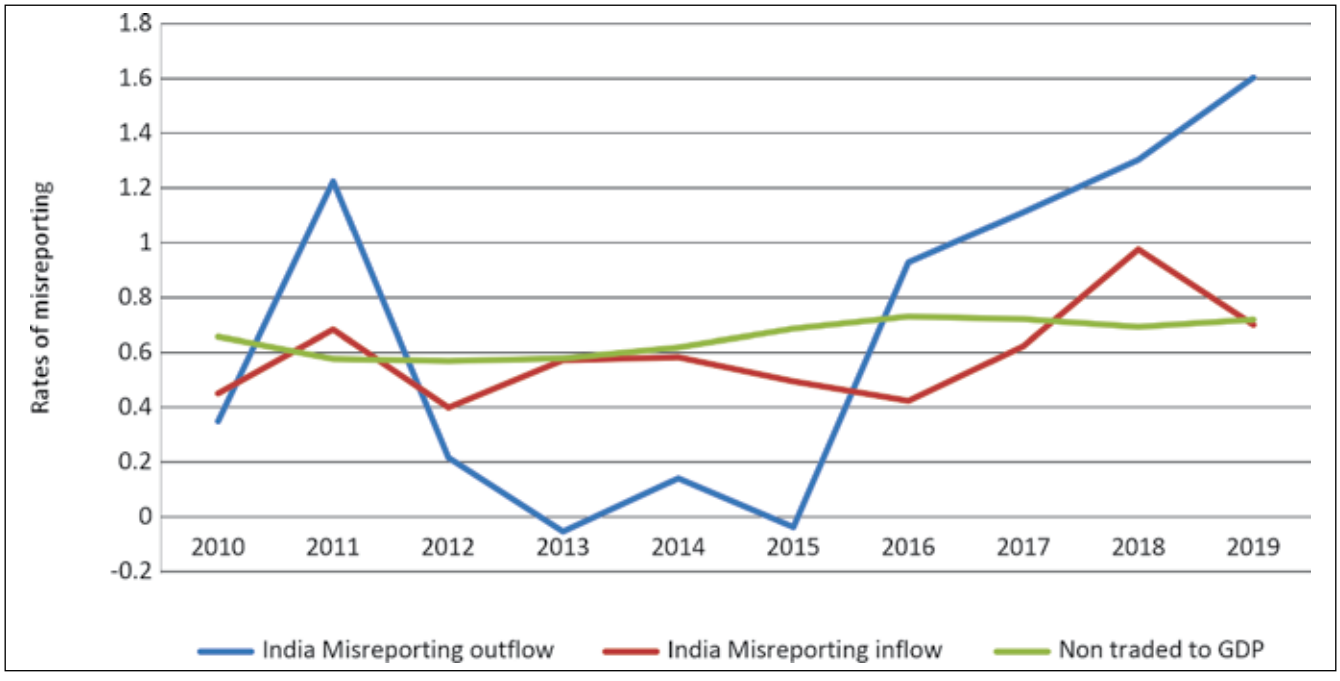
O^{Mis}= (India's capital outflow to a trade-partner as reported by India) - (the trade-partner's capital inflow from India as reported by the trade-partner)

where I^{Mis} is India's misreporting of capital inflow; O^{Mis} is India's misreporting of capital outflow.

Rate of misreporting capital inflow (I^{R})={(I^{Mis})/ (the trade-partner's capital outflow to India as reported by the trade-partner)}

[28] See Appendix 36. &Appendix 37. India's misreporting of capital flows to and from Mauritius is studied from 2011 through 2019.
[29] https://data.imf.org/?sk=40313609-F037-48C1-84B1-E1F1CE54D6D5
[30] See Appendix 35.

Figure 20: India-US incidence of misreporting capital flows (inflow and outflow)



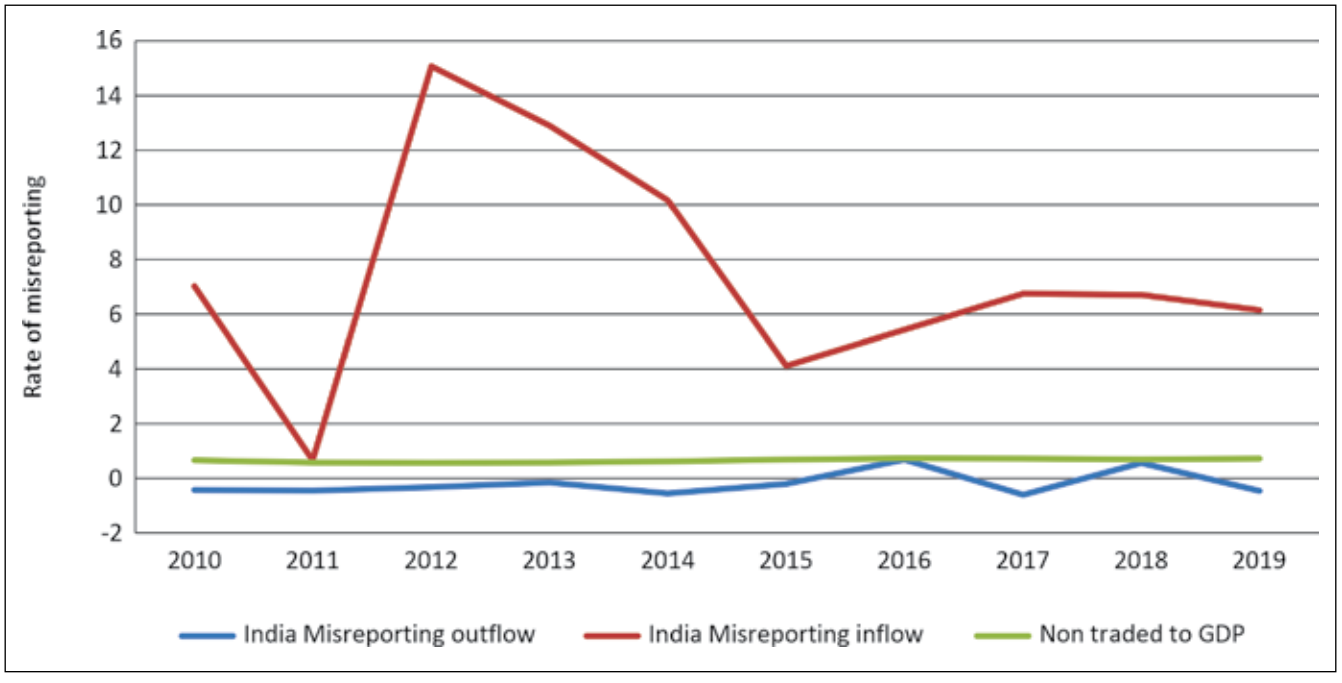
Source: Direction of Trade Statistics (DOTS), IMF

The average rate and standard deviation of India misreporting its capital outflow to US are worked out at 0.6785 and 0.6195 and those of India misreporting its capital inflow from US at 0.5907 and 0.1712, respectively **(Figure 20)**. India's true capital outflow come on average at (11,901) with a standard deviation of (4357.0866); whereas the reported capital outflow come on average at (18,277) with a standard deviation of (5247.7051). This indicates a gap of -6376 units between the average values. Similarly, the average value of India's true capital inflow is worked out at 67,228 and standard deviation at 19379.1671. The average value and standard deviation of India's reported capital inflow are worked out at 108,036 and 37899.7378 respectively. The result is a gap of -40808 units between the average values of capital inflows.

The correlation coefficient between India's rate of misreporting capital flows (outflow and inflow) with the US and the ratio of non-traded to GDP are 0.4998 and 0.1869, which are significant at p-values of 0.0706 and 0.3026 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. The graph clearly indicates that India mostly over reports its capital outflow and inflow, and India's rate of over-reporting capital outflow and inflow are both rising. Over-reporting capital outflow implies outflow from India's recorded (legal) source to unrecorded destination in the US. On the other hand, over-reporting capital inflow implies inflow from unrecorded source in US to recorded (legal) destination in India[31].

[31] See Appendix 15. & Appendix 16.

Figure 21: India-UK incidence of misreporting capital flows (inflow and outflow)



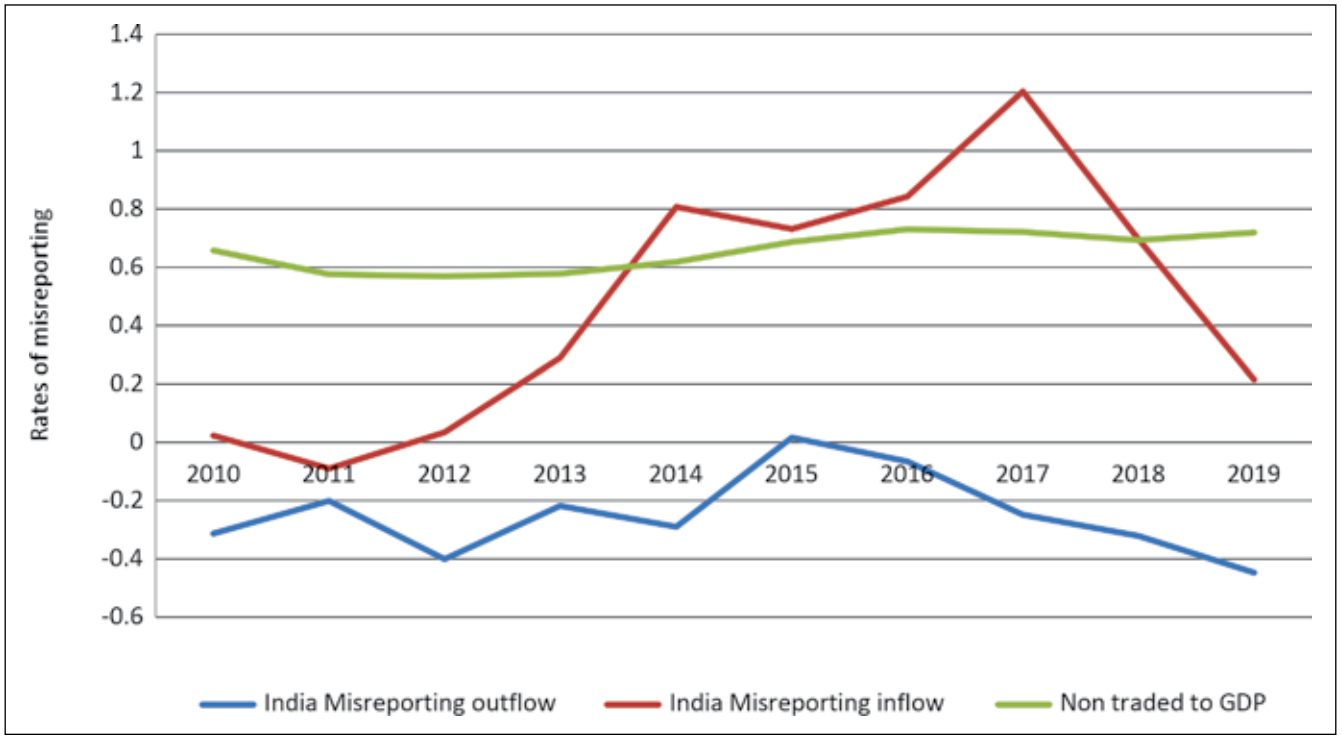
Source: Direction of Trade Statistics (DOTS), IMF

The average rate and standard deviation of India misreporting its capital outflow to the UK are worked out at -0.1933 and 0.4537 and those of India misreporting its capital inflow from the UK at 7.4972 and 4.2085, respectively **(Figure 21)**. India's true capital outflow come on average at (10,336) with a standard deviation of (6748.7096); whereas the reported capital outflow come on average at (6,724) with a standard deviation of (2728.6794). This indicates a gap of 3,612 units between the average values. Similarly, the average value of India's true capital inflow is worked out at 16180.0799 and standard deviation at 10829.9094. The average value and standard deviation of India's reported capital inflow are worked out at 101,896 and 29884.3635 respectively. The result is a gap of -85,715.9201 units between the average values of capital inflows.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with the UK and the ratio of non-traded to GDP are 0.3469 and -0.4332, which are significant at p-values of 0.163 and 0.1056 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India mostly under reports its capital outflow and over reports its capital inflow to and from the UK respectively. The estimated trend of India's rate of under-reporting capital outflow is increasing and it moves towards the horizontal axis, and that of over-reporting capital inflow is falling. Under-reporting capital outflow implies outflow from India's unrecorded source to UK's recorded (legal) destination. On the other hand, over-reporting capital inflow implies inflow from unrecorded source in UK

to recorded (legal) destination in India. The falling trend in India's over-reporting its capital inflow indicates that lesser amount of money is coming in from UK's unrecorded source[32].

Figure 22: India-Japan incidence of misreporting capital flows (inflow and outflow)



Source: Direction of Trade Statistics (DOTS), IMF

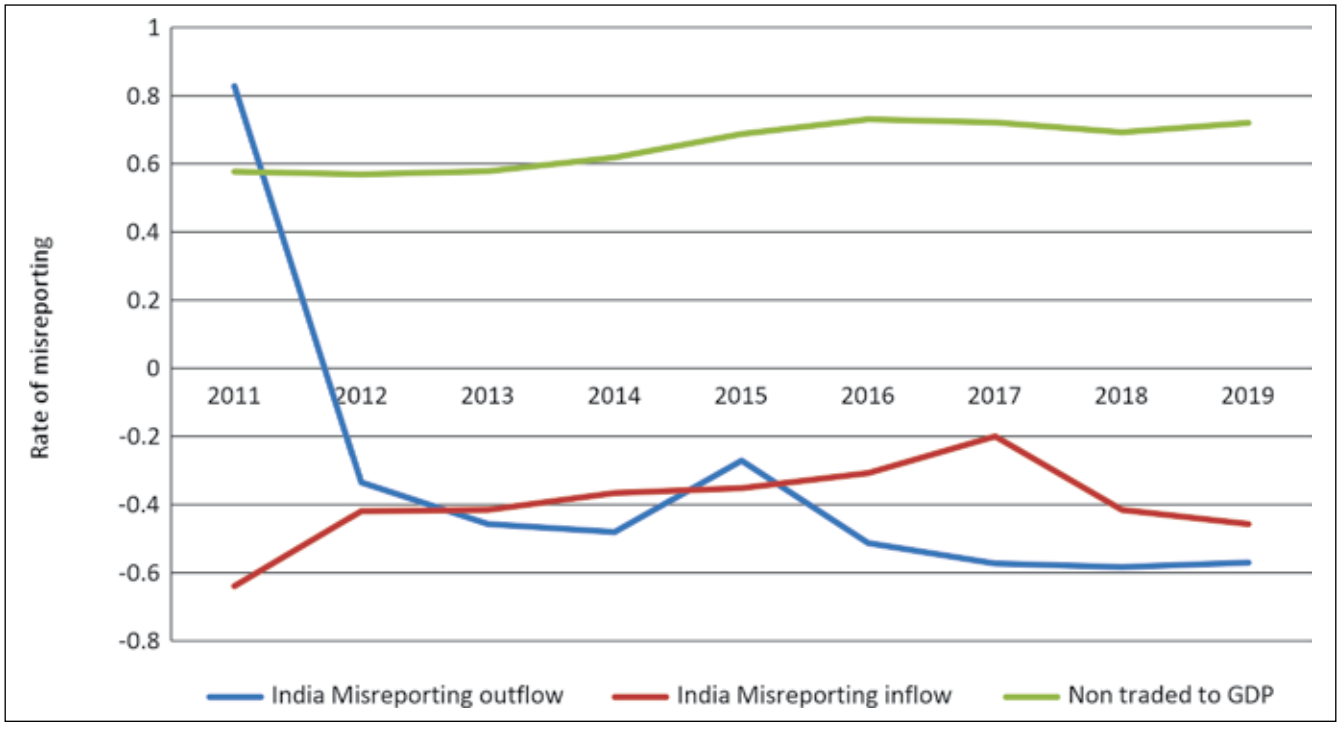
The average rate and standard deviation of India misreporting its capital outflow to Japan are worked out at -0.2487 and 0.1418 and those of India misreporting its capital inflow from Japan at 0.4756 and 0.4359, respectively **(Figure 22)**. India's true capital outflow come on average at (131) with a standard deviation of (36.9566); whereas the reported capital outflow come on average at (98) with a standard deviation of (33.4866). This indicates a gap of 33 units between the average values. Similarly, the average value of India's true capital inflow is worked out at 35,557 and standard deviation at 10368.2611. The average value and standard deviation of India's reported capital inflow are worked out at 53,456 and 24317.0008 respectively. The result is a gap of -17,899 units between the average values of capital inflows.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with Japan and the ratio of non-traded to GDP are 0.1835 and 0.6283, which are significant at p-values of 0.3059 and 0.0259 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India mostly under reports its capital outflow

[32] See Appendix 17. & Appendix 18.

and over reports its capital inflow to and from Japan. The estimated trend of India's rate of under-reporting capital outflow is increasing and it moves towards the horizontal axis, and that of over-reporting capital inflow is also increasing. Under-reporting capital outflow implies Outflow from India's unrecorded source to recorded (legal) destination in Japan. On the other hand, Over-reporting capital inflow implies inflow from unrecorded source in Japan to recorded (legal) destination in India[33].

Figure 23: India-Mauritius incidence of misreporting capital flows (inflow and outflow)



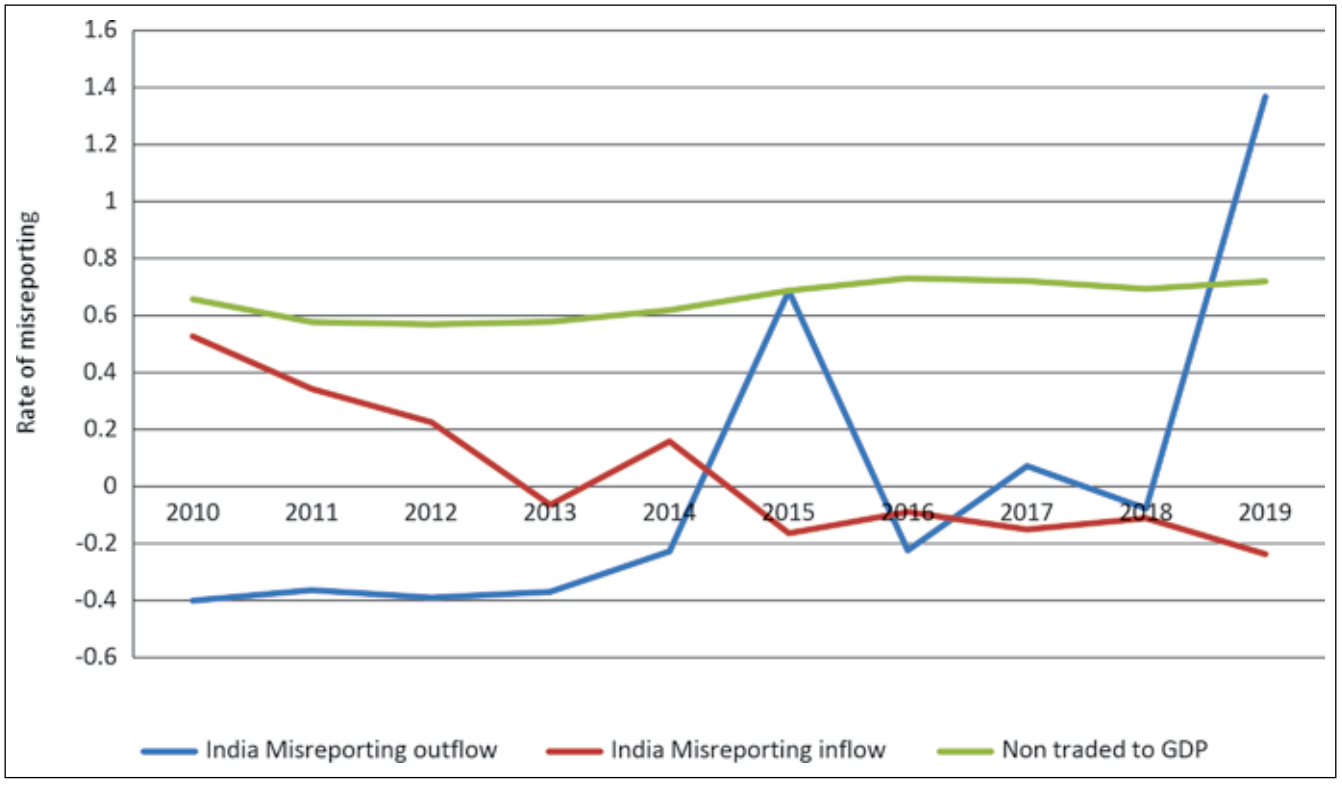
Source: Direction of Trade Statistics (DOTS), IMF

The average rate and standard deviation of India misreporting its capital outflow to Mauritius are worked out at -0.3282 and 0.4467 and those of India misreporting its capital inflow from Mauritius at -0.3969 and 0.1190, respectively **(Figure 23)**. India's true capital outflow come on average at (42734.6667) with a standard deviation of (10696.3744); whereas the reported capital outflow come on average at (24741.11) with a standard deviation of (4772.89). This indicates a gap of 17993.5567 units between the average values. Similarly, the average value of India's true capital inflow is worked out at 227216.4444 and standard deviation at 35641.2557. The average value and standard deviation of India's reported capital inflow are worked out at 133666.33 and 13322.64 respectively. The result is a gap of 93550.1144 units between the average values of capital inflows.

[33] See Appendix 19. & Appendix 20.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with Mauritius and the ratio of non-traded to GDP are -0.5247 and 0.5826, which are significant at p-values of 0.059 and 0.038 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India mostly under reports its capital outflow and inflow to and from Mauritius. The graph clearly indicates that India's rate of under-reporting capital outflow is falling, and it moves away from the horizontal axis; whereas under-reporting capital inflow is rising, and it moves towards the horizontal axis. Under-reporting capital outflow implies Outflow from India's unrecorded source to recorded (legal) destination in Mauritius. On the other hand, under-reporting capital inflow implies inflow from recorded (legal) source in Mauritius to unrecorded destination in India[34].

Figure 24: India-Germany incidence of misreporting capital flows (inflow and outflow)



Source: Direction of Trade Statistics (DOTS), IMF

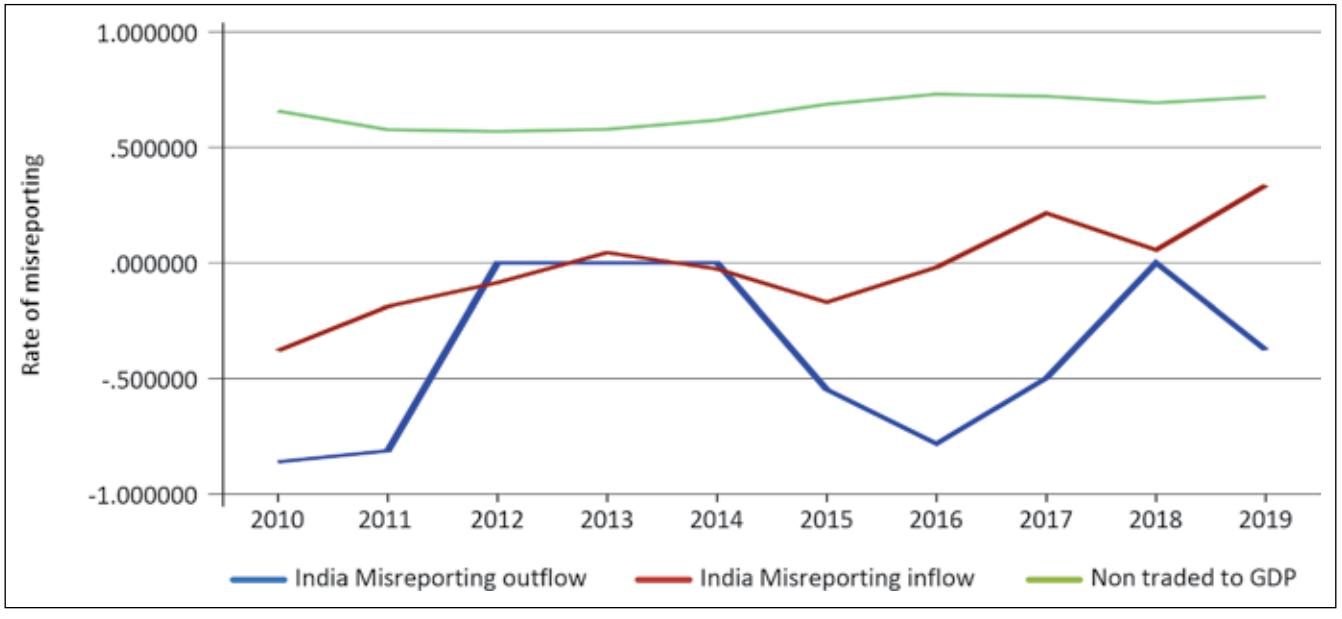
The average rate and standard deviation of India misreporting its capital outflow to Germany are worked out at 0.0073 and 0.58089 and those of India misreporting its capital inflow from Germany at 0.0439 and 0.25423, respectively **(Figure 24)**. India's true capital outflow come on average at (902.1) with a standard deviation of (209.5749); whereas the reported capital outflow come on average at (822.1) with a standard deviation of (249.20). This indicates a gap of 80 units between the average values. Similarly, the average value of India's true

[34] See Appendix 27. & Appendix 28.

capital inflow is worked out at 39407.2 and standard deviation at 15508.2064. The average value and standard deviation of India's reported capital inflow are worked out at 38004.8 and 9835.28 respectively. The result is a gap of 1402.4 units between the average values of capital inflows.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with Germany and the ratio of non-traded to GDP are 0.5708 and -0.59, which are significant at p-values of 0 .042 and 0.036 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India under reports its capital outflow and inflow in most of the years, and over reports those in a few years. The graph clearly indicates that India's rate of misreporting capital outflow is rising, and that of misreporting capital inflow is falling. Under-reporting capital outflow in most years indicate Outflow from India's unrecorded source to recorded (legal) destination in Germany. On the other hand, under-reporting capital inflow in most years implies inflow from recorded (legal) source in Germany to unrecorded destination in India[35].

Figure 25: India-France incidence of misreporting capital flows (inflow and outflow)



Source: Direction of Trade Statistics (DOTS), IMF

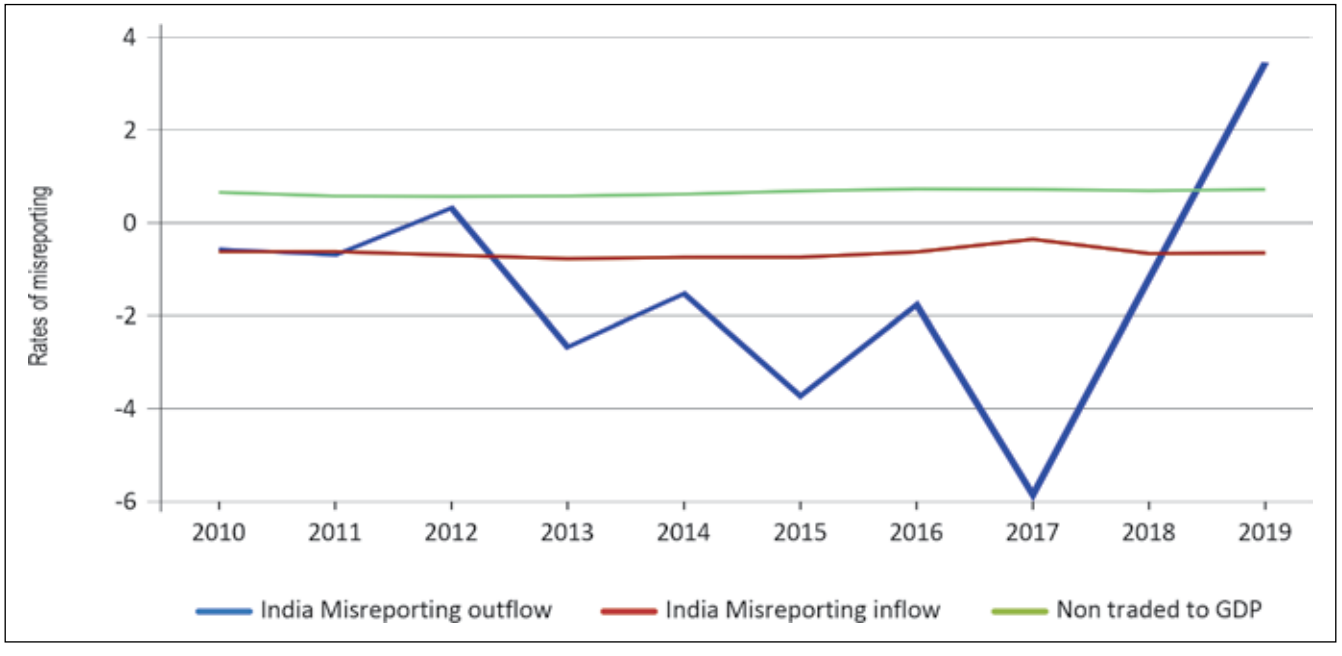
The average rate and standard deviation of India misreporting its capital outflow to France are worked out at -0.6462 and 0.1985 and those of India misreporting its capital inflow from France at -0.0219 and 0.2046, respectively **(Figure 25)**. India's true capital outflow come on average at (307.7) with a standard deviation of (304.9397); whereas the reported capital

[35] See Appendix 21. & Appendix 22.

outflow come on average at (192) with a standard deviation of (101.9586). Similarly, the average value of India's true capital inflow is worked out at 10309.2 and standard deviation at 1794.0963. The average value and standard deviation of India's reported capital inflow are worked out at 10284.2 and 3626.5949 respectively.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with France and the ratio of non-traded to GDP are 0.56 and 0.616, which are significant at p-values of 0.12 and 0.096 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India mostly under reports its capital outflow and inflow to and from the France[36]. Under-reporting capital outflow implies Outflow from India's unrecorded source to recorded (legal) destination in France. On the other hand, under-reporting capital inflow implies inflow from recorded (legal) source in France to unrecorded destination in India[37].

Figure 26: India-Italy incidence of misreporting capital flows (inflow and outflow)



Source: Direction of Trade Statistics (DOTS), IMF

The average rate and standard deviation of India misreporting its capital outflow to Italy are worked out at -1.4484 and 2.6165 and those of India misreporting its capital inflow from Italy at -0.6473 and 0.1243, respectively **(Figure 26)**. India's true capital outflow come on average at (57.7) with a standard deviation of (305.5414); whereas the reported capital

[36] The data of France's reported capital inflow is missing for the years 2012, 2013, 2014 and 2018. Therefore, the values of India's rate of misreporting capital outflow to France are interpolated and plotted for these years.
[37] See Appendix 23. & Appendix 24.

outflow come on average at (244.9) with a standard deviation of (166.3934). This indicates a gap of -187.2 units between the average values. Similarly, the average value of India's true capital inflow is worked out at 10786.2and standard deviation at 3110.1966. The average value and standard deviation of India's reported capital inflow are worked out at 3889 and 2239.4838 respectively. The result is a gap of 6897.2 units between the average values of capital inflows.

The correlation coefficient between India's rate of misreporting capital (outflow and inflow) with Italy and the ratio of Non-Traded to GDP are -0.1319 and 0.496, which are significant at p-values of 0.358 and 0.072 respectively. The estimated time trend for 2010-19 shows a positive slope for non-traded to GDP ratio. India mostly under reports its capital outflow and inflow to and from the Italy[38]. The graph clearly indicates that India's rate of under-reporting capital outflow is falling, and it moves away from the horizontal axis; whereas the estimated trend of under-reporting capital inflow is rising, and it moves towards the horizontal axis. Just to remind that under-reporting capital outflow implies Outflow from India's unrecorded source to recorded (legal) destination in Italy. On the other hand, under-reporting capital inflow implies inflow from recorded (legal) source in Italy to unrecorded destination in India[39.]

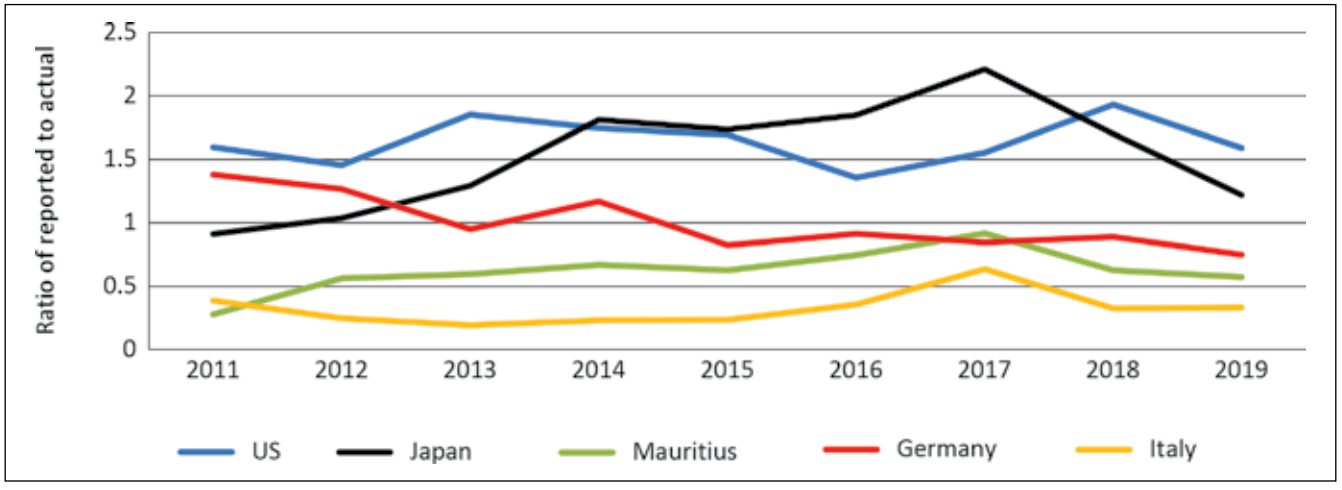
India's ratio of reported net capital inflow as a proportion of its true (actual) net capital inflow carves a clear idea of illegal flows to and from its partner countries, that is, US, the UK, Japan, Mauritius, Germany, and Italy[40]. If the ratio is close to 1 it means that India's aggregate net inflow is not majorly estimated wrongly in the national accounts data. If US$ 100 is actual net inflow and US$ 100 is also reported net inflow, for the aggregate accounts it is the same thing. If the ratio is greater than 1, then the net inflow is being underestimated. This ratio is defined and depicted (from 2011 to 2019) as follows:

In case of India's ratio of reported to actual net capital inflow from the US, the following definition is used.

$$\frac{\textit{reported net inflow}}{\textit{actual net inflow}} = \frac{\textit{India's reported inflow - India's reported outflow}}{\textit{US reported outflow - US reported inflow}}$$

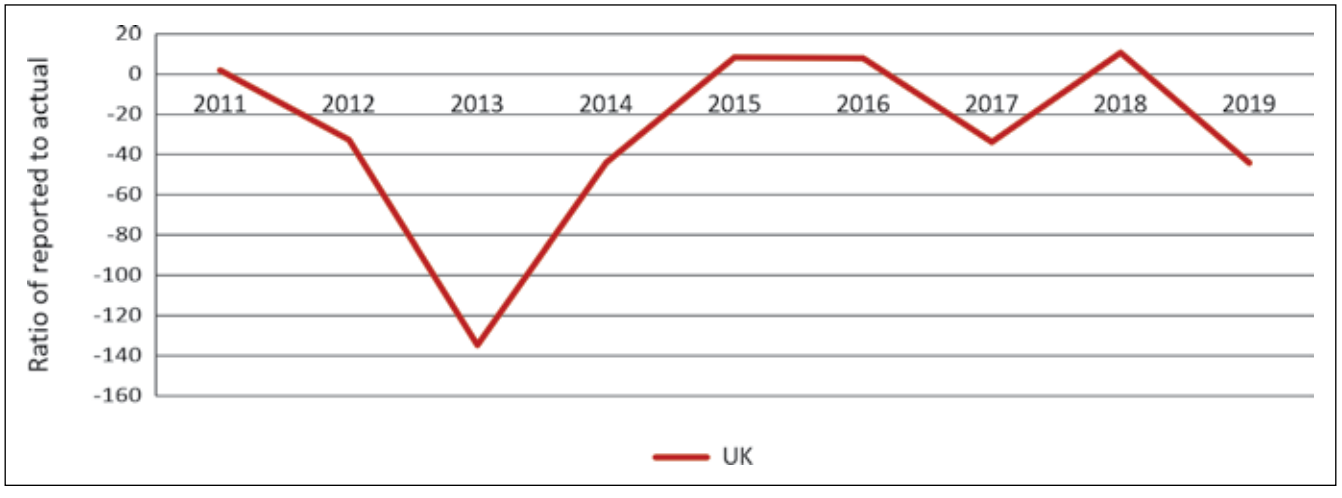
[38] India's misreporting of capital flows to and from Italy is studied from 2011 through 2019. The data on India's rate of misreporting outflow to Italy for the year 2018 is an extreme (outlier) value, such that the value is interpolated for 2018.
[39] See Appendix 25. & Appendix 26.
[40] The ratio of reported to actual net capital inflow for France is not considered here. This is because the data of France's reported capital inflow is missing for the years 2012, 2013, 2014 and 2018.

Figure 27: Ratio of reported to actual net capital inflow in India from six investment partners



Source: Direction of Trade Statistics (DOTS), IMF

Figure 28: Ratio of reported to actual net capital inflow in India from UK



Source: Direction of Trade Statistics (DOTS), IMF

India's ratio of reported to actual net capital inflow from US, Japan and Mauritius increases through 2012 and 2013[41] **(Figure 27)**. However, in case of inflow from Italy the value of the ratio declines from 2011 till 2015; and in case of Germany, it consistently falls[42]. India's ratio of reported to actual net capital inflow from Japan, Mauritius and Italy reaches its peak in 2017, and post 2017 it gradually declines. If the ratio is greater than 1, it indicates that India's reported net inflow is greater than India's actual net inflow. That is, the inflow is possibly from some unrecorded source in a developed country to recorded destination in India. Again, a less than 1 value of the ratio implies India's reported net inflow is relatively

[41] See Appendix 29, Appendix 31. & Appendix 34.
[42] See Appendix 32. & Appendix 33.

less than its actual net inflow. That is, the inflow is possibly from recorded source in a developed country to some unrecorded destination in India. In context of India- UK capital flow, India's ratio of reported net capital inflow to actual net capital outflow falls sharply in 2013, 2017 and 2019[43] **(Figure 28)**.

4.2 Suggestive Measures for True Net Capital Inflow & Misreporting Net Capital Inflow

Trade Misreporting which leads to BOT Misreporting is also a cause for capital inflows and outflows. At this juncture, the study of India's true (actual) capital flows to and from its partner countries (the US, the UK, Japan, Germany, Italy, Mauritius) involve the concepts of Reported and True Capital Inflows and Outflows. Two methods have been suggested here for the calculation of True (Actual) Capital Inflows and Outflows, and thereby the True (Actual) Net Capital Flows (Inflows and Outflows). Those are: (a) assigning equal weights to the data of reported capital flows (both inflows and outflows) of India and its partner countries, respectively; (b) assigning weights to the data of reported capital flows (both inflows and outflows) of India and its trading partners, respectively, according to the scores of the countries in the freedom house index. The difference between the True Weighted Net Capital Inflow and Reported Net Capital Inflow gives an idea of the measure of misreporting net capital inflows. The previous section (that is, 4.1) analyzed India's rate of misreporting capital flows to and from its partner countries (namely, the US, the UK, Japan, Germany, France, Italy & Mauritius). The present section simply provides suggestive methodologies in measuring India's absolute values (that is, true values) of misreporting net capital inflows. However, the gaps between India's true and reported values of net capital inflows are also illustrated graphically.

a. Assigning Equal Weights

Suppose the case of India-US,

True (Actual) capital inflow= (India's reported inflow from US+ US reported outflow to India)/2

True (Actual) capital outflow= (India's reported outflow to US+ US reported inflow from India)/2

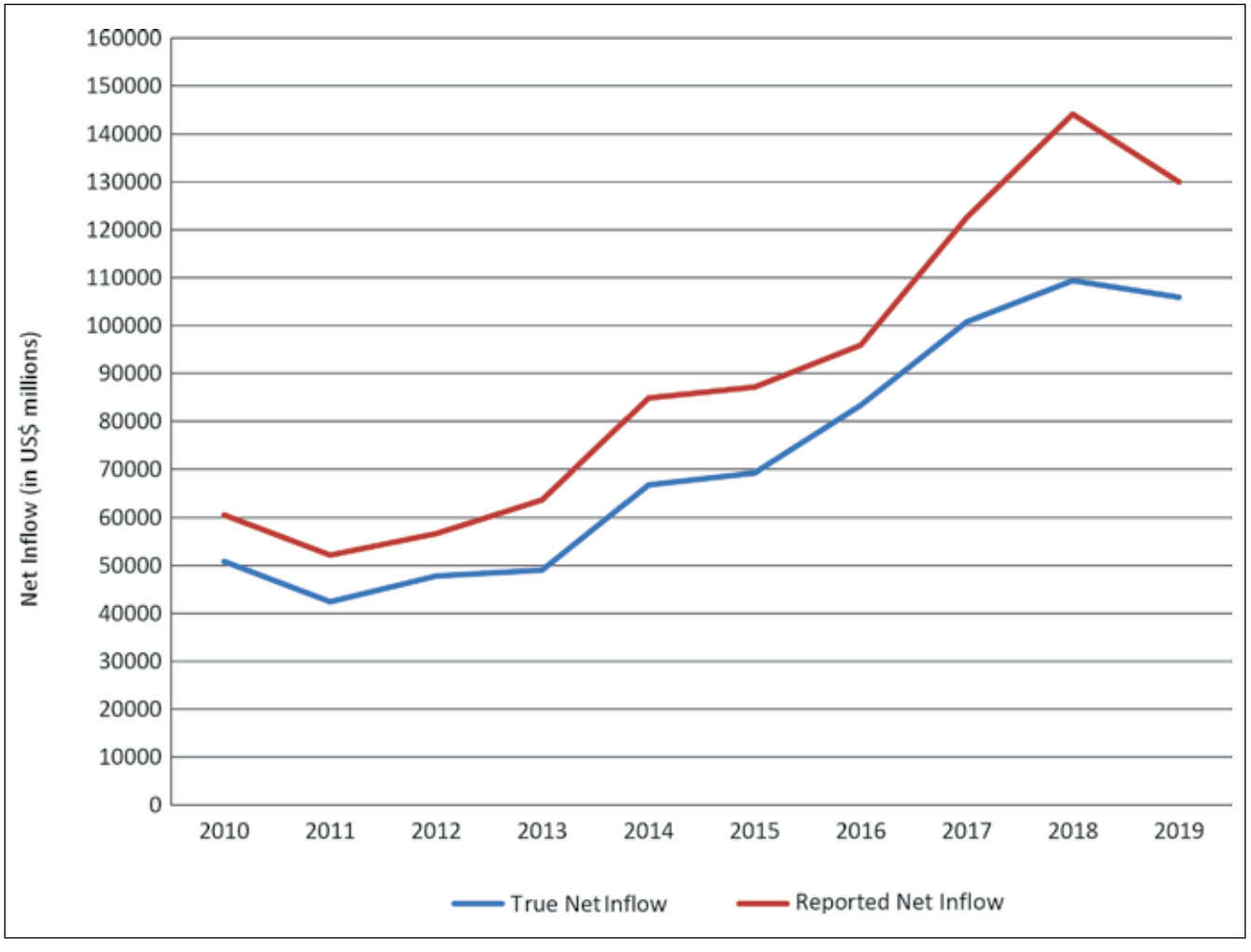
[43] See Appendix 30.

True Net Inflow [Actual Net Inflow] = True capital inflow – True capital outflow

Reported Net Inflow= India's reported inflow from US- India's reported outflow to US

The graphs of the True Net Inflows [Actual Net Inflow] and Reported Net Inflows into India from its significant partner countries (the US, the UK, Japan, Germany, Italy, Mauritius) are depicted below.

Figure 29: India-US True Net (equal weights) and Reported Net Inflows



Source: Direction of Trade Statistics (DOTS), IMF

The graph shows similar movements of True Net (equal weights) and Reported Net Inflows into India from US over the years **(Figure 29)**. However, Reported Net Inflow is consistently greater than the True Net (equal weights) Inflow. In the year 2018, the gap between the Reported Net and True Net (equal weights) Inflows is maximum (that is, 34740), and it is minimum in 2012 (that is, 8857). The mean values of the Reported Net Inflows and True

Net (equal weights) are 89,759 and 72542.79 respectively. This indicates a gap of 17,216.21 between the mean values[44].

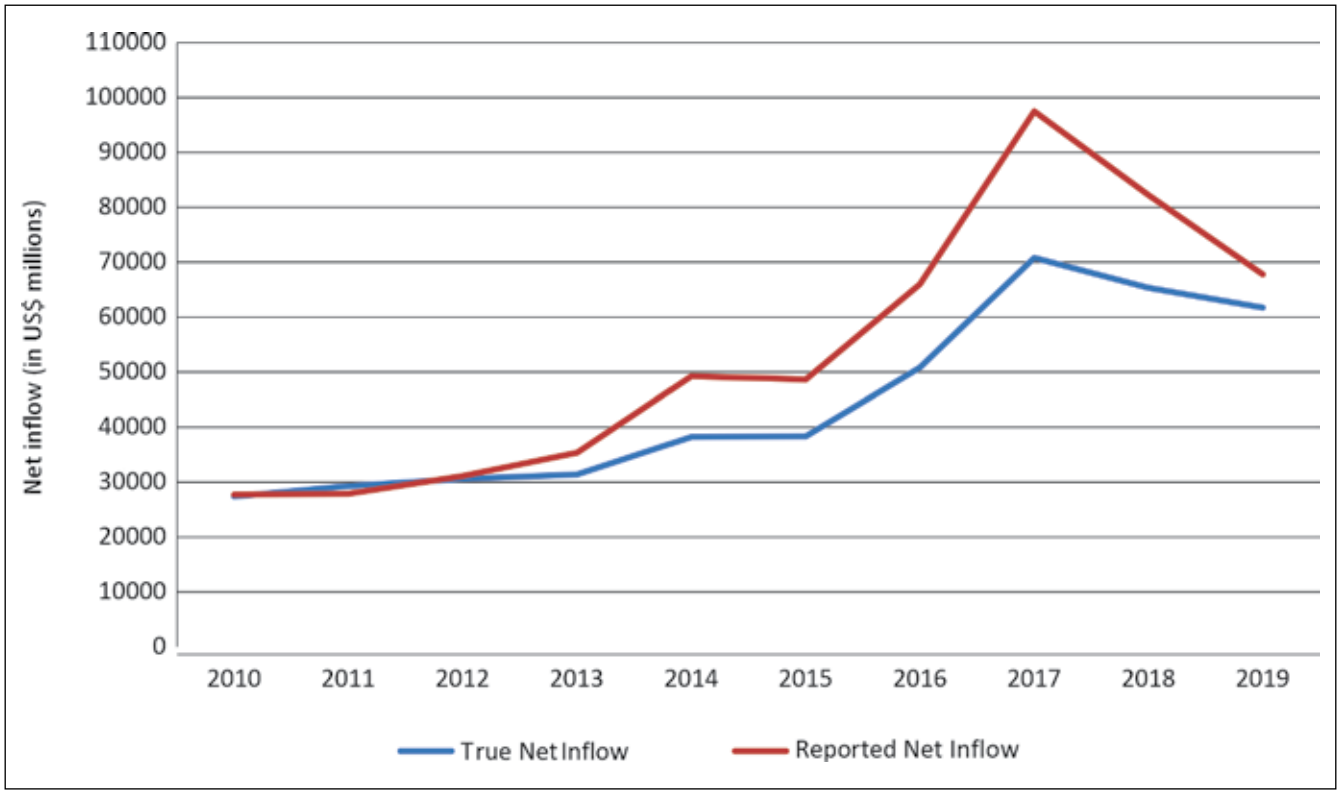
Figure 30: India-UK True Net (equal weights) and Reported Net Inflows

Source: Direction of Trade Statistics (DOTS), IMF

Similar trends of True Net (equal weights) and Reported Net Inflows are observed over the years into India from UK **(Figure 30)**. During 2010 till 2019 the Reported Net Inflows is greater than the True Net (equal weights) Inflows. In the year 2019, the gap between the Reported Net and True Net (equal weights) Inflows is maximum (namely, 68766), and it is minimum (namely, 15989) in 2011. This gap is increasing in the years 2012, 2013, and 2014. The mean values of the Reported Net and True Net (equal weights) Inflows are 95,172 and 50508.34 respectively, implying a gap of 44,663.66 between the mean values[45].

[44] See Appendix 45.
[45] See Appendix 46.

Figure 31: India-Japan True Net (equal weights) and Reported Net Inflows

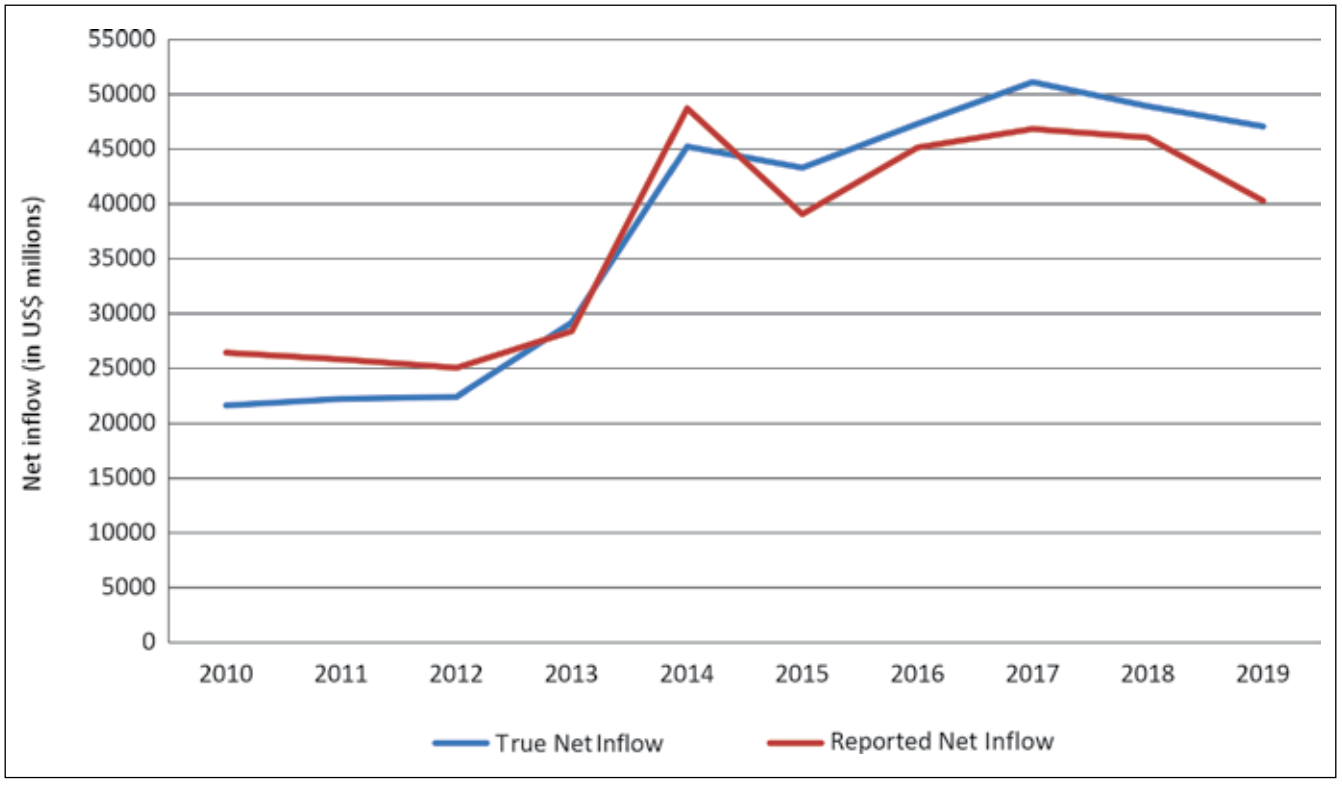


Source: Direction of Trade Statistics (DOTS), IMF

The graphs depicting True Net (equal weights) and Reported Net Inflows into India from Japan show a similar pattern of movement over the years **(Figure 31)**. The Reported Net Inflows is greater than the True Net (equal weights) Inflows in most of the years. The gap between the Reported Net and True Net (equal weights) Inflows is maximum (that is, 26683) in 2017, and it is minimum (that is, 333) in 2010. However, this gap increases continuously during 2012-2014 and 2016-2017. In 2011, the Reported Net Inflows is less than the True Net (equal weights) Inflows. The mean values of the Reported Net and True Net (equal weights) Inflows are 53,358 and 44391.77114 respectively. This indicates a gap of 8,966.23 between the mean values[46].

[46] See Appendix 47.

Figure 32: India-Germany True Net (equal weights) and Reported Net Inflows

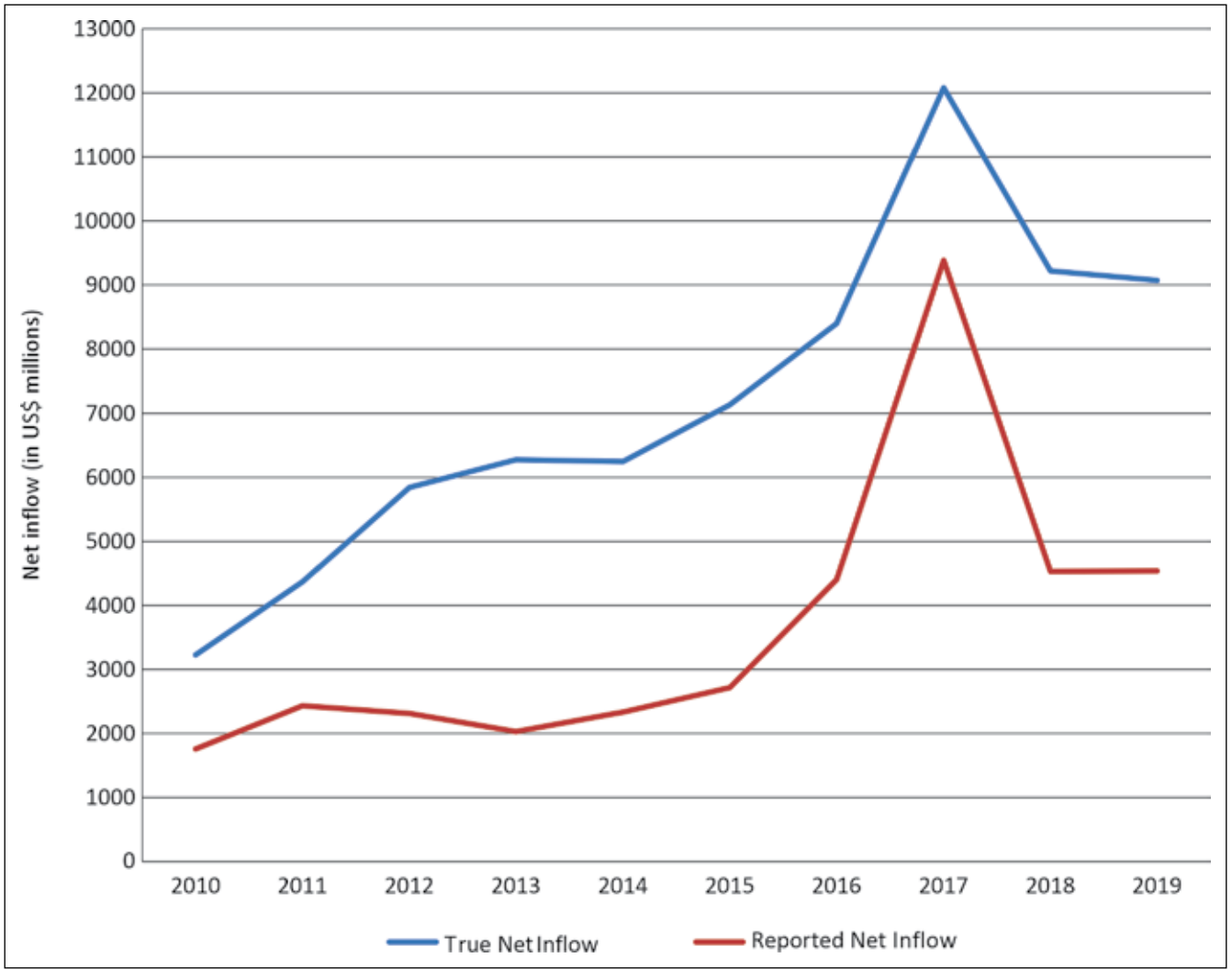


Source: Direction of Trade Statistics (DOTS), IMF

The graphs representing the True Net (equal weights) and Reported Net Inflows into India from Germany indicate that the values of the latter are mostly lesser than that of the former, over the years **(Figure 32)**. During 2010-2012 the Reported Net Inflows is greater than the True Net (equal weights) Inflows. The gap between the Reported Net and True Net (equal weights) Inflows is negative and maximum in magnitude (namely, -6781.5) in 2019. The mean values of the Reported Net and True Net (equal weights) Inflows are 37182.7 and 37843.9 respectively, implying a gap of -661.2 between the mean values[47].

[47] See Appendix 48.

Figure 33: India-Italy True Net (equal weights) and Reported Net Inflows

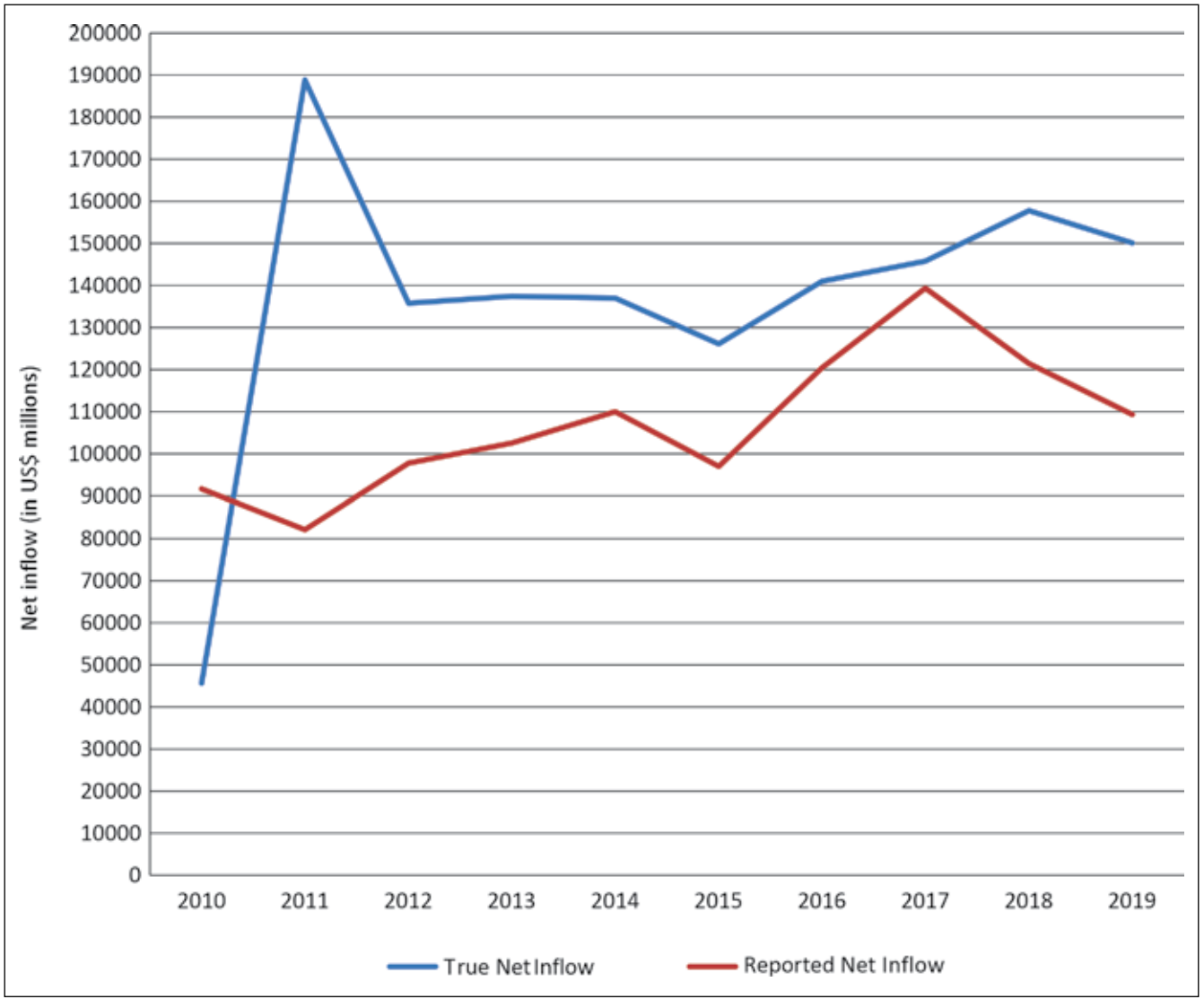


Source: Direction of Trade Statistics (DOTS), IMF

During 2010 through 2019, the Reported Net Inflows is consistently lesser than the True Net (equal weights) Inflows into India from Italy **(Figure 33)**. However, from 2015 till 2018 these graphs depict similar pattern of movements. The gap between the Reported Net and True Net (equal weights) Inflows is negative and maximum in absolute value (that is, -4692.5) in 2018, and it is negative and minimum in absolute value (that is, -1469) in 2010. This gap is negative and increasing in magnitude from 2010 through 2013 and it is negative and decreasing in magnitude from 2015 till 2017. The mean values of the Reported Net and the True Net (equal weights) Inflows are 3644.2 and 7186.35 respectively. This indicates a gap of -3542.15 between the mean values[48].

[48] See Appendix 49.

Figure 34: India-Mauritius True Net (equal weights) and Reported Net Inflows

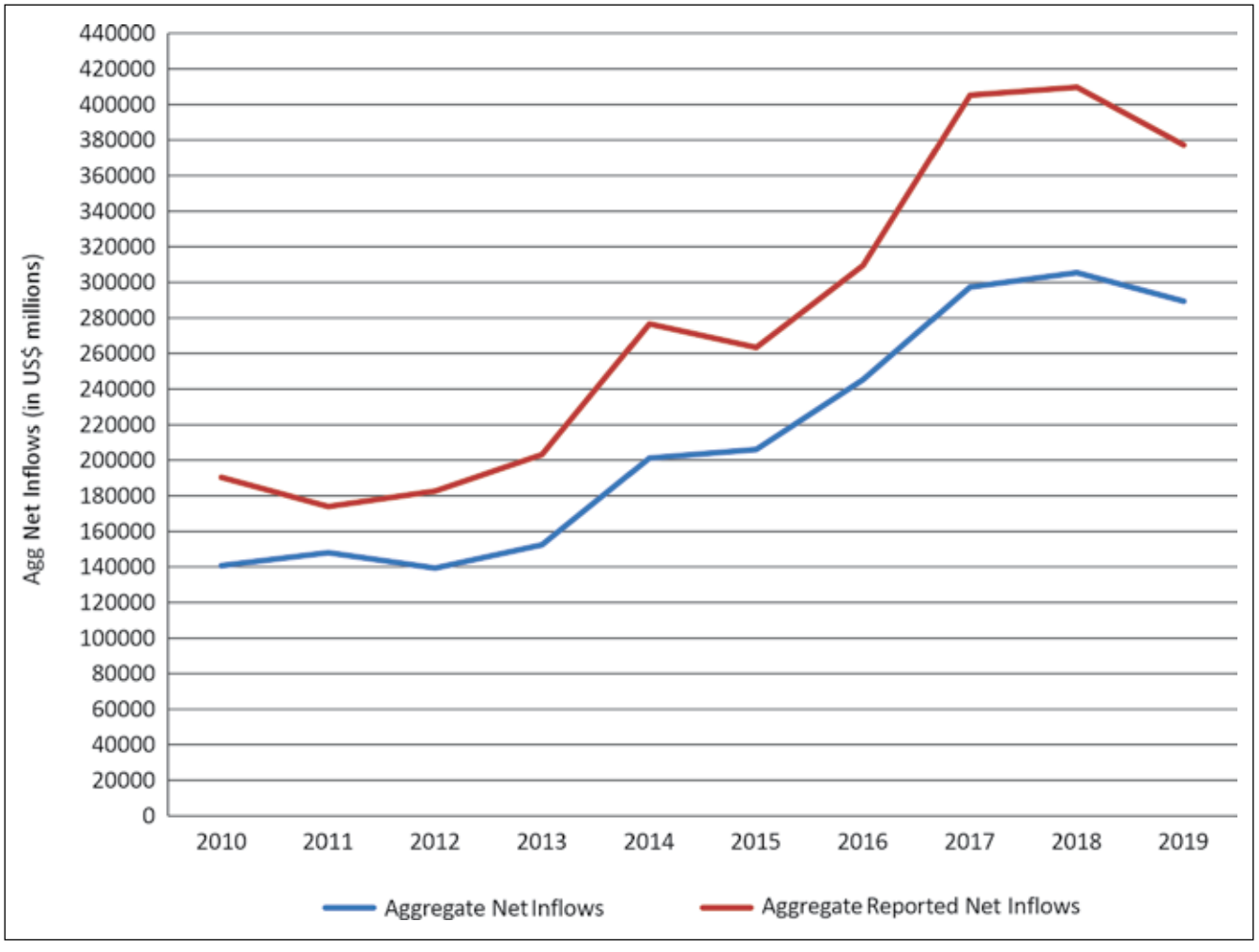


Source: Direction of Trade Statistics (DOTS), IMF

It is quite prominent that the Reported Net Inflow is located below the True Net (equal weights) Inflows into India from Mauritius in most of the years **(Figure 34)**. From 2014 till 2017 these graphs depict a similar pattern of movement. The gap between the Reported Net and True Net (equal weights) Inflow is maximum in 2019 (namely, -40833.5), and it is minimum in 2017 (namely, -6363). This gap falls in magnitude during 2012-2014 and 2015-2017, and it increases in magnitude during 2018 and 2019. The mean values of the Reported Net and True Net (equal weights) Inflows are 107206.7 and 136594.65 respectively. This indicates a gap of -29387.95 between the mean values[49].

[49] See Appendix 50.

Figure 35: India's Aggregate True Net (equal weights) & Aggregate Reported Net Inflows



Source: Direction of Trade Statistics (DOTS), IMF

The trends of India's Aggregate True Net (equal weights) Inflows and Aggregate Reported Net Inflows are similar over the years. The gap between the Reported Net and True Net (equal weights) Inflows is and highest (that is, 107,858) in 2017 and it is lowest (that is, 25,964) in 2011. In case of India's Aggregate Net Capital Inflows from its partner countries (that is, the US, the UK, Japan, Germany and Italy), the gap between the Reported Net and True Net (equal weights) Inflows and is increasing during 2011-2014, and 2015-2017. The graph representing the Reported Net Inflows is located above the True Net (equal weights) Inflows for all the years. This indicates that India mostly over reports its Aggregate Net Inflows. The mean values of the Aggregate Reported Net Inflows and the Aggregate True Net (equal weights) Inflows are 279,116 and 212473.16 respectively, indicating a gap of -66,642.84 between the mean values[50].

[50] See Appendix 51.

b. Assigning Weights following the Freedom House Index score

In case of India-US

True (weighted) capital inflow= [((67/150) * India's reported inflow from US+ ((83/150) *US reported outflow to India)]

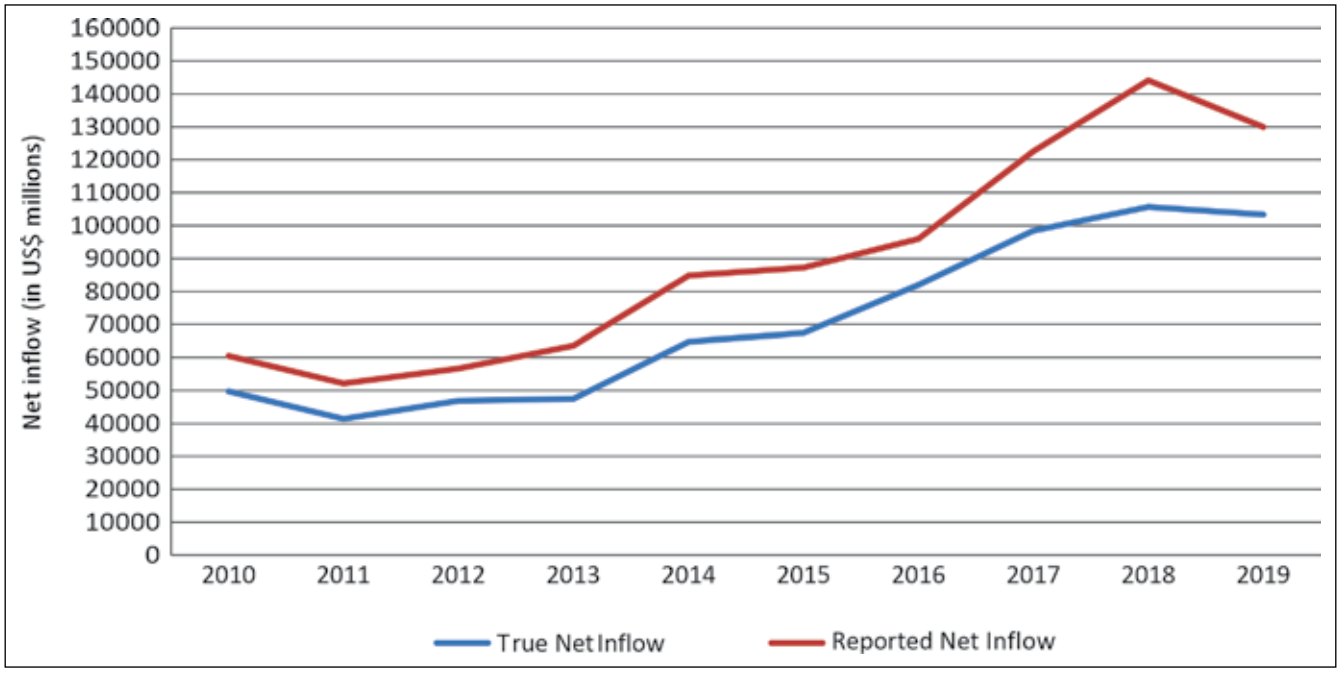
True (weighted) capital outflow= [((67/150) * India's reported outflow to US+ ((83/150) *US reported inflow from India)]

True Net (weighted) Inflow [Actual Net Inflow] = True (weighted) capital inflow – True (weighted) capital outflow

Reported Net Inflow= India's reported inflow from US - India's reported outflow to US

The graphs of the True (weighted) Net Inflow [Actual Net Inflow] and Reported Net Inflow into India from its significant partner countries (the US, the UK, Japan, Germany, Italy, and Mauritius) are represented below. Here, the pattern of movements of the graphs depicting True Net (weighted) and Reported Net Inflows are same as that in case of True Net (equal weights) and Reported Net Inflows discussed above.

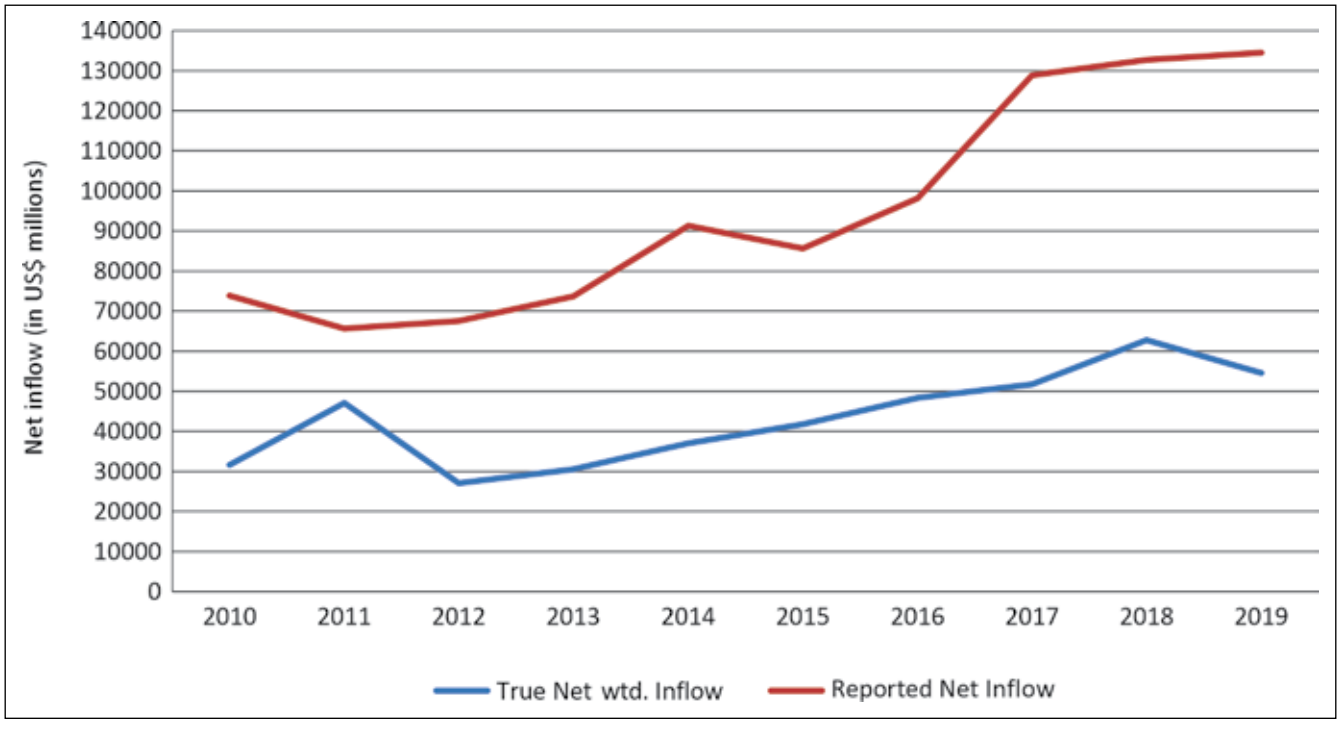
Figure 36: India-US True Net (weighted) and Reported Net Inflows[51]



Source: Direction of Trade Statistics (DOTS), IMF

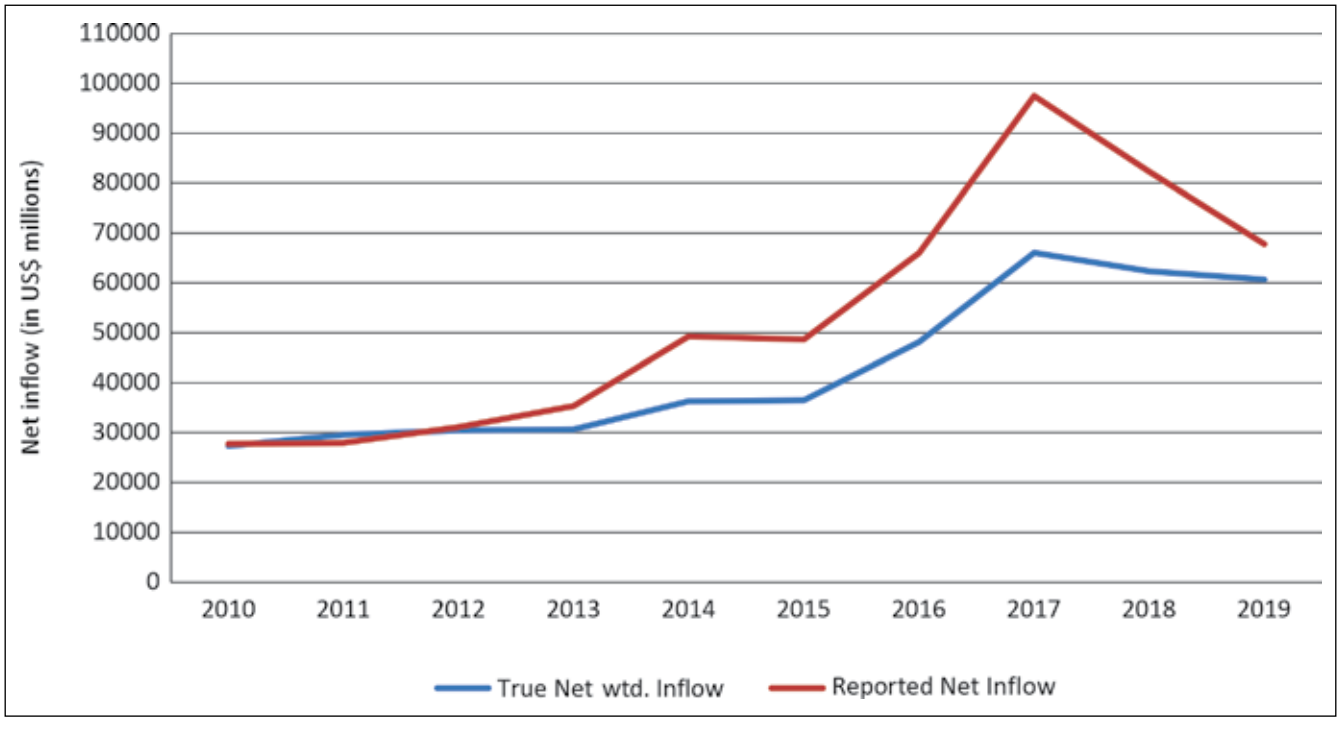
[51] See Appendix 52.

Figure 37: India-UK True Net (weighted) and Reported Net Inflows[52]



Source: Direction of Trade Statistics (DOTS), IMF

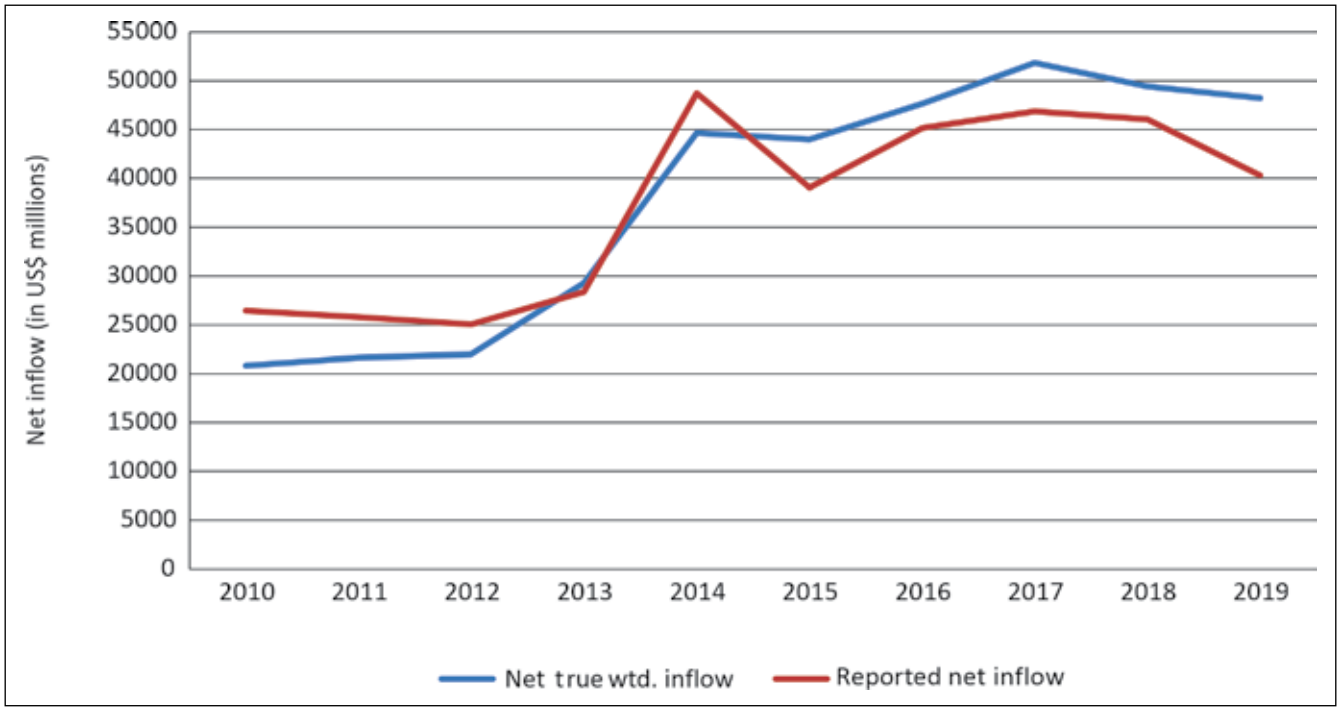
Figure 38: India-Japan True Net (weighted) and Reported Net Inflows[53]



Source: Direction of Trade Statistics (DOTS), IMF

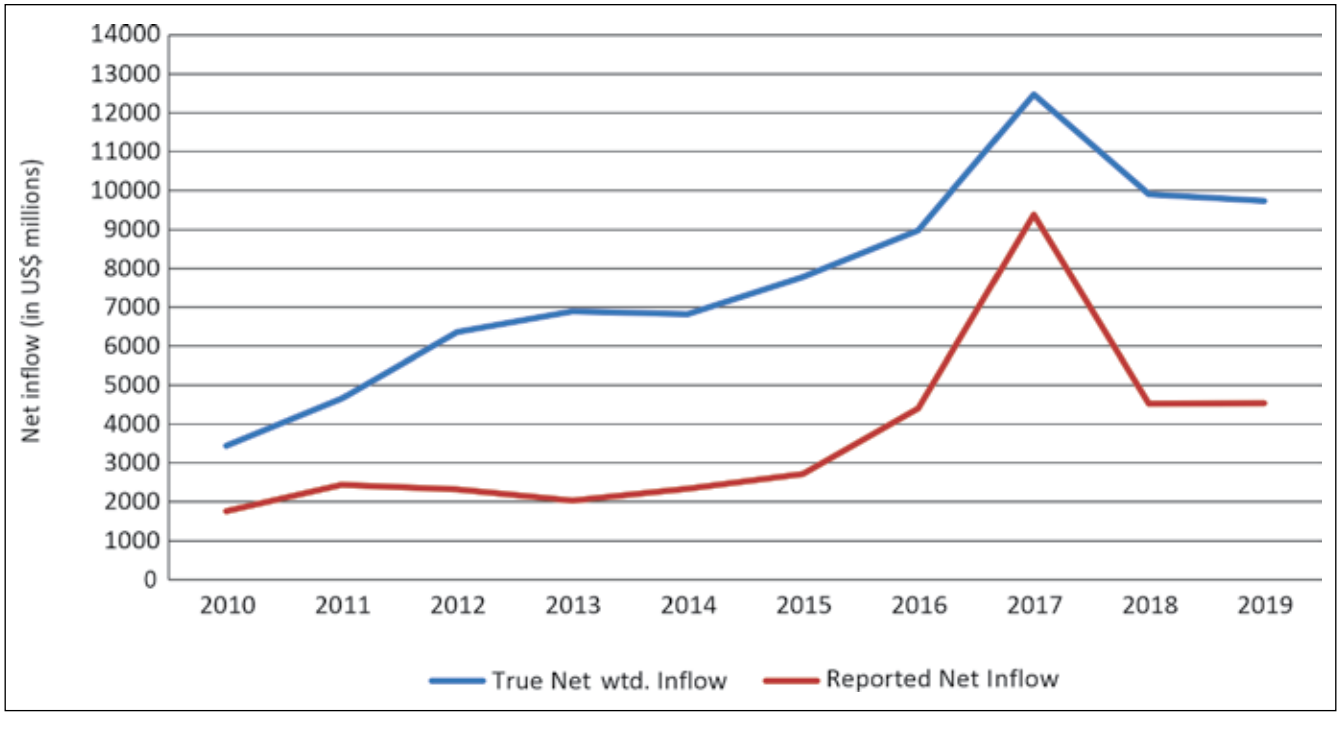
[52] See Appendix 53.
[53] See Appendix 54.

Figure 39: India-Germany True Net (weighted) and Reported Net Inflows[54]



Source: Direction of Trade Statistics (DOTS), IMF

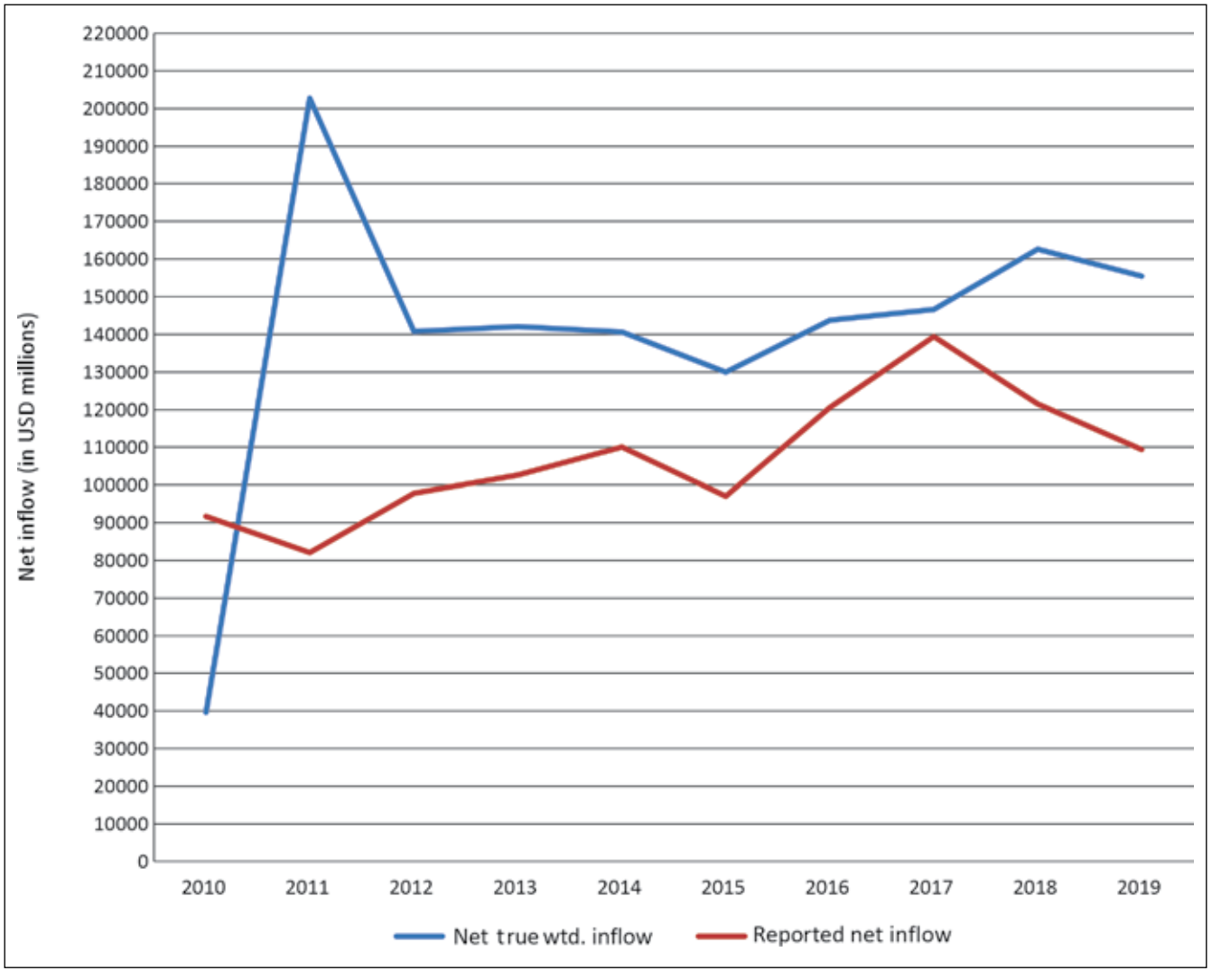
Figure 40: India-Italy True Net (weighted) and Reported Net Inflows[55]



Source: Direction of Trade Statistics (DOTS), IMF

[54] See Appendix 55.
[55] See Appendix 56.

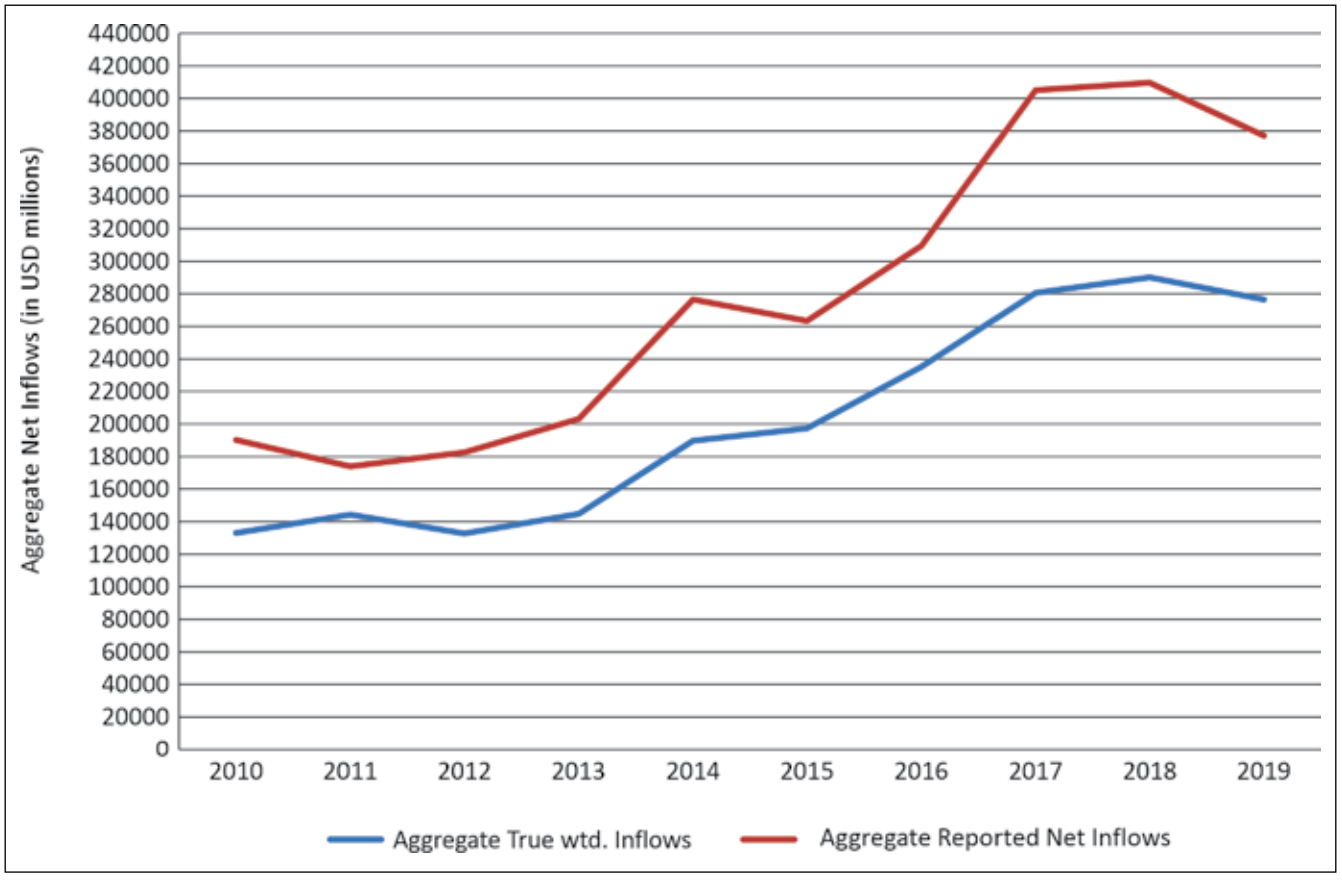
Figure 41: India-Mauritius True Net (weighted) and Reported Net Inflows[56]



Source: Direction of Trade Statistics (DOTS), IMF

[56] See Appendix 57.

Figure 42: India's Aggregate True Net (weighted) & Aggregate Reported Net Inflows[57]



Source: Direction of Trade Statistics (DOTS), IMF

The pattern of the graphs depicting True Net (equal weights) and True Net (weighted) Inflows into India are same, but their mean values are different. The mean values of True Net (weighted) and Reported Net Inflows in case of India-US are 70706.436 and 89759 respectively, implying a gap of -19052. Similarly, in case of India- UK the respective values are 43250.443 and 95172 respectively, with a gap of -51922. Again, the mean values of True Net (weighted) and Reported Net Inflows for India-Japan are 42796.619 and 53358 respectively, resulting in a gap of -10561. In case of India-Germany data, the mean values of True Net (weighted) and Reported Net Inflows are 37954.784 and 37182.7 respectively. This indicates a gap of -772.084 between the mean values. The mean values of True Net (weighted) and Reported Net Inflows in case of India-Italy are 7705.264 and 3644.2 respectively, implying a gap of 4061.064. Again, for India-Mauritius, the mean values of True Net (weighted) and Reported Net Inflows are 140411.266 and 107206.7 respectively, resulting in a gap of 33204.57. Finally, the mean values of India's Aggregate True Net (weighted) and Reported Net Inflows are 202413.5467 and 279,116 respectively. This indicates a gap of -76,702 between the mean values.

[57] See Appendix 58.

Chapter

DATA, METHODOLOGY & EMPIRICS

First, the study tries to assess whether export mis-invoicing causally affects import underreporting. Thus, a part of misreported export is noted to finance actual imports. The study shows that the hypothesis cannot be rejected, and the conjecture cannot be undermined. The data on misreporting is appropriately constructed.

Second, one could do the same with misreported capital flow from India to USA and underreported export or one could eliminate the residual misreported exports after accounting for import financing. The fact that a part of export earnings is not reported in India, even after accounting for import-financing would imply that such earning is used for unrecorded foreign investment as well as brought into India in a disguised form. Such decomposition is impossible to capture with publicly available data.

To address the issue of inter-linkage between import and export mis-invoicing, quarterly data from 1960-2017 is considered. Note that annual data might be too long an interval for studying the inter-relationship. Furthermore, the degrees of freedom, (number of independent variables that can be estimated in a statistical analysis) also increase when quarterly data are used.

Define

M^{Mis} = India's Import from USA as reported by India
– (USA's Export to India as reported by USA × 1.06)

X^{Mis} = India's Export to USA as reported by India

$$- \left(\frac{\text{USA's Import from India as reported by USA}}{1.06} \right)$$

$$\bar{M}^{Mis} = \frac{M^{\{Mis\}}}{(\text{USA's Export to India as reported by USA} \times 1.06)}$$

$$\bar{X}^{Mis} = \frac{X^{\{Mis\}} \times 1.06}{(\text{USA's Import from India as reported by USA})}$$

The study only deals with rate of import and export mis-invoicing. This is because the rate series are unit free. Further, if import increases substantially at some point, then one might also expect that mis-invoicing would also increase. The rate is a relative measure and thus, normalizes this type of cases.

The study addresses the issue following a simple multi equation reduced form VAR model. Thus, it considers VAR model defined at the level values. The model can be written as follows:

$$\bar{M}_t^{Mis} = c_0 + \sum_{i=1} \alpha_i \bar{M}_{t-i}^{Mis} + \sum_{i=1} \beta_i \bar{X}_{t-i}^{Mis} + u_t$$

$$\bar{X}_t^{Mis} = c_1 + \sum_{i=1} \theta_i \bar{M}_{t-i}^{Mis} + \sum_{i=1} \gamma_i \bar{X}_{t-i}^{Mis} + v_t$$

Note that by construction of the above two equations, mis-reporting series are related through lags. This is justified in the sense that the amount of capital that is generated through under-reporting of export can only be utilized by under-reporting importers in the next period. Following **Table 2** it can be observed that the first and second lag of the export mis-invoicing series significantly affect the import mis-invoicing series. While the first lag is positive, the same for the second lag is negative. This implies that an increase of $\bar{X}_t^{Mis}$ at period t-1, increases $\bar{M}_t^{Mis}$ at period t. On the contrary an increase of $\bar{X}_t^{Mis}$ at period t-2, negatively effects $\bar{M}_t^{Mis}$ at period t.

Table 2: Casual Relationship Import and Export Mis-invoicing

	Dependent Variable	
	$\bar{M}_t^{Mis}$	$\bar{X}_t^{Mis}$
L. $\bar{M}_t^{Mis}$	0.17***(2.70)	-0.03 (-1.00)
L2. $\bar{M}_t^{Mis}$	0.08(1.23)	0.02(0.52)
L.$\bar{X}_t^{Mis}$	0.32***(2.61)	0.35***(5.75)
L2.$\bar{X}_t^{Mis}$	-0.35***(-2.86	0.35***(5.63)
Constant C	-0.04***(-2.15)	-0.04***(-3.88)
Frequency and Log-Likelihood NOS LL	234 54.46	234 213.74
Granger Causality Test		
ALL Lags	9.85* 9.85*	1.11 1.11
Unit Root Tests: With Trend		
ALL PP	-9.31*** -12.60***	-2.91 -8.71***
Unit Root Tests: Without Trend		
ADF PP	-9.33*** -12.57***	-2.85* -8.65***
Zivot Andrews Unit Root Tests		
min t Break Year	-13.62*** Q1-1970	-5.49** Q1-1986

Notes: Lag length has been selected using th eSchwartz BIC Criterion.

NOS is the number of observations and LL = Log Likelihood. The row all corresponding to column 2 in the Granger Causality Test tests $\bar{X}_t^{Mis}$ Granger causes $\bar{M}_t^{Mis}$ if and only if the Null Hypothesis $H_0 = \alpha_1 = \alpha_2 = ... = \alpha_{p1} = \beta_1 = \beta_2 = ... = \beta_{p2} = 0$ can be rejected. Simarly $\bar{M}_t^{Mis}$ Granger causes $\bar{X}_t^{Mis}$ if and only if the Null Hypothesis $H_0 = \theta_1 = \theta_2 = ... = \theta_{q1} = \gamma_1 = \gamma_2 = ... = \gamma_{q2} = 0$ can be rejected. The same for row lags tests the Null Hypothesis $H_0 = \beta_1 = \beta_2 = ... = \beta_{p2} = 0$ and $H_0 = \theta_1 = \theta_2 = ... = \theta_{p2} = 0$ is presented in column 2 and 3 respectively. Both test statistics confirms that only the first hypothesis (i.e. $\bar{X}_t^{Mis}$ Granger causes $\bar{M}_t^{Mis}$) can be rejected. Both import and export misreporting rates are stationary.

Granger Causality Test presented at the bottom of the distribution confirms that only export mis-invoicing series causes import mis-invoicing series. That is

$$\bar{M}_{Mis} = f(\bar{X}_{Mis}).$$

Similar results also holds even if the relationship of the above two variables at their first difference is studied. Finally, the result also holds if the annual data instead of quarterly data is considered. The result remains unchanged even after conducting the same analysis with annual data (instead of quarterly) of the two countries.

To check robustness of the analysis the exercise re-run the entire analysis with two period moving average of both the mis-invoicing series.

Table 3: Causal Relationship between Moving average Import and Export Mis-invoicing series

	Dependent Variable	
	M_Mis	**X_Mis**
L.M_mis_MA	0.76***(12.16)	-0.06**(-1.98)
L2.M_mis_MA	-0.24***(-3.89)	0.06**(2.04)
L.X_mis_MA	0.39***(2.92)	1.01***(15.49)
L2.X_mis_MA	-0.45***(-3.36)	-0.18***(-2.81)
_cons	-0.03***(-2.70)	-0.02***(-3.72)
Frequency and Log-Likelihood		
NOS	234	234
LL	176.96	343.78
Granger Causality Tests		
All	11.3***	4.93*
Lags	11.3***	4.93*

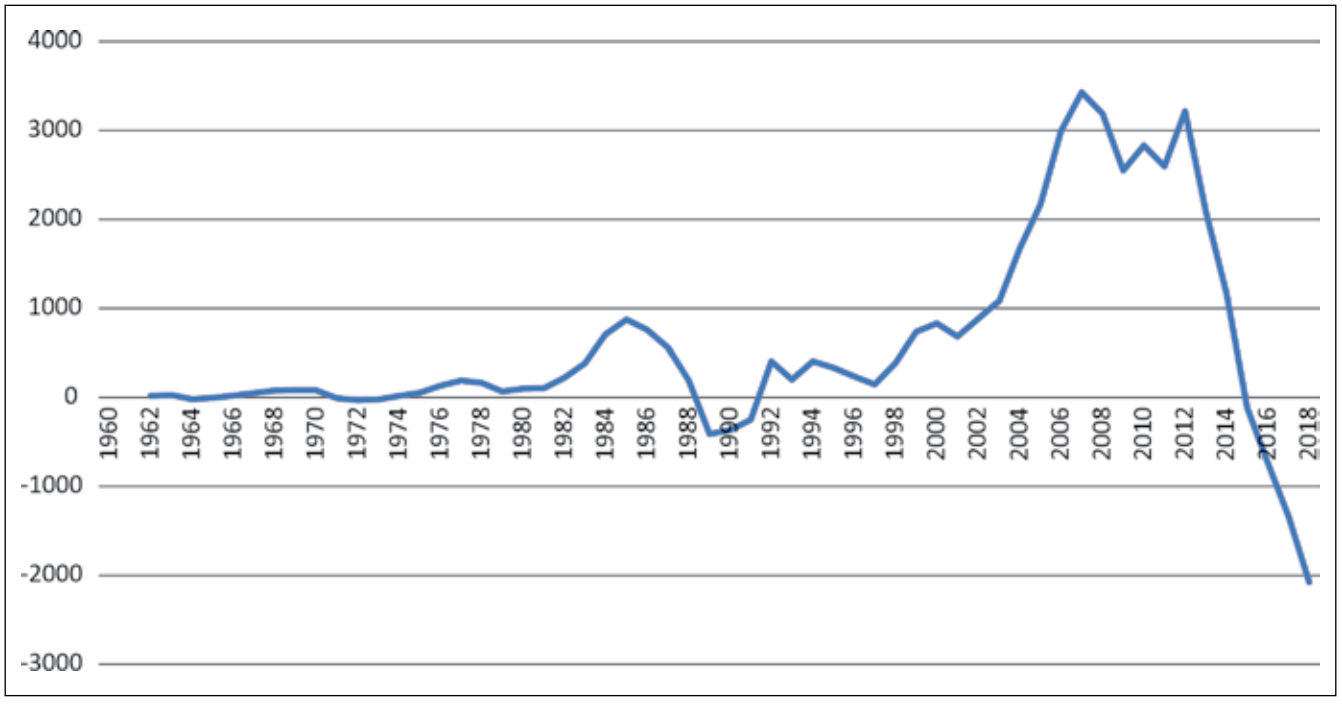
Note: Both the variables are stationary. Results have been omitted.

The hypothesis that exports granger causes import mis-invoicing series is failed to be rejected at 10% level of significance. Since 10% is not widely accepted, the study decides to ignore this. Note that instead of considering two period moving average considering three period moving average the result is exactly similar as the previous one (this result is omitted). **Hence, it can be concluded that Import Misinvoicing=f (Export Misinvoicing)**

As a preliminary exercise the study takes a 3-year moving average of difference of export under invoicing data and the import under invoicing data to construct a proxy of the residual flow as possible indicator of unaccounted capital outflow. **Figure 43** gives us some idea about the surplus left out after the imports under invoicing are accounted for. Note that there are periods when there is over invoicing of imports as somewhat conventional in this literature

when China and Brazil are taken as examples. Exact under invoicing coupled with import over invoicing reinforces the capital outflow hypothesis.

Figure 43: Difference between 3 yr. Moving Average of Export & Import (under-reporting) of India with USA (in US$ million)



Source: Direction of Trade Statistics (DOTS), IMF

5.1 Analytical Example

Let us try to set up a simple decision model which determines the choice of misreporting by the representative agent who exports, imports and engages in foreign investment. The basic idea being that the agent under invoice export to finance import and foreign investment to save interest and other regulatory transaction costs. This is the main reason of mis-invoicing transactions.

Let's define the gross earning of the agent without the consideration of expected punishment costs. Then

$$V_t = e_t(X_t - \tilde{X}_t) + e_t\tilde{X}_t + (e_t\mu - e_{t-1})M_t - e_{t-1}\tilde{M}_tR + (e_t(1+R^*) - e_{t-1})\bar{F}_t - e_{t-1}\tilde{F}_tR \quad (1)$$

where (X_t, M_t, $\bar{F}t$) → actual values of export, import and foreign investment

(X_t, $\tilde{M}_t$, $\tilde{F}_t$) → reported values.

(e_t, e_{t-1}) → rupee/ dollar exchange rates.

R → interest and other regulatory costs of properly reporting.

R* → dollar rate of interest.

$\mu > 1$ is the import premium above import costs.

Note that higher R makes true reports ($\tilde{M}_t$, $\tilde{F}_t$) more costly. Lower ($\tilde{M}_t$, $\tilde{F}_t$) will save on this count.

Let us now bring optimum invoicing into the analysis.

Suppose $\lambda e_t(X_t - \tilde{X}_t)$ finance $e_t(M_t - \tilde{M}_t)$ and $(1 - \lambda)e_t (X_t - \tilde{X}_t)$ finances $c_t (F_t - \tilde{F}_t)$.

It should be noted that any other opportunity costs of blocking misreported export earnings have been considered deliberately. This will mean

$$\tilde{M}_t = M_t - \lambda(X_t - \tilde{X}_t) \tag{2}$$

$$\tilde{F}_t = F_t - (1 - \lambda)\ (X_t - \tilde{X}_t) \tag{3}$$

Suppose the agent anticipates being audited with probability ½ and facing a punishment function *S*.

$$S = Z\left(M_t - \tilde{M}_t\right)^2 + Z(F_t - \tilde{F}_t)^2 \tag{4}$$

Thus, net expected earnings can be defined as

$$\Omega_t = V_t - \frac{1}{2}Z\lambda^2\left(X_t - \tilde{X}_t\right)^2 e_t^2 - \frac{1}{2}Z(1-\lambda)^2(X_t - \tilde{X}_t)^2 e_t^2 \tag{5}$$

$$\frac{\delta\Omega_t}{\delta\tilde{X}_t} = 0$$

$$\Rightarrow\ -e_{t-1}R\lambda - e_{t-1}R(1-\lambda) + Z\lambda^2 e_t^2\left(X_t - \tilde{X}_t\right) + Z(1-\lambda)^2 e_t^2\left(X_t - \tilde{X}_t\right) = 0 \tag{6}$$

$$\Rightarrow X_t - \tilde{X}_t^{\ *} = \frac{e_{t-1}R}{Ze_t^2(\lambda^2+(1-\lambda))} \quad \text{with } \frac{\delta^2\Omega_t}{\delta\tilde{X}_t^{\ 2}} < 0 \tag{7}$$

And further optimizing with respect to λ,

$$\lambda^* = \frac{1}{2} \tag{8}$$

Hence

$$\tilde{X}_t^{\,*} = X_t - \frac{2e_{t-1}R}{Ze_t^2} \tag{9}$$

$\tilde{X}_t^{\,*}$ drops with higher R, lower Z, higher e_{t-1} and lower e_t. Thus, expected depreciation i.e., rising $\frac{e_t}{e_{t-1}}$ with increase $\tilde{X}_t^{\,*}$ and reduce underinvoicing of export. Note that in case import is over-invoiced, it might be used to finance foreign investment.

5.2 Impulse Response Function between import and export mis-invoicing: from quarterly data

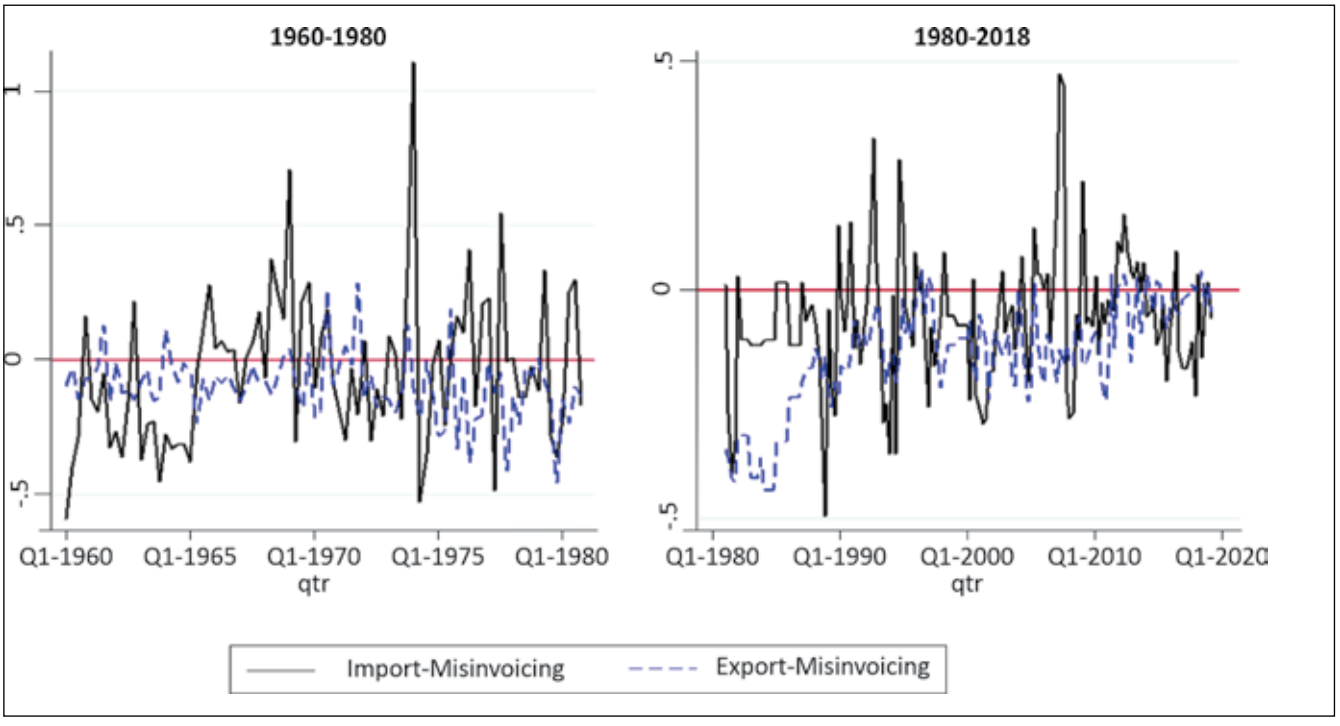
In order to address the issue of inter-linkage between import and export mis-invoicing, for the present exercise the study considers quarterly data from 1960-2017. The analysis has been restricted only to the context of bilateral trade between India and the United States of America. The rate of import and export mis-invoicing for any time point *t* is defined as*:*

$$RtIMP_t = \frac{M_t^{Mis}}{x_{dt}^f \times 1.06}$$

$$RtEX_t = \frac{X_t^{Mis} \times 1.06}{m_{dt}^f}$$

In **Table 2**, the results associated with unit root tests of $RtEX_t$ and $RtIMP_t$ are presented. It is readily observable that both the series are stationary.

Figure 44: Import and Export Mis-invoicing series



In the above figure the import and export mis-invoicing series have been plotted. The plot has been divided separately for the time period 1960-1980 and 1980-2018. If any mis-invoicing figure lies below the horizontal axis (0 line) then it is said that the underlying series is under invoiced, otherwise it is over-invoiced. It can be observed that export is grossly under-invoiced, in the time regimes. Nevertheless, some periods exhibit over-invoicing of the export mis-invoicing. The frequency is substantially higher in the 1960-1980, compared to the other time regime. Import on the other hand is both over and under-invoiced in a frequent rate. The degree of import mis-invoicing is substantially higher, particularly when import is over-invoiced.

5.3 VAR Estimates

This section establishes a relationship between the export and import mis-invoicing series. It begins with a simple VAR model.

The two series are stationary; hence a Vector Autoregressive (VAR) model is applied to capture the relationship between them. The results are presented in Table 3. Note that when import under invoicing is the dependent variable then the lagged values of export under invoicing significantly affects it. From the table it can be observed that $\frac{\partial\, RtIMP_t}{\partial\, RtEX_{t-1}}$ = 0.32>0, whereas $\frac{\partial\, RtIMP_t}{\partial\, RtEX_{t-2}}$ = -0.35 < 0.

Both these coefficients are highly significant. However, the reverse causality seems do not exist. That is when R_tEX is the dependent variable, the coefficients of RtIMP are not significant. This is also reflected in the Granger Causality Tests, where RtEX granger causes RtIMP.

Table 4: Vector Autoregressive Estimates

Sample: Q3-1960 - Q4-2018		Number of obs	= 234
Log likelihood	= 271.0375	AIC	= -2.23109
FPE	= .0003682	HQIC	= -2.171552
Det(Sigma_ml)	= .0003381	SBIC	= -2.083427

Equation	Parms	RMSE	R-sq	chi2	P>chi2
RTIMP	5	.193807	0.0785	19.93149	0.0005
RTEX	5	.098121	0.3711	138.0957	0.0000

		Coef.	Std.Err.	z	P>|z|	[95% Conf.	Interval]
RTIMP							
	RTIMP						
	L1.	.172868	.0641384	2.70	0.007	.047159	.298577
	L2.	.0779524	.0631653	1.23	0.217	-.0458494	.2017541
	RTEX						
	L1.	.3165146	.1211801	2.61	0.009	.079006	.5540232
	L2.	-.3476847	.1217791	-2.86	0.004	-.5863674	-.1090021
	_cons	-.0418456	.019421	-2.15	0.031	-.07991	-.0037812
RTEX							
	RTIMP						
	L1.	-.0325613	.0324722	-1.00	0.316	-.0962057	.031083
	L2.	.0165535	.0319795	0.52	0.605	-.0461252	.0792323
	RTEX						
	L1.	.3526087	.0613515	5.75	0.000	.232362	.4728553
	L2.	.3468373	.0616547	5.63	0.000	.2259962	.4676783
	_cons	-.0381267	.0098325	-3.88	0.000	-.0573981	-.0188554

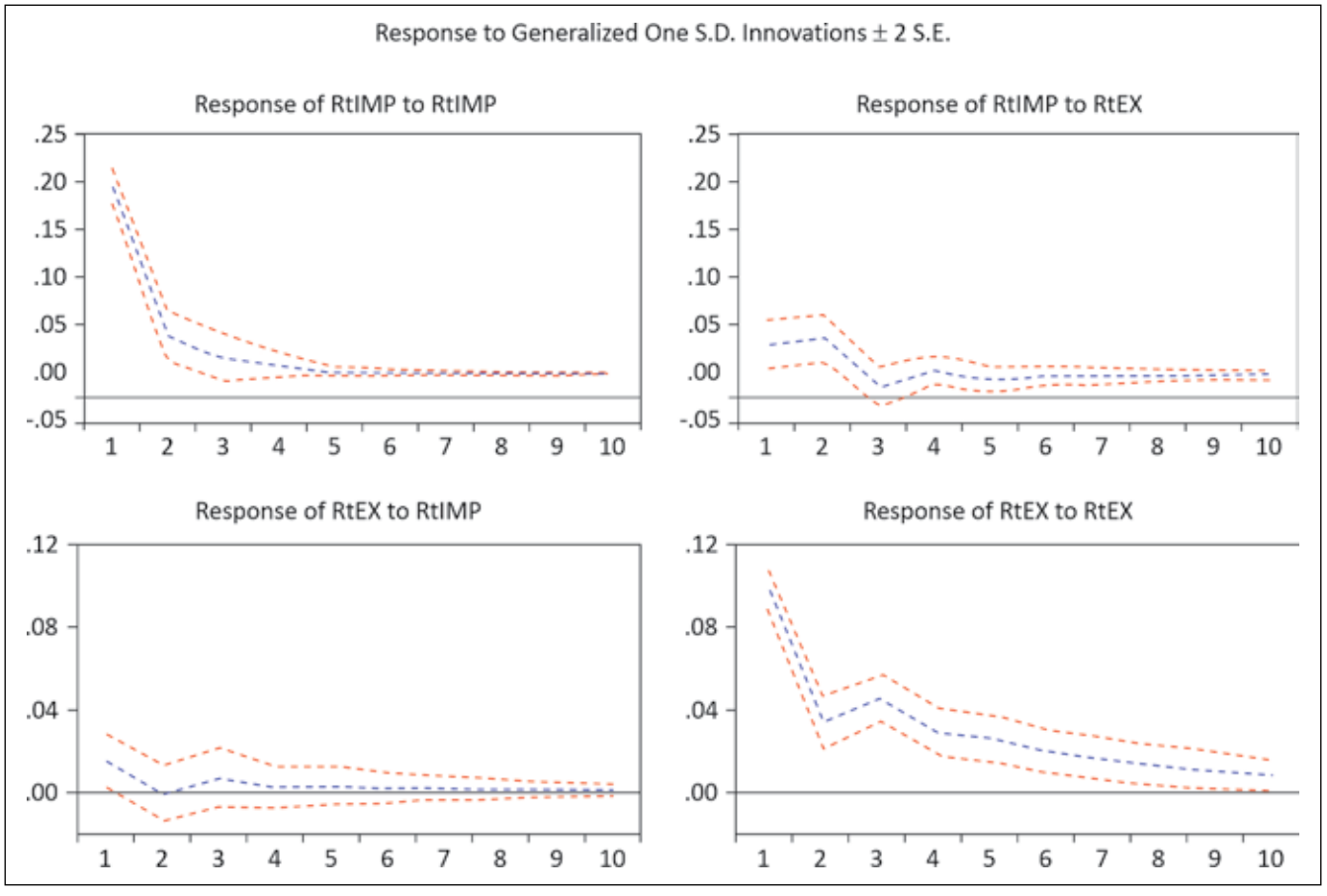
Table 5: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: RTIMP			
Excluded	Chi-sq	df	Prob.
RTEX	9.638045	2	0.0081
All	9.638045	2	0.0081
Dependent variable: RTEX			
Excluded	Chi-sq	df	Prob.
RTIMP	1.085732	2	0.5811
All	1.085732	2	0.5811

Impulse response functions have been considered to better understand the relationship between the two mis-invoicing series. Generalized Impulse Response functions have been used where a fixed order (e.g., Cholesky) is not required. Figure 45 presents the results related to Generalized impulse functions. The dotted line represents the confidence interval. The estimated shocks represented by the blue line that lies in between these two lines is the estimated shock. The estimated line always lies between the confidence intervals. If all the three lines lies above (below) 0 then it may be concluded that effect of shock on one variable to the other is positive (negative). If one of the lines lies above 0 and others below 0 then it may be concluded that there is no significant effect of the shock. The first panel in the graph shows the effect of shock on RTIMP on itself. It can be observed that the shocks decline over time and eventually converges to 0. Thus, the shock does not have any effect in the long run. The last panel shows the shock of RTEXP on itself. This effect persists for a longer period. However, it can be noticed that the effects are also decreasing over time.

Recall that in the Granger Causality tests it was observed that RTEX Granger causes RTIMP. From the GIRF plots it can be observed that a one-unit shock on RTEX has significant impacts on RTIMP for two consecutive periods. On the contrary the impacts of RTIMP on RTEX are much smaller. In fact, this effect is positive and significant only in period 1.

Figure 45: Generalized Impulse Response functions



Chapter

AGGREGATE REGRESSION ANALYSIS

6.1 Data and Methodology

The field survey discussed in the earlier chapters, enabled us to identify at a micro-level the variables that affect misreporting of trade and capital flows. The present chapter engages in a further detailed analysis of those variables. Two aggregate empirical exercises have been carried out to study the fluctuations in net misreported capital flows between India, on the one hand, and its partner countries separately, on the other. Those countries are the US, the UK, Germany, Italy, Japan and Singapore. In one exercise, using the export- import database from 1995 to 2019 the net misreported outflow [58](expressed in US$ millions) is considered as the dependent variable[59]. In the other exercise, based on the capital inflow-outflow data from 2010 to 2019 the net misreported inflow [60](expressed in US$ millions) is considered as the dependent variable. The idea that (X-M) is usually recorded as positive capital outflow in BOP accounting is used in the definition of the dependent variable in the first regression. The availability of limited mirror data for capital inflow and outflow restricts the time span for the latter analysis[61].

The explanatory variables in these models are interest rate parity condition, India's Non-traded to GDP ratio and market capitalization of listed foreign companies in foreign countries as a percentage of its GDP, as a business wealth indicator in the partner country. The role of interest rate parity is quite significant in context of net outflow. It is based on the idea of interest rate differential, which triggers the direction of movement of capital between countries. Countries with higher interest rate are always a favorable investment destination for capital. For India's Non-traded to GDP ratio, a spur in this ratio is expected to necessarily

[58] Net misreported outflow= [(True export- Reported export)- (True Import-Reported import)] = $(X - \tilde{X}) - (M - \tilde{M})$
[59] See Appendix 59. & Appendix 60.
[60] Net misreported inflow= [(True inflow - Reported inflow)- (True outflow - Reported outflow)]= $(I - \tilde{I}) - (O - \tilde{O})$
[61] See Appendix 61 & Appendix 62.

indicate an expansion beyond the traded sector and generate better financial prospects for capital inflow into India. However, market capitalization of listed foreign companies in foreign countries as a percentage of its GDP is indicative of the wealth of the concerned country. An increase in the percentage of market capitalization of listed companies increases the wealth of the foreign country and generates lucrative prospects for inflow and outflow of capital to and from such countries. It is also indicative of whether foreign stock markets are attractive destinations.

The variables have been defined as follows:

- Interest rate parity- $(1+i_d)$ - F/S * $(1+i_f)$

  where i_d- interest rate in India

  i_f- interest rate in the foreign country

  F – Forward rate

  S- Spot rate

- Non-traded to GDP ratio- In case of India-US, the Non- traded to GDP ratio is calculated as: 1- {(India's export to US + India's import from US)/India's GDP}
- Net misreported outflow= [(True export- Reported export)- (True Import-Reported import)] = $(X-\tilde{X}) - (M-\tilde{M})$

In case of India-US,

(i) True export= (India's reported export to US+US reported import from India)/2

True import= (India's reported import from US+US reported export to India)/2

(ii) The True export and true import can also be calculated using weights

- Net misreported inflow= [(True inflow - Reported inflow)- (True outflow - Reported outflow)] = $(I-\tilde{I}) - (O-\tilde{O})$

In case of India-US,

(iii) True inflow= (India's reported inflow from US+US reported outflow to India)/2

True outflow= (India's reported outflow to US+US reported inflow from India)/2

(iv) The True inflow and true outflow can also be calculated using weights

All the variables have been expressed in their natural logarithms. This analysis is based on both time series and cross section data, from 1995 through 2019 (for export-import database) for six partner countries of India (that is, the US, the UK, Germany, Italy, Japan and Singapore); and from 2010 through 2019 (for capital inflow-outflow database), for five partner countries of India (that is, the US, the UK, Germany, Italy and Japan). The regression analysis is, however, based on panel data. The requisite series are collected from the World Bank[62] and IMF DOTS.

6.2 Findings

We fit the following equations

$$\ln\left[\left(\mathrm{X}-\widetilde{\mathrm{X}}\right)-\left(M-\widetilde{M}\right)\right]=\alpha+\beta\ln(\text{Interest rate parity }_{it})+\gamma ln(\text{India's non traded to GDP ratio }_{it})$$
$$+\delta ln(\text{Market capitalization of listed foreign companies in a foreign country as a percentage of its GDP}_{it})+\epsilon_{it} \quad (10)$$

$$\ln\left[(I-\bar{I})-\left(O-\bar{O}\right)\right]=\alpha+\beta\ln(\text{Interest rate parity }_{it})+\gamma ln(\text{India's non traded to GDP ratio }_{it})$$
$$+\delta ln(\text{Market capitalization of listed foreign companies in a foreign countryas a percentage of its GDP}_{it})+\epsilon_{it} \quad (11)$$

In respect of the export-import database from 1995 till 2019 (represented in equation (10)) we consider net misreported outflow as the dependent variable. The series of the explanatory variables are mostly stationary in nature. However, the series of Non-traded to GDP ratio is stationary at first difference. The Hausman test applied to the dataset shows a highly significant value of Chi-square statistic and thus suggests that fixed effect regression model is appropriate in this case. The Wooldridge test for autocorrelation in panel data returns a p-value of 0.72, which suggests that there is no autocorrelation. Therefore, the dataset does not suffer from autocorrelation. Heteroskedasticity in residuals is always a potential problem. Since the estimations are made using the 'robust estimates' in the Stata software, this problem is duly accounted for. Our estimation yields F-value of 6.62, which is significant at a p-value of 0.0342[63]. This indicates that there is a very significant relationship among the variables that are considered in the model.

The coefficient of the interest rate parity bears a positive estimated coefficient, namely 0.7933, at significance level more than 0.053. This indicates a significant direct relationship between interest rate premium and India's net misreported outflow. It should be noted at

[62] https://data.worldbank.org/
[63] See Appendix 72.

this juncture that the values of India's reported exports and imports are generally less than that of its actual exports and imports[64]. On the whole, net misreported capital outflow from India increases with an increase in interest rate parity. Higher domestic interest rate may reduce the reported capital outflow even if there is no change in actual capital outflow. Underreporting inflow is less profitable now. Hence, the difference between actual and reported outflow increases.

The coefficient of Non-traded to GDP ratio is negative in sign, namely -123.405 at a significance level more than 0.053. This indicates a significant inverse relationship between India's Non-traded to GDP ratio and its net misreported outflow.

An increase in Non-traded to GDP ratio results in an expansion beyond the traded sector, thereby attracting capital inflow into India. In this favorable financial situation, the true and reported capital outflow (inflow) both must decline (rise). Again, it is possible that it is the reported outflow that is declining as misreporting is less lucrative now but that is dominated by a drop in actual outflow explaining the negative outcome. Another issue might be that higher income within the country is partly offloaded abroad increasing reported outflow. A mix of all these can be reasons for such a behavior.

The positive coefficient of market capitalization of listed foreign companies in foreign countries as a percentage of its GDP (namely 1.150) has a t-statistic which is significant at 0.120. This reflects that market capitalization of listed foreign companies exert a positive impact on India's net misreported outflow. An increase in market capitalization of foreign companies in a foreign country as a percentage of its GDP, raises its wealth (or income). They might be interested in investing in India. That is, India's reported outflow falls on account of an increase in the percentage of market capitalization of foreign companies in foreign countries[65].

In respect of the capital inflow-outflow database from 2010 through 2019 (represented in equation (11)) we consider net misreported outflow as the dependent variable. The variable interest rate parity is stationary at first difference, and the remaining variables are stationary at levels. Here, with a limited dataset the study simply tries to show some directional movements of the variables. However, the fixed effect regression model yields F-value of

[64] The Analytical example in 5.1. suggests that the basic idea is that the agent under invoice export to finance import and foreign investment to save interest and other regulatory transaction costs. That is,

$$\widetilde{M}_t = M_t - \lambda(X_t - \widetilde{X}_t)$$

$$\widetilde{F}_t = F_t - (1-\lambda)(X_t - \widetilde{X}_t)$$

[65] See Appendix 63. & Appendix 64.

9.14, which is significant at a p-value of 0.0001. This indicates that there is a very significant relationship among the variables that are considered in the model[66]. Our estimation results show a negative coefficient (that is, -0.0008) of interest rate parity, and positive coefficients (that is, 108.55 and 1.548 respectively) for Non-traded to GDP ratio and market capitalization of listed foreign companies in foreign countries as a percentage of its GDP. The coefficient of interest rate parity is insignificant at a p-value of 0.99. Whereas the remaining coefficients are significant at p-values of, 0.08 and 0.012 respectively.

The Hausman test applied to the dataset shows an insignificant value of Chi-square statistic which is indicative of the random effect regression model being the best suitable approach. The Wooldridge test for autocorrelation in panel data returns a p-value of 0.02, which suggests the presence of autocorrelation. The autocorrelation in the dataset is then corrected and the regression is run to get robust results. Our estimation yields Wald Chi-square value of 11.1 which is significant at a p-value of 0.01, thereby indicating a strong relationship among the variables used in the model. The regression analysis results in a negative coefficient (namely -0.02) of interest rate parity which is insignificant at 0.95 approximately. At a higher value of interest rate premium, by the same argument as before, reported inflow will rise and hence negative relationship exists here between interest rate and misreported inflow.

The coefficient of Non-traded to GDP ratio bears a positive estimated coefficient namely 55.834 approximately and is significant at 0.1. An increase in India's Non-traded to GDP ratio implies an expansion beyond the traded sector. Such expansion reflects better financial prospects and attracts inflow of capital into India. In this case, the actual inflow is more sensitive than reported inflow. The gap between actual and reported inflow becomes higher. However, the factors affecting outflow of capital are not active in this case. Therefore, India's net misreported inflow increases, at a higher level of Non-traded to GDP ratio.

The positive coefficient of market capitalization of listed foreign companies in foreign countries as a percentage of its GDP (namely 1.85) has a t-statistic which is significant at 0.002. This suggests that market capitalization of listed foreign companies exerts a significant favorable impact on the net misreported inflow into India. Higher percentage of market capitalization in foreign countries increases the wealth in those countries. Higher wealth results in increasing outflow of capital from such countries. That is, inflow of capital into India increases. In this case the actual inflow in India is sensitive to the wealth effect, thereby raising the gap between India's actual and reported inflow. The overall effect is an increase in net misreported inflow into India on account of higher percentage of market capitalization of

[66] See Appendix 73.

foreign companies in foreign countries[67]. But the shortage of data does impact the strength of the regression analysis for capital flows.

The role of reported capital flows is quite relevant in the interpretations of a few explanatory variables used in the regression analysis. This is like the argument used in (Marjit, Dasgupta and Mitra, 2000), where devaluation of currency increases the official (that is, reported) export growth of India by reducing the black-market premium. However, this spur in official export growth wanes out after some period as official export growth converges to the actual export growth. Here also the shocks might sometimes affect the reported segment much more than or along with the actual segment and hence policy outcomes can be misinterpreted. It is not about how exactly it can affect the deviation between and actual and reported, but the potential impact on reported outcome and that is key to the measurement error of critical variables.

[67] See Appendix 65. & Appendix 66.

Chapter

7

CONCLUSION AND POLICY TAKEAWAYS

The significance of the study is multidimensional. Apart from its contribution to the frontier of academic literature on international trade and finance, this provides a host of policy insights and guides the government towards a more effective measurement of the external components in GDP.

The Fundamental Policy prescription seems to be that policy and other parameters can affect the reported segment of Official Statistics while true figures might or might not move significantly. Any prediction on the basis of reported statistics could possibly lead to incorrect inferences.

However, the following specific policy relevant actions are important.

First, the study pinpoints the perceptions and experiences of actual traders regarding policy loopholes which may provide a guideline to the regulatory authorities. Generally speaking, going by the information provided by the traders of big cities, except Chennai, the extent of misreporting is roughly about 5% to 10% of total trade which corroborates the aggregate evidence. The case of Chennai is an interesting deviation. Either it is a pure regional variation of reality, or it is more of a truth telling problem. As our record shows India-Singapore trade does show breakaway trend from other countries which needs to be seriously investigated.

Second, the study shows that it is export misreporting which causes import misreporting. One could explain this as a financing issue of imports and as unrecorded foreign investment by Indians. Thus, a clear guideline will be to trace the gap in the export front. Variations in relative interest rates and expected depreciations of currency will affect such incentives.

Third, BOT or BOP measurement is a critical issue and so is the true contribution of the external sector to the GDP. This is a similar problem as accounting for the contribution of

informal sector in national income. The study proposes simple but meaningful methods by which the reported statistics should be mended for better measurement of these critical macro variables.

Fourth, it will confer great benefits if the Government cares to develop a “Mirror Data Base” through bilateral channels at least with the major trading partners. This will help in forecasting trade and macro figures. Unfortunately, this is not the case in most of the countries. But that seems to be critical in tracking “Unrecorded” capital flows. In fact, the study has shown why “Trade” may not be the only channel of interest for policy making. Trade Misreporting which leads to BOT Misreporting is a cause for capital inflows and outflows. Data shows that there may have been remarkably high amount of revenue loss from Import under-invoicing. However, trade account transactions should not be overemphasized to locate the unrecorded capital flows. The share of the non-traded sector in GDP is also considered as an inducement for illegitimate flows. Thus, government should adopt policies to check the misreporting of trade statistics and also pursue adequate fiscal and monetary policies to check illegitimate capital flows through the non-traded sector.

The study has already provided detailed description of what have been done in this project. The core of the idea and the findings point out that it is crucial that the governments must undertake bilateral initiatives to maintain official Mirror Data at both ends of transactions to monitor the trends in unrecorded capital flows which might generate in both traded and non-traded segments. This will not only help better revenue projections but also provide better information about National Income data. Appendix 71 shows the extent of potential revenue loss from Import under-invoicing is remarkably high. Hence, it needs very serious attention.

APPENDIX

Appendix 1: Freedom house index of Developed Countries

Freedom Index	Countries	India's export in 2019 (in US$ million)	India's import in 2019 (in US$ million)	Total imports (in US$ million)	% Of exports	% Of imports
85 free	Argentina	631.24	2,167.61	479,894.38	0.194309595	0.451684806
97 free	Australia	2,955.50	10,573.69	479,894.38	0.90976809	2.203336909
98 free	Canada	2,897.34	3,926.30	479,894.38	0.891865159	0.818159196
92 free	Cabo Verde	2.19	2.21	479,894.38	0.00067413	0.000460518
90 free	Chile	877.09	1,140.76	479,894.38	0.269987648	0.23771064
91 free	Costa Rica	131.32	51.62	479,894.38	0.040423193	0.010756534
91 free	Czech Rep	467.40	266.46	479,894.38	0.143876029	0.055524718
93 free	Dominica	2.33	0.27	479,894.38	0.000717225	5.62624E-05
94 free	Iceland	19.05	10.02	479,894.38	0.00586401	0.002087959
89 free	Mauritius	782.05	26.65	479,894.38	0.24073224	0.005553305
97 free	New Zealand	383.77	557.84	479,894.38	0.118132871	0.116242245
100 free	Norway	428.07	621.54	479,894.38	0.131769388	0.129515999
93 free	Taiwan	1,637.40	4,194.20	479,894.38	0.504027836	0.87398398
50 partly free	Singapore	10,792.90	14,902.17	479,894.38	3.32229268	3.105302046
94 free	UK	8,805.82	6,880.21	479,894.38	2.710625626	1.433692555
86 free	US	54,221.27	34,951.02	479,894.38	16.69050287	7.283065078
-	EU	47,225.24	43,669.25	479,894.38	14.53697052	9.099762744
96 free	Japan	4,817.74	12,746.15	479,894.38	1.483006637	2.656032354
89 free	Mauritius	782.05	26.65	479,894.38	0.24073224	0.005553305
94 free	Germany	8,571.39	12,912.00	479,894.38	2.638462902	2.690592042
90 free	France	5,432.79	4,125.69	479,894.38	1.672332593	0.859707922
89 free	Italy	5,188.63	4,708.02	479,894.38	1.59717476	0.981053373
India's total exports to the World in 2019 (in US$ million)		324,863.01				

Appendix 2: India's Rate of Misreporting Export to US

Year	India's exports to US in fob (in US$ million)	US imports from India (in US$ million)	US total imports in fob (in US$ million)	India's export to US in fob - US import from India in fob (in US$ million)	Rate of India's export misreporting
1980	967.03	1,209.50	1141.037736	-174.01	-0.152499545
1981	769.12	1,324.90	1249.90566	-480.79	-0.384657559
1982	978.99	1,522.20	1436.037736	-457.05	-0.318268502
1983	1,296.12	2,333.80	2201.698113	-905.58	-0.411308218
1984	1,450.68	2,736.90	2581.981132	-1,131.30	-0.438151421
1985	1,563.34	2,478.50	2338.207547	-774.86	-0.3313925
1986	1,777.69	2,464.60	2325.09434	-547.41	-0.235434958
1987	2,114.01	2,725.40	2571.132075	-457.13	-0.177791415
1988	2,513.05	3,153.40	2974.90566	-461.86	-0.155250523
1989	4,423.51	3,551.03	3350.027358	1,073.48	0.320439366
1990	2,693.68	3,421.40	3227.735849	-534.05	-0.165456919
1991	2,922.27	3,429.10	3235	-312.73	-0.096671097
1992	3,533.24	4,065.60	3835.471698	-302.23	-0.078799032
1993	3,885.08	4,794.10	4522.735849	-637.66	-0.1409895
1994	4,660.50	5,663.10	5342.54717	-682.04	-0.127662625
1995	5,304.65	6,090.60	5745.849057	-441.2	-0.076785703
1996	6,184.49	6,528.40	6158.867925	25.62	0.004160482
1997	6,742.38	7,711.90	7275.377358	-533	-0.073261129
1998	7,102.75	8,658.70	8168.584906	-1,065.83	-0.130479749
1999	8,099.95	9,598.10	9054.811321	-954.86	-0.105453475
2000	9,083.25	11,034.30	10409.71698	-1,326.47	-0.127425845
2001	8,318.85	10,290.50	9708.018868	-1,389.17	-0.143095302
2002	10,308.34	12,449.60	11744.90566	-1,436.56	-0.122313596
2003	11,363.89	13,752.20	12973.77358	-1,609.89	-0.124087776
2004	12,839.27	16,436.70	15506.32075	-2,667.05	-0.171997431
2005	16,475.21	19,875.10	18750.09434	-2,274.89	-0.121326638
2006	18,515.46	22,992.70	21691.22642	-3,175.76	-0.146407654
2007	20,285.37	25,113.60	23692.07547	-3,406.70	-0.143790897
2008	22,418.45	26,931.50	25407.07547	-2,988.63	-0.117629747

Year	India's exports to US in fob (in US$ million)	US imports from India (in US$ million)	US total imports in fob (in US$ million)	India's export to US in fob - US import from India in fob (in US$ million)	Rate of India's export misreporting
2009	18,280.02	22,043.20	20795.4717	-2,515.45	-0.120961544
2010	23,611.47	30,706.80	28968.67925	-5,357.21	-0.184931151
2011	33,359.49	36,154.50	34108.01475	-748.53	-0.021945809
2012	36,195.99	40,512.64	38219.47551	-2,023.48	-0.052943815
2013	38,710.93	41,808.51	39441.98937	-731.06	-0.018534943
2014	42,495.62	45,244.02	42683.03768	-187.42	-0.004390886
2015	40,400.33	44,741.39	42208.859	-1,808.53	-0.042847158
2016	41,950.54	45,998.44	43394.7531	-1,444.21	-0.033280781
2017	46,065.27	48,631.29	45878.57203	186.7	0.004069394
2018	51,614.04	54,407.47	51327.80529	286.23	0.005576601
2019	54,221.27	57,665.48	54401.39189	-180.12	-0.003310979

Appendix 3: India's Rate of Misreporting Imports from US

Year	India's imports from US in CIF (in US$ million)	US exports to India (in US$ million)	US exports in CIF (in US$ million)	India imports from US in CIF-US export to India in CIF (in US$ million)	Rate of India's import misreporting
1980	1,865.21	1,689.30	1790.658	74.55	0.041633857
1981	1,370.10	1,747.60	1852.456	-482.36	-0.260387291
1982	1,562.23	1,598.50	1694.41	-132.18	-0.078008878
1983	1,704.06	1,827.90	1937.574	-233.52	-0.12052021
1984	1,481.74	1,569.70	1663.882	-182.14	-0.109467794
1985	1,769.89	1,641.90	1740.414	29.47	0.016934949
1986	1,429.76	1,536.20	1628.372	-198.61	-0.121967972
1987	1,503.12	1,463.60	1551.416	-48.3	-0.031129767
1988	1,855.79	2,490.00	2639.4	-783.61	-0.296889445
1989	2,309.52	2,463.18	2610.97504	-301.45	-0.115454997
1990	2,634.84	2,486.40	2635.584	-0.74	-0.000282052
1991	1,891.19	2,002.70	2122.862	-231.67	-0.109132388
1992	2,258.25	1,914.40	2029.264	228.99	0.112843627
1993	2,170.66	2,767.30	2933.338	-762.68	-0.260003366
1994	2,431.74	2,296.30	2434.078	-2.34	-0.000959986
1995	3,343.91	3,295.80	3493.548	-149.64	-0.042832673
1996	3,186.86	3,317.90	3516.974	-330.12	-0.093863675
1997	3,709.15	3,615.60	3832.536	-123.39	-0.032194349
1998	3,659.60	3,544.80	3757.488	-97.89	-0.026051447
1999	3,582.90	3,666.70	3886.702	-303.8	-0.07816447
2000	3,152.25	3,652.70	3871.862	-719.61	-0.185856831
2001	3,058.88	3,764.20	3990.052	-931.17	-0.233372181
2002	4,129.41	4,098.00	4343.88	-214.47	-0.049372876
2003	4,890.38	4,986.40	5285.584	-395.2	-0.074770113
2004	5,981.21	6,095.00	6460.7	-479.49	-0.074217159
2005	8,848.42	7,957.90	8435.374	413.04	0.048965357
2006	11,172.88	10,091.30	10696.778	476.11	0.044509325
2007	18,708.40	17,592.40	18647.944	60.46	0.003242191

Year	India's imports from US in CIF (in US$ million)	US exports to India (in US$ million)	US exports in CIF (in US$ million)	India imports from US in CIF- US export to India in CIF (in US$ million)	Rate of India's import misreporting
2008	18,628.01	18,666.40	19786.384	-1,158.37	-0.058543906
2009	16,643.61	16,462.40	17450.144	-806.53	-0.046219216
2010	19,135.63	19,222.80	20376.168	-1,240.53	-0.060881627
2011	23,454.08	21,542.18	22834.71544	619.36	0.027123819
2012	25,141.62	22,105.74	23432.08213	1,709.54	0.072957194
2013	23,479.82	21,811.35	23120.03238	359.79	0.015561902
2014	21,234.25	21,607.50	22903.95287	-1,669.71	-0.072900299
2015	20,701.16	21,529.61	22821.38896	-2,120.22	-0.092905167
2016	20,574.52	21,688.96	22990.30049	-2,415.78	-0.105078273
2017	24,064.04	25,700.46	27242.48927	-3,178.45	-0.116672498
2018	33,003.03	33,120.08	35107.28468	-2,104.25	-0.059937836
2019	34,951.02	34,409.59	36474.16505	-1,523.15	-0.041759559

Appendix 4: India's Rate of Misreporting Exports to UK

Year	India export to UK in fob (in US$ millions)	UK import from India (in US$ millions)	UK import in fob (in US$ millions)	India export to UK in fob-UK import from India in fob (in US$ millions)	Rate of India's export misreporting
1980	528.75	734	692.4528302	-163.7	-0.236410082
1981	385.05	589.9	556.509434	-171.46	-0.308097983
1982	449.77	672.2	634.1509434	-184.38	-0.29075824
1983	461.16	555.2	523.7735849	-62.61	-0.119544724
1984	538.03	767.4	723.9622642	-185.93	-0.256827208
1985	433.21	553.7	522.3584906	-89.15	-0.170660109
1986	512.38	650	613.2075472	-100.83	-0.164431477
1987	708.37	883.2	833.2075472	-124.84	-0.149831168
1988	849.12	1,006.83	949.8366206	-100.72	-0.106035731
1989	1,200.98	1,147.99	1083.00603	117.98	0.108934731
1990	1,109.02	1,426.88	1346.114893	-237.1	-0.17613535
1991	1,136.74	1,374.04	1296.266246	-159.53	-0.1230675
1992	1,333.19	1,512.98	1427.336078	-94.14	-0.065956239
1993	1,265.20	1,634.82	1542.28349	-277.08	-0.179657465
1994	1,532.92	1,973.79	1862.067837	-329.15	-0.176763514
1995	1,880.77	2,266.17	2137.892063	-257.12	-0.120268964
1996	2,011.01	2,513.83	2371.533701	-360.53	-0.152022951
1997	2,120.18	2,659.82	2509.268388	-389.09	-0.155062484
1998	1,928.38	2,408.47	2272.146204	-343.77	-0.151298012
1999	1,990.33	2,404.55	2268.44786	-278.12	-0.122604916
2000	2,233.05	2,539.76	2396.001117	-162.95	-0.068009616
2001	2,165.65	2,650.64	2500.601648	-334.95	-0.133949695
2002	2,412.84	2,776.75	2619.580173	-206.74	-0.078921416
2003	2,892.29	3,289.13	3102.953562	-210.66	-0.067890662
2004	3,414.68	4,207.32	3969.168899	-554.49	-0.13969926
2005	4,714.85	5,050.61	4764.730599	-49.88	-0.010468116
2006	5,478.64	5,623.72	5305.396183	173.24	0.032653518
2007	6,428.42	7,295.09	6882.163084	-453.74	-0.065930234

Year	India export to UK in fob (in US$ millions)	UK import from India (in US$ millions)	UK import in fob (in US$ millions)	India export to UK in fob-UK import from India in fob (in US$ millions)	Rate of India's export misreporting
2008	6,989.08	7,685.85	7250.797584	-261.72	-0.036095355
2009	6,182.83	6,367.70	6007.261155	175.57	0.029225641
2010	6,421.50	8,027.58	7573.190369	-1,151.69	-0.152074642
2011	8,788.65	9,495.58	8958.093843	-169.44	-0.0189151
2012	8,270.50	8,900.06	8396.287245	-125.79	-0.014981428
2013	9,624.96	9,034.91	8523.496688	1,101.47	0.12922726
2014	9,676.97	9,891.32	9331.43599	345.54	0.037029222
2015	8,902.02	8,783.07	8285.915352	616.11	0.074355726
2016	9,022.20	8,137.57	7676.95544	1,345.24	0.17523124
2017	9,026.43	9,023.45	8512.685823	513.74	0.060350421
2018	9,782.99	9,473.97	8937.707146	845.28	0.094574911
2019	8,805.82	9,670.18	9122.813587	-316.99	-0.034747349

Appendix 5: India's Rate of Misreporting Imports from UK

Year	India imports from UK in CIF (in US$ millions)	UK export to India (in US$ millions)	UK export in CIF (in US$ millions)	India imports from UK in CIF- UK export to India in CIF (in US$ millions)	Rate of India's import misreporting
1980	953.53	1,229.40	1303.164	-349.63	-0.268296239
1981	790.71	1,287.80	1365.068	-574.36	-0.420754131
1982	976.21	1,415.90	1500.854	-524.64	-0.34956325
1983	927.44	1,216.30	1289.278	-361.84	-0.280653356
1984	1,001.91	1,043.10	1105.686	-103.77	-0.09385554
1985	927.15	1,158.90	1228.434	-301.28	-0.245257713
1986	1,176.46	1,386.00	1469.16	-292.7	-0.199226306
1987	1,447.19	1,782.40	1889.344	-442.15	-0.234023231
1988	1,660.22	1,979.25	2098.010087	-437.79	-0.2086692
1989	1,650.13	2,263.94	2399.779113	-749.65	-0.312382333
1990	1,664.49	2,237.25	2371.487115	-707	-0.298123641
1991	1,185.53	1,804.83	1913.122098	-727.59	-0.380317649
1992	1,393.09	1,667.64	1767.69347	-374.6	-0.211915761
1993	1,458.59	1,695.05	1796.748724	-338.16	-0.18820776
1994	1,470.63	2,008.59	2129.104292	-658.48	-0.309274711
1995	1,683.06	2,654.94	2814.236407	-1,131.18	-0.401947898
1996	1,947.86	2,658.55	2818.066999	-870.2	-0.308794865
1997	2,366.38	2,584.02	2739.064245	-372.69	-0.136064441
1998	2,577.18	2,080.30	2205.119982	372.06	0.168723253
1999	2,685.75	2,349.60	2490.575862	195.17	0.078365065
2000	3,052.78	3,598.66	3814.581419	-761.81	-0.199709047
2001	2,732.62	2,936.92	3113.135169	-380.52	-0.122230308
2002	2,723.57	2,822.79	2992.152661	-268.58	-0.089761563
2003	3,120.00	3,854.40	4085.662073	-965.66	-0.236353705
2004	3,382.09	4,198.25	4450.143116	-1,068.05	-0.240003348
2005	3,839.27	5,084.37	5389.431207	-1,550.16	-0.287629204
2006	4,113.43	4,774.50	5060.969555	-947.54	-0.187224396
2007	4,758.44	5,501.72	5831.818622	-1,073.38	-0.184056349
2008	6,250.96	7,082.61	7507.562309	-1,256.60	-0.167377871

Year	India imports from UK in CIF (in US$ millions)	UK export to India (in US$ millions)	UK export in CIF (in US$ millions)	India imports from UK in CIF- UK export to India in CIF (in US$ millions)	Rate of India's import misreporting
2009	3,978.86	4,337.99	4598.267468	-619.41	-0.134705174
2010	5,181.00	5,913.15	6267.937897	-1,086.94	-0.173412936
2011	7,475.92	8,366.35	8868.329149	-1,392.41	-0.157009532
2012	6,488.51	6,682.21	7083.146025	-594.63	-0.083950494
2013	6,500.78	7,461.09	7908.753062	-1,407.98	-0.17802763
2014	4,785.48	6,132.12	6500.045797	-1,714.56	-0.263777351
2015	5,384.15	5,869.54	6221.715957	-837.57	-0.134620214
2016	3,865.69	4,377.13	4639.762493	-774.07	-0.166834915
2017	4,333.71	5,233.39	5547.389431	-1,213.68	-0.218783889
2018	7,047.64	6,582.98	6977.963302	69.68	0.009985249
2019	6,880.21	5,724.99	6068.489524	811.72	0.133759887

Appendix 6: India's Rate of Misreporting Exports to EU

Year	India exports to EU in fob (in US$ millions)	EU imports from India (in US$ millions)	EU imports in fob (in US$ millions)	India exports to EU in fob-EU import from India in fob (in US$ millions)	Rate of India's export misreporting
1980	1,646.44	2,076.43	1958.893396	-312.45	-0.159505054
1981	1,109.16	1,856.39	1751.307547	-642.15	-0.366667493
1982	1,413.01	2,453.75	2314.855832	-901.85	-0.389590312
1983	1,382.50	1,758.40	1658.871589	-276.37	-0.166603761
1984	1,454.81	1,904.86	1797.033281	-342.22	-0.190437914
1985	1,333.62	2,012.85	1898.918101	-565.3	-0.297695357
1986	1,709.86	2,082.03	1964.182306	-254.32	-0.129478355
1987	2,414.84	2,850.68	2689.323398	-274.48	-0.102062637
1988	2,970.43	3,371.10	3180.283	-209.85	-0.06598532
1989	3,625.92	3,912.57	3691.10247	-65.19	-0.017660704
1990	4,032.89	4,885.51	4608.968635	-576.08	-0.12499084
1991	4,065.00	5,026.44	4741.921576	-676.92	-0.14275322
1992	4,534.66	5,201.49	4907.068486	-372.41	-0.075892366
1993	4,652.61	6,087.83	5743.237557	-1,090.63	-0.189897895
1994	5,287.58	7,125.87	6722.517448	-1,434.94	-0.213452274
1995	6,559.69	8,554.49	8070.275977	-1,510.59	-0.187178974
1996	6,676.26	9,053.23	8540.78108	-1,864.52	-0.218307959
1997	7,126.33	8,674.94	8183.909947	-1,057.58	-0.129227344
1998	7,295.60	9,112.60	8596.789528	-1,301.19	-0.151357611
1999	7,530.08	8,890.77	8387.517046	-857.44	-0.102228352
2000	8,159.55	9,328.80	8800.752975	-641.2	-0.07285774
2001	8,052.87	9,438.00	8903.773038	-850.9	-0.095566141
2002	9,009.91	10,132.40	9558.869942	-548.96	-0.057429445
2003	10,980.78	12,638.74	11923.34413	-942.56	-0.079051809
2004	13,194.30	16,204.72	15287.46792	-2,093.17	-0.136920324
2005	17,343.60	18,746.61	17685.47837	-341.88	-0.019330873
2006	20,516.17	22,766.78	21478.09549	-961.92	-0.044786195
2007	26,245.27	29,216.78	27562.99893	-1,317.73	-0.047807842
2008	33,845.38	35,961.67	33926.10756	-80.73	-0.002379599

Year	India exports to EU in fob (in US$ millions)	EU imports from India (in US$ millions)	EU imports in fob (in US$ millions)	India exports to EU in fob-EU import from India in fob (in US$ millions)	Rate of India's export misreporting
2009	28,818.38	29,104.22	27456.80902	1,361.57	0.049589533
2010	35,210.10	36,391.20	34331.31881	878.78	0.025597181
2011	46,423.03	46,137.45	43525.89611	2,897.13	0.066561068
2012	41,447.22	39,344.20	37117.16766	4,330.05	0.116658999
2013	42,222.52	39,876.12	37618.98263	4,603.54	0.122372773
2014	41,780.70	39,511.24	37274.75358	4,505.95	0.120884682
2015	35,991.64	35,026.72	33044.0738	2,947.57	0.089201105
2016	37,173.91	35,355.23	33353.98834	3,819.92	0.114526746
2017	42,204.39	40,559.76	38263.9233	3,940.47	0.102981251
2018	47,662.65	44,848.02	42309.45482	5,353.20	0.126524797
2019	47,225.24	44,372.18	41860.55096	5,364.69	0.128156198

Appendix 7: India's Rate of Misreporting Imports from EU

Year	India imports from EU in CIF (in US$ millions)	EU exports to India (in US$ millions)	EU exports in CIF (in US$ millions)	India imports from EU in CIF-EU exports to India in CIF (in US$ millions)	Rate of India's import misreporting
1980	2,671.62	2,531.63	2683.53098	-11.91	-0.004438548
1981	2,876.90	3,092.05	3277.575409	-400.68	-0.122247503
1982	3,054.85	3,068.78	3252.906917	-198.06	-0.060886449
1983	2,686.63	2,694.97	2856.666278	-170.04	-0.05952273
1984	3,365.93	3,122.54	3309.895741	56.04	0.016930373
1985	3,740.39	3,693.08	3914.665852	-174.27	-0.044517647
1986	4,132.42	4,937.27	5233.505757	-1,101.08	-0.210391013
1987	4,687.03	5,570.04	5904.241681	-1,217.21	-0.206158058
1988	5,204.87	5,738.79	6083.120172	-878.25	-0.144374246
1989	5,185.47	6,392.13	6775.653171	-1,590.18	-0.234690799
1990	6,412.70	6,155.35	6524.674336	-111.97	-0.017161589
1991	4,795.77	5,181.65	5492.549626	-696.78	-0.126859414
1992	6,014.22	5,470.43	5798.652227	215.57	0.03717586
1993	5,737.55	6,256.26	6631.632023	-894.08	-0.134820346
1994	5,505.45	7,111.38	7538.067879	-2,032.62	-0.269647643
1995	7,600.90	10,079.78	10684.56355	-3,083.66	-0.28860922
1996	8,360.23	10,269.88	10886.07364	-2,525.84	-0.232024924
1997	8,484.40	9,210.06	9762.661609	-1,278.26	-0.130933721
1998	8,254.68	8,311.52	8810.214462	-555.54	-0.063056293
1999	8,340.75	8,842.69	9373.250874	-1,032.50	-0.110153978
2000	7,678.30	9,026.76	9568.368137	-1,890.07	-0.197532966
2001	7,507.71	8,676.75	9197.352704	-1,689.64	-0.183709388
2002	9,491.71	10,706.74	11349.14653	-1,857.44	-0.163662995
2003	11,401.43	12,672.75	13433.11285	-2,031.68	-0.151244325
2004	14,074.61	17,168.78	18198.90262	-4,124.30	-0.226623283
2005	20,511.88	21,302.28	22580.42173	-2,068.54	-0.091607548
2006	24,816.09	25,722.68	27266.04453	-2,449.96	-0.089853723
2007	31,551.18	34,634.73	36712.81689	-5,161.64	-0.140594947
2008	37,487.32	39,119.25	41466.40082	-3,979.08	-0.095959095

Year	India imports from EU in CIF (in US$ millions)	EU exports to India (in US$ millions)	EU exports in CIF (in US$ millions)	India imports from EU in CIF-EU exports to India in CIF (in US$ millions)	Rate of India's import misreporting
2009	32,985.15	34,125.14	36172.6438	-3,187.49	-0.088118877
2010	37,298.21	40,422.41	42847.75919	-5,549.55	-0.129517862
2011	48,455.67	48,206.31	51098.69023	-2,643.03	-0.051723932
2012	47,749.09	42,959.26	45536.81592	2,212.28	0.048582177
2013	44,591.24	40,245.01	42659.71342	1,931.53	0.045277547
2014	43,797.32	41,120.24	43587.45677	209.87	0.004814876
2015	38,870.68	36,382.05	38564.97136	305.71	0.007927021
2016	36,733.94	37,393.56	39637.17152	-2,903.24	-0.073245276
2017	40,951.97	41,883.94	44396.97674	-3,445.01	-0.077595525
2018	45,969.42	47,308.69	50147.20787	-4,177.79	-0.083310478
2019	43,669.25	42,795.95	45363.70612	-1,694.46	-0.037352683

Appendix 8: India's Rate of Misreporting Exports to Japan

Year	India exports to Japan in fob (in US$ millions)	Japan imports from India (in US$ millions)	Japan imports in fob (in US$ millions)	India export to Japan in fob-Japan import from India in fob (in US$ millions)	Rate of India's export misreporting
1980	775.83	1,019.80	962.0754717	-186.25	-0.193587174
1981	557.07	1,053.30	993.6792453	-436.61	-0.4393865
1982	909.6	1,120.10	1056.698113	-147.1	-0.139204228
1983	834.23	1,131.00	1066.981132	-232.75	-0.218140236
1984	826.65	1,132.90	1068.773585	-242.12	-0.226541697
1985	920.61	1,197.40	1129.622642	-209.01	-0.185028367
1986	1,017.31	1,309.20	1235.09434	-217.79	-0.17633185
1987	1,198.49	1,545.90	1458.396226	-259.91	-0.178215215
1988	1,420.58	1,805.80	1703.584906	-283	-0.166123159
1989	2,136.67	1,963.41	1852.273674	284.4	0.153538502
1990	1,656.00	2,074.75	1957.309721	-301.31	-0.153939914
1991	1,653.96	2,185.65	2061.931204	-407.97	-0.197856846
1992	1,522.83	2,035.10	1919.90986	-397.08	-0.206823397
1993	1,656.54	2,286.90	2157.448924	-500.91	-0.232177232
1994	1,923.53	2,650.21	2500.195283	-576.67	-0.230649349
1995	2,130.40	2,916.81	2751.710377	-621.31	-0.225790615
1996	2,077.97	2,852.01	2690.571682	-612.6	-0.227684379
1997	1,925.35	2,657.73	2507.292999	-581.94	-0.232100117
1998	1,713.63	2,177.24	2054.004312	-340.38	-0.165714994
1999	1,677.05	2,246.01	2118.880726	-441.83	-0.20852081
2000	1,767.23	2,636.70	2487.452385	-720.23	-0.28954419
2001	1,532.13	2,212.04	2086.831863	-554.7	-0.26580903
2002	1,775.63	2,090.14	1971.831182	-196.2	-0.099503131
2003	1,747.97	2,173.97	2050.913898	-302.94	-0.147710664
2004	1,910.52	2,611.30	2463.494422	-552.98	-0.224469285
2005	2,392.92	3,193.71	3012.932438	-620.01	-0.205783825
2006	2,767.34	4,117.08	3884.039006	-1,116.69	-0.287508449
2007	3,606.01	4,158.98	3923.569513	-317.56	-0.080935686
2008	3,618.34	5,270.30	4971.984999	-1,353.65	-0.272254715

Year	India exports to Japan in fob (in US$ millions)	Japan imports from India (in US$ millions)	Japan imports in fob (in US$ millions)	India export to Japan in fob-Japan import from India in fob (in US$ millions)	Rate of India's export misreporting
2009	3,186.04	3,729.28	3518.189099	-332.15	-0.09441047
2010	4,812.81	5,683.30	5361.601007	-548.79	-0.102356173
2011	5,663.55	6,802.73	6417.666632	-754.11	-0.117505872
2012	6,697.23	6,992.57	6596.768246	100.46	0.015228613
2013	6,763.65	7,079.04	6678.337312	85.31	0.012774519
2014	5,732.29	6,981.90	6586.700062	-854.41	-0.129717479
2015	4,734.94	4,867.38	4591.863713	143.08	0.031159414
2016	3,827.25	4,669.73	4405.409799	-578.16	-0.131238405
2017	4,503.71	5,354.51	5051.426313	-547.72	-0.108428052
2018	4,742.60	5,506.91	5195.197756	-452.6	-0.087118485
2019	4,817.74	5,363.43	5059.837109	-242.1	-0.047846819

Appendix 9: India's Rate of Misreporting Imports from Japan

Year	India imports from Japan in CIF (in US$ millions)	Japan exports to India (in US$ millions)	Japan exports in CIF (in US$ millions)	India imports from Japan in CIF- Japan exports to India in CIF (in US$ millions)	Rate of India's import misreporting
1980	815.07	919.6	974.776	-159.71	-0.163838667
1981	880.4	1,194.80	1266.488	-386.09	-0.304849316
1982	1,179.43	1,404.80	1489.088	-309.65	-0.207949047
1983	1,265.12	1,433.70	1519.722	-254.6	-0.167533139
1984	1,085.10	1,166.30	1236.278	-151.18	-0.122287582
1985	1,363.56	1,609.50	1706.07	-342.51	-0.200761193
1986	1,931.17	2,118.90	2246.034	-314.87	-0.140188882
1987	1,741.74	1,977.00	2095.62	-353.88	-0.168865131
1988	1,874.49	2,083.00	2207.98	-333.49	-0.151038506
1989	1,493.71	2,007.35	2127.795578	-634.09	-0.298001583
1990	1,800.83	1,711.43	1814.118032	-13.29	-0.007325324
1991	1,364.30	1,525.06	1616.565761	-252.26	-0.156047943
1992	1,504.20	1,488.18	1577.472239	-73.28	-0.04645166
1993	1,376.47	1,536.04	1628.200725	-251.73	-0.154605464
1994	1,839.88	2,048.50	2171.40788	-331.52	-0.152677377
1995	2,234.33	2,542.90	2695.47082	-461.14	-0.171079878
1996	2,133.52	2,436.48	2582.668723	-449.15	-0.173907331
1997	2,155.53	2,207.94	2340.415452	-184.89	-0.078998988
1998	2,385.50	2,409.34	2553.904888	-168.4	-0.065940156
1999	2,518.28	2,426.28	2571.855061	-53.58	-0.020833235
2000	2,015.60	2,488.47	2637.774175	-622.17	-0.235870902
2001	1,756.17	1,939.62	2056.002489	-299.84	-0.145834687
2002	1,913.86	1,868.94	1981.078997	-67.22	-0.033931472
2003	2,459.84	2,395.94	2539.695589	-79.86	-0.031443507
2004	2,921.39	3,044.30	3226.962124	-305.58	-0.09469445
2005	3,854.61	3,523.68	3735.100956	119.51	0.03199516
2006	4,461.98	4,486.01	4755.174768	-293.2	-0.061658536
2007	5,891.33	6,165.45	6535.374134	-644.04	-0.098547432
2008	8,160.97	7,910.27	8384.883133	-223.91	-0.026704216

Year	India imports from Japan in CIF (in US$ millions)	Japan exports to India (in US$ millions)	Japan exports in CIF (in US$ millions)	India imports from Japan in CIF- Japan exports to India in CIF (in US$ millions)	Rate of India's import misreporting
2009	6,385.90	6,331.73	6711.638316	-325.74	-0.048533021
2010	8,282.05	9,051.93	9595.049295	-1,313.00	-0.13684122
2011	11,196.34	11,069.32	11733.48407	-537.15	-0.04577913
2012	12,402.71	10,583.81	11218.83472	1,183.87	0.105525515
2013	10,540.97	8,613.41	9130.213155	1,410.76	0.154515276
2014	9,968.64	8,113.81	8600.634974	1,368.00	0.159058523
2015	9,638.08	8,104.03	8590.26904	1,047.81	0.121976844
2016	9,842.91	8,190.47	8681.896414	1,161.01	0.133727788
2017	10,469.42	8,852.75	9383.912614	1,085.51	0.115677482
2018	12,534.53	11,016.19	11677.16298	857.37	0.073422544
2019	12,746.15	10,975.98	11634.53979	1,111.61	0.095543977

Appendix 10: India's Rate of Misreporting Exports to Singapore

Year	India exports to Singapore in fob (in US$ millions)	Singapore imports from India (in US$ millions)	Singapore imports in fob (in US$ millions)	India exports to Singapore in fob- Singapore imports from India in fob (in US$ millions)	Rate of India's export misreporting
1980	126.84	115.26	108.7358491	18.1	0.166496616
1981	94.83	132.94	125.4150943	-30.59	-0.243870919
1982	125.96	190.08	179.3207547	-53.36	-0.297552922
1983	129.18	348.47	328.745283	-199.56	-0.607044069
1984	124.68	221.03	208.5188679	-83.84	-0.402062964
1985	103.03	220.85	208.3490566	-105.32	-0.505474816
1986	172.89	160.21	151.1415094	21.75	0.143901722
1987	188.27	250.16	236	-47.73	-0.202265902
1988	218	265.4	250.3773585	-32.38	-0.129314243
1989	370.81	303.57	286.3867102	84.42	0.294784244
1990	308.3	374.45	353.2580217	-44.96	-0.127262359
1991	386.47	420.6	396.7917461	-10.32	-0.026020567
1992	515.06	532.95	502.7790273	12.28	0.024428955
1993	727.4	675.94	637.6782707	89.72	0.140694799
1994	737.97	789.69	744.9915094	-7.03	-0.009429799
1995	806.63	921.39	869.2377452	-62.61	-0.072026031
1996	942.63	1,011.96	954.6784839	-12.05	-0.012621142
1997	829.15	1,048.11	988.7821218	-159.63	-0.161443172
1998	583.05	605.98	571.6749677	11.38	0.019897727
1999	633.9	739.08	697.2493606	-63.35	-0.090856104
2000	826	1,075.76	1014.870521	-188.87	-0.186103071
2001	909.51	1,118.35	1055.051561	-145.55	-0.137951193
2002	1,309.26	1,157.90	1092.353958	216.91	0.198569443
2003	1,949.02	1,443.81	1362.089073	586.93	0.430902449
2004	3,377.84	2,787.43	2629.64706	748.19	0.284521515
2005	5,069.12	4,079.20	3848.303203	1,220.82	0.317234869
2006	5,908.02	4,883.70	4607.267925	1,300.75	0.282326212
2007	7,042.89	5,869.04	5536.828257	1,506.06	0.272007651

Year	India exports to Singapore in fob (in US$ millions)	Singapore imports from India (in US$ millions)	Singapore imports in fob (in US$ millions)	India exports to Singapore in fob- Singapore imports from India in fob (in US$ millions)	Rate of India's export misreporting
2008	9,112.16	8,480.26	8000.24227	1,111.91	0.138984914
2009	6,721.49	5,611.61	5293.974821	1,427.52	0.269649921
2010	9,093.86	9,233.49	8710.841749	383.02	0.043970486
2011	16,147.32	14,142.29	13341.78399	2,805.53	0.210281613
2012	14,692.51	12,967.56	12233.54458	2,458.97	0.201002173
2013	13,478.66	9,117.68	8601.584665	4,877.07	0.566997222
2014	9,644.91	8,270.21	7802.080722	1,842.83	0.236197654
2015	7,702.97	5,794.29	5466.315899	2,236.66	0.409170579
2016	7,571.90	5,874.46	5541.944339	2,029.96	0.366289386
2017	11,590.97	7,273.79	6862.062807	4,728.91	0.689137848
2018	10,428.27	7,263.60	6852.451818	3,575.82	0.521830474
2019	10,792.90	6,361.10	6001.041657	4,791.86	0.798504429

Appendix 11: India's Rate of Misreporting Imports from Singapore

Year	India imports from Singapore in CIF (in US$ millions)	Singapore exports to India (in US$ millions)	Singapore exports in CIF (in US$ millions)	India imports from Singapore in CIF- Singapore exports to India in CIF (in US$ millions)	Rate of India's import misreporting
1980	475.17	446.93	473.7458	1.42	0.003006254
1981	463.14	567.61	601.6666	-138.53	-0.230238142
1982	438.34	542.04	574.5624	-136.22	-0.23708206
1983	348.66	437.65	463.909	-115.25	-0.248426316
1984	445.31	662.49	702.2394	-256.93	-0.365868014
1985	321.4	485.14	514.2484	-192.85	-0.375012764
1986	252.65	472.06	500.3836	-247.74	-0.495091654
1987	309.91	557.05	590.473	-280.56	-0.475149383
1988	365.65	737.27	781.5062	-415.86	-0.532121434
1989	491.58	935.96	992.1197268	-500.54	-0.504516196
1990	689.06	1,103.09	1169.278415	-480.22	-0.410699977
1991	311.14	1,004.30	1064.557227	-753.42	-0.707727314
1992	688.58	934.87	990.9594674	-302.38	-0.305139515
1993	593.15	954.57	1011.846935	-418.7	-0.413794966
1994	720	1,261.26	1336.9303	-616.93	-0.461453182
1995	965.77	1,877.41	1990.054601	-1,024.28	-0.514701758
1996	974.25	2,075.40	2199.91934	-1,225.67	-0.557141722
1997	1,164.25	2,284.94	2422.036675	-1,257.79	-0.519309508
1998	1,337.63	2,438.25	2584.543565	-1,246.92	-0.482452136
1999	1,496.85	2,513.07	2663.858835	-1,167.01	-0.438089594
2000	1,481.52	2,870.92	3043.172079	-1,561.65	-0.513164238
2001	1,333.90	2,743.51	2908.121574	-1,574.22	-0.54132007
2002	1,402.13	2,649.45	2808.416107	-1,406.29	-0.500739577
2003	1,922.73	3,091.77	3277.272965	-1,354.54	-0.413314281
2004	2,457.97	4,174.40	4424.861169	-1,966.90	-0.444510186
2005	3,178.18	5,896.72	6250.522026	-3,072.34	-0.491533811
2006	4,955.61	7,672.86	8133.232285	-3,177.62	-0.390695993
2007	7,460.62	10,000.24	10600.25873	-3,139.64	-0.296185333

Year	India imports from Singapore in CIF (in US$ millions)	Singapore exports to India (in US$ millions)	Singapore exports in CIF (in US$ millions)	India imports from Singapore in CIF- Singapore exports to India in CIF (in US$ millions)	Rate of India's import misreporting
2008	8,747.04	11,961.85	12679.56332	-3,932.52	-0.310146519
2009	6,047.47	9,253.40	9808.599282	-3,761.13	-0.383451956
2010	7,269.77	13,340.96	14141.41761	-6,871.65	-0.485923874
2011	8,230.04	14,116.66	14963.6609	-6,733.62	-0.449998477
2012	7,603.25	10,902.51	11556.65622	-3,953.41	-0.342089242
2013	6,997.10	11,271.07	11947.33934	-4,950.24	-0.414337944
2014	7,071.25	11,129.64	11797.41614	-4,726.16	-0.400610095
2015	7,407.61	10,691.21	11332.68608	-3,925.07	-0.346349786
2016	6,719.83	9,760.66	10346.30179	-3,626.47	-0.350509086
2017	7,219.61	11,016.23	11677.20063	-4,457.59	-0.381734525
2018	14,329.70	12,343.35	13083.95269	1,245.75	0.095211847
2019	14,902.17	11,480.18	12168.98857	2,733.18	0.224602186

Appendix 12: Vector Autoregressive Model: A Causal Relationship between Import and Export

Misreporting

Variable	United States	United Kingdom	Australia	Japan	Singapore	France
Dependent Variable: IM_MIS						
LD.IM_MIS	-0.099(0.137)	-0.024888	0.529***(0.170)	-0.014(0.123)	0.071(0.161)	-0.605***(0.163)
L2D.IM_MIS	-0.033976	-0.471***(0.137)	-0.658***(0.190)	-0.406***(0.127)	-0.672***(0.201)	0.062(0.165)
L3D.IM_MIS	-0.161(0.148)		0.204(0.206)		-0.436(0.325)	
L4D.IM_MIS	-0.308**(0.154)		-0.260(0.208)		-0.159(0.282)	
L5D.IM_MIS			0.145(0.257)		0.696**(0.339)	
LD.EX_MIS	-0.089(0.110)	-0.186(0.151)	-1.888(2.403)	0.270*(0.155)	-0.451(0.382)	-0.050(0.198)
L2D.EX_MIS	-0.187(0.115)	-0.323**(0.151)	-4.172(3.761)	0.281*(0.153)	-0.811(0.515)	-0.276(0.207)
L3D.EX_MIS	-0.03275		-0.634(3.470)		1.466***(0.413)	
L4D.EX_MIS	-0.090(0.114)		-1.396(4.797)		0.667(0.450)	
L5D.EX_MIS			-6.249(4.016)		-2.366***(0.912)	
_cons	-71.777(72.953)	9.955(46.501)	15.377(112.544)	29.431(42.843)	-97.895(105.304)	-58.353(57.417)
Dependent Variable: EX_MIS						
LD.IM_MIS	-0.205(0.163)	-0.087(0.115)	0.030***(0.007)	0.258***(0.091)	-0.389***(0.078)	-0.209***(0.069)
L2D.IM_MIS	0.481***(0.162)	-0.077(0.129)	-0.057***(0.008)	-0.112(0.094)	0.058(0.098)	-0.278***(0.070)
L3D.IM_MIS	-0.407**(0.175)		-0.017**(0.009)		-0.691***(0.158)	
L4D.IM_MIS	-0.485***(0.182)		-0.081***(0.009)		0.549***(0.137)	
L5D.IM_MIS			0.088***(0.011)		-0.098(0.164)	
LD.EX_MIS	-0.551***(0.130)	-0.658***(0.142)	-1.002***(0.101)	-0.904***(0.115)	0.172(0.186)	-0.356***(0.084)
L2D.EX_MIS	-0.064(0.137)	-0.179(0.143)	-0.04819	-0.464***(0.113)	-0.023(0.250)	-0.870***(0.087)
L3D.EX_MIS	0.270*(0.155)		0.044(0.146)		-0.559***(0.201)	
L4D.EX_MIS	0.232*(0.135)		0.376*(0.202)		0.762***(0.218)	
L5D.EX_MIS			0.419**(0.169)		-0.420(0.443)	
_cons	-2.059(86.500)	5.355(43.845)	-2.890(4.739)	-22.980(31.616)	15.409(51.108)	4.450(24.235)
Granger Causality Tests (GCT)						
	IM_MIS Granger causes EX_MIS	NO evidence of GCT	IM_MIS Granger causes EX_MIS	IM_MIS Granger causes EX_MIS	NO evidence of GCT	IM_MIS Granger causes EX_MIS

*Notes: ***, ** and * stands for significance at 1%, 5% and 10% respectively.*
Standard error is presented in the parenthesis.
Lag Selection criterion: AIC

Appendix 13: Vector Autoregressive Model: A Causal Relationship between Rate of Import and Export

Misreporting

	Dependent Variable	
	$\overline{M}_t^{Mis}$	$\overline{X}_t^{Mis}$
L. $\overline{M}_t^{Mis}$	0.17***(2.70)	-0.03 (-1.00)
L2. $\overline{M}_t^{Mis}$	0.08(1.23)	0.02(0.52)
L.$\overline{X}_t^{Mis}$	0.32***(2.61)	0.35***(5.75)
L2.$\overline{X}_t^{Mis}$	-0.35***(-2.86	0.35***(5.63)
Constant C	-0.04***(-2.15)	-0.04***(-3.88)
Frequency and Log-Likelihood NOS LL	234 54.46	234 213.74
Granger Causality Test		
ALL Lags	9.85* 9.85*	1.11 1.11
Unit Root Tests: With Trend		
ALL PP	-9.31*** -12.60***	-2.91 -8.71***
Unit Root Tests: Without Trend		
ADF PP	-9.33*** -12.57***	-2.85* -8.65***
Zivot Andrews Unit Root Tests		
min t Break Year	-13.62*** Q1-1970	-5.49** Q1-1986

Notes: Lag length has been selected using th eSchwartz BIC Criterion.

NOS is the number of observations and LL = Log Likelihood. The row all corresponding to column 2 in the Granger Causality Test tests $\overline{X}_t^{Mis}$ Granger causes $\overline{M}_t^{Mis}$ if and only if the Null Hypothesis $H_0 = \alpha_1 = \alpha_2 = ... = \alpha_{p1} = \beta_1 = \beta_2 = ... = \beta_{p2} = 0$ can be rejected. Simarly $\overline{M}_t^{Mis}$ Granger causes $\overline{X}_t^{Mis}$ if and only if the Null Hypothesis $H_0 = \theta_1 = \theta_2 = ... = \theta_{q1} = \gamma_1 = \gamma_2 = ... = \gamma_{q2} = 0$ can be rejected. The same for row lags tests the Null Hypothesis $H_0 = \beta_1 = \beta_2 = ... = \beta_{p2} = 0$ and $H_0 = \theta_1 = \theta_2 = ... = \theta_{p2} = 0$ is presented in column 2 and 3 respectively. Both test statistics confirms that only the first hypothesis (i.e. $\overline{X}_t^{Mis}$ Granger causes $\overline{M}_t^{Mis}$) can be rejected. Both import and export misreporting rates are stationary.

Appendix 14: An alternative picture of causality

So far, it has been observed that import misreporting granger causes export misreporting. However, in a past exercise an opposite result was observed, in the context.

The same result is presented here also. Formally the rate of import and export misreporting for any time point t are defined as:

$$\bar{M}_t^{Mis} = \frac{M_t^{Mis}}{x_{dt}^f \times 1.06}$$

$$\bar{X}_t^{Mis} = \frac{X_t^{Mis} \times 1.06}{}$$

To address the issue of inter-linkage between import and export misreporting, for the present exercise quarterly data from 1960-2017 is considered.

The analysis is restricted only in the context of bilateral trade between India- United States of America. The results are presented in Table 2. Note that when import invoicing is dependent variable then the lagged values of export mis-invoicing significantly effects import misreporting. From the table it can be observed that, $\frac{\partial \bar{M}_t^{Mis}}{\partial \bar{X}_{t-1}^{Mis}} = 0.32 > 0$, whereas $\frac{\partial \bar{M}_t^{Mis}}{\partial \bar{X}_{t-2}^{Mis}} = -0.35 < 0$. Both these coefficients are highly significant. This is also reflected in the Granger Causality Tests, where export misreporting granger causes import misreporting. The older exercise was with quarterly data, but the present one is with annual data since our explanatory variables are unlikely to have quarterly figures.

Appendix 15: India's Rate of Misreporting Capital Outflow to US

Year	US reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	2555			
2010	8,204	11,068	2,864	0.349084182
2011	5,323	11,841	6,518	1.224548045
2012	11,919	14,491	2,572	0.215799328
2013	15,321	14,499	-822	-0.053658813
2014	17,855	20,368	2,513	0.140741359
2015	19,278	18,548	-730	-0.037847171
2016	9,498	18,322	8,824	0.929074856
2017	11,338	23,937	12,599	1.111197138
2018	10,253	23,616	13,363	1.303338493
2019	10,018	26,078	16,060	1.603154488

Appendix 16: India's Rate of Misreporting Capital Inflow from US

Year	US reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	43,504			
2010	49,333	71,595	22,262	0.451259828
2011	38,000	63,991	25,991	0.683966441
2012	50,827	71,113	20,286	0.399112783
2013	49,700	78,145	28,445	0.57234276
2014	66,481	1,05,263	38,782	0.583352343
2015	70,722	1,05,724	35,002	0.494922928
2016	80,241	1,14,202	33,961	0.423241779
2017	90,319	1,46,532	56,213	0.622381307
2018	84,888	1,67,731	82,843	0.975905337
2019	91,765	1,56,061	64,296	0.70065475

Appendix 17: India's Rate of Misreporting Capital Outflow to UK

Year	UK reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	6,057			
2010	8,591	4,907	-3,684	-0.428796302
2011	8,590	4,709	-3,881	-0.451833237
2012	6,539	4,443	-2,096	-0.320522057
2013	6,222	5,260	-962	-0.1546382
2014	10,673	4,739	-5,934	-0.555960134
2015	7,832	6,216	-1,616	-0.20628693
2016	3,661	6,170	2,509	0.685263097
2017	21,547	8,535	-13,012	-0.603905263
2018	6,046	9,442	3,397	0.561819334
2019	23,657	12,818	-10,839	-0.458180511

Appendix 18: India's Rate of Misreporting Capital Inflow from UK

Year	UK reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	8744			
2010	9819	78,735	68,916	7.018597903
2011	42,255	70,351	28,096	0.664913375
2012	4477	71,949	67,472	15.07083914
2013	5675	78,898	73,223	12.90277823
2014	8,597	96,078	87,481	10.17588121
2015	17956	91,850	73,894	4.115274159
2016	16224	1,04,288	88,064	5.427993601
2017	17726	1,37,367	1,19,641	6.749482226
2018	18457	1,42,138	1,23,681	6.701050412
2019	20615	1,47,308	1,26,693	6.145677167

Appendix 19: India's Rate of Misreporting Capital Outflow to Japan

Year	Japan reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	62			
2010	80	55	-25	-0.312891241
2011	103	82	-21	-0.200457422
2012	111	67	-45	-0.400936504
2013	111	87	-24	-0.217992997
2014	86	61	-25	-0.289966213
2015	143	146	2	0.016558927
2016	151	142	-10	-0.06512035
2017	175	131	-43	-0.247973889
2018	169	115	-54	-0.321485593
2019	178	99	-80	-0.447177916

Appendix 20: India's Rate of Misreporting Capital Inflow from Japan

Year	Japan reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	17,986			
2010	27,135	27,777	641	0.023627479
2011	30,773	28,006	-2,767	-0.089906005
2012	30,133	31,184	1,050	0.034860226
2013	27,494	35,455	7,961	0.289545337
2014	27,300	49,330	22,030	0.806977487
2015	28,179	48,800	20,621	0.731804843
2016	35,869	66,115	30,245	0.843206184
2017	44,290	97,613	53,323	1.203937859
2018	48,560	82,400	33,840	0.696873307
2019	55,835	67,883	12,047	0.21576558

Appendix 21: India's Rate of Misreporting Capital Outflow to Germany

Year	Germany reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	722			
2010	784	470	-314	-0.4005102
2011	976	621	-355	-0.36372951
2012	1248	761	-487	-0.39022435
2013	1151	725	-426	-0.37011295
2014	898	694	-204	-0.22717149
2015	747	1260	513	0.686746988
2016	918	712	-206	-0.22440087
2017	948	1016	68	0.071729958
2018	856	790	-66	-0.0771028
2019	495	1172	677	1.367676768

Appendix 22: India's Rate of Misreporting Capital Inflow from Germany

Year	Germany reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	14270			
2010	17623	26908	9285	0.526868297
2011	19676	26417	6741	0.342600122
2012	21047	25807	4760	0.226160498
2013	31096	29105	-1991	-0.064027528
2014	42662	49421	6759	0.158431391
2015	48264	40332	-7932	-0.164346096
2016	50356	45874	-4482	-0.089006275
2017	56338	47876	-8462	-0.150200575
2018	52658	46842	-5816	-0.110448555
2019	54352	41466	-12886	-0.237084192

Appendix 23: India's Rate of Misreporting Capital Outflow to France

Year	France reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	951			
2010	791	110	-681	-0.860935525
2011	694	130	-564	-0.812680115
2012	0	202	202	
2013	0	441	441	
2014	0	130	130	
2015	241	109	-132	-0.547717842
2016	528	115	-413	-0.78219697
2017	432	217	-215	-0.497685185
2018	0	222	222	
2019	391	244	-147	-0.375959079

Appendix 24: India's Rate of Misreporting Capital Inflow from France

Year	France reported out flow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	6822			
2010	8920	5535	-3385	-0.379484305
2011	8872	7201	-1671	-0.188345356
2012	8060	7370	-690	-0.08560794
2013	8412	8786	374	0.044460295
2014	9916	9652	-264	-0.026623639
2015	11526	9558	-1968	-0.170744404
2016	10316	10114	-202	-0.019581233
2017	11212	13624	2412	0.21512665
2018	12666	13376	710	0.056055582
2019	13192	17626	4434	0.336112796

Appendix 25: India's Rate of Misreporting Capital Outflow to Italy

Year	Italy reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	155			
2010	322	140	-182	-0.565217391
2011	533	162	-371	-0.696060038
2012	520	686	166	0.319230769
2013	-190	318	508	-2.673684211
2014	-365	192	557	-1.526027397
2015	-92	251	343	-3.72826087
2016	-183	140	323	-1.765027322
2017	-28	136	164	-5.857142857
2018	3	170	167	55.66666667
2019	57	254	197	3.456140351

Appendix 26: India's Rate of Misreporting Capital Inflow from Italy

Year	Italy reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	4158			
2010	5018	1898	-3120	-0.621761658
2011	6840	2597	-4243	-0.620321637
2012	9892	3000	-6892	-0.696724626
2013	10330	2345	-7985	-0.772991288
2014	9794	2528	-7266	-0.741882785
2015	11452	2968	-8484	-0.740831296
2016	12212	4540	-7672	-0.628234523
2017	14746	9522	-5224	-0.354265564
2018	13918	4700	-9218	-0.662307803
2019	13660	4793	-8867	-0.649121523

Appendix 27: India's Rate of Misreporting Capital Outflow to Mauritius

Year	Mauritius reported inflow in millions (US$)	India reported outflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting outflow
2009	407			
2010	614	22102	21488	34.99674267
2011	16778	30666	13888	0.827750626
2012	37272	24788	-12484	-0.334943121
2013	45931	24950	-20981	-0.456793886
2014	52442	27263	-25179	-0.48013043
2015	45192	32965	-12227	-0.270556736
2016	41786	20364	-21422	-0.512659742
2017	47468	20276	-27192	-0.572849077
2018	47732	19884	-27848	-0.583424118
2019	50011	21514	-28497	-0.569814641

Appendix 28: India's Rate of Misreporting Capital Inflow from Mauritius

Year	Mauritius reported outflow in millions (US$)	India reported inflow in millions (US$)	Misreporting in millions (US$)	Rate of India's misreporting inflow
2009	34			
2010	104	113842	113738	1093.634615
2011	312416	112740	-199676	-0.639134999
2012	211207	122592	-88615	-0.419564692
2013	218310	127554	-90756	-0.415720764
2014	216616	137273	-79343	-0.366284116
2015	200450	130044	-70406	-0.351239711
2016	203377	140897	-62480	-0.307212713
2017	199596	159678	-39918	-0.199993988
2018	241950	141357	-100593	-0.415759454
2019	241026	130862	-110164	-0.457062724

Appendix 29: India's ratio of reported to actual net capital inflow from US

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	US reported outflow (in US$ millions)	US reported inflow (in US$ millions)	India inflow-India outflow (in US$ millions)	US outflow-US inflow (in US$ millions)	Ratio of Reported to Actual
2010	71,595	11,068	49,333	8,204	60,527	41,129	1.4716408
2011	63,991	11,841	38,000	5,323	52,149	32,677	1.595907075
2012	71,113	14,491	50,827	11,919	56,622	38,908	1.455268666
2013	78,145	14,499	49,700	15,321	63,647	34,379	1.851320336
2014	1,05,263	20,368	66,481	17,855	84,895	48,626	1.745874843
2015	1,05,724	18,548	70,722	19,278	87,176	51,444	1.694571905
2016	1,14,202	18,322	80,241	9,498	95,880	70,743	1.35532831
2017	1,46,532	23,937	90,319	11,338	1,22,595	78,981	1.552210077
2018	1,67,731	23,616	84,888	10,253	1,44,115	74,635	1.930924133
2019	1,56,061	26,078	91,765	10,018	1,29,982	81,747	1.590054454

Appendix 30: India's ratio of reported net capital inflow to actual net capital outflow from UK

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	UK reported outflow (in US$ millions)	UK reported inflow (in US$ millions)	India inflow- India outflow (in US$ millions)	UK outflow-UK inflow (in US$ millions)	Ratio of Reported to Actual
2010	78,735	4,907	9819	8,591	73,827	1,228	60.142543
2011	70,351	4,709	42,255	8,590	65,642	33,665	1.9498699
2012	71,949	4,443	4477	6,539	67,506	-2,062	-32.73438
2013	78,898	5,260	5675	6,222	73,639	-547	-134.7189
2014	96,078	4,739	8,597	10,673	91,339	-2,076	-44.00031
2015	91,850	6,216	17956	7,832	85,634	10,124	8.4583452
2016	1,04,288	6,170	16224	3,661	98,118	12,563	7.8101155
2017	1,37,367	8,535	17726	21,547	1,28,833	-3,821	-33.71889
2018	1,42,138	9,442	18457	6,046	1,32,696	12,411	10.691471
2019	1,47,308	12,818	20615	23,657	1,34,490	-3,042	-44.21479

Appendix 31: India's ratio of reported to actual net capital inflow from Japan

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	Japan reported outflow (in US$ millions)	Japan reported inflow (in US$ millions)	India inflow-India outflow (in US$ millions)	Japan outflow -Japan inflow (in US$ millions)	Ratio of Reported to Actual
2010	27,777	55	27,135	80	27,721	27,055	1.02462774
2011	28,006	82	30,773	103	27,924	30,670	0.91046474
2012	31,184	67	30,133	111	31,117	30,022	1.03647838
2013	35,455	87	27,494	111	35,367	27,382	1.29161008
2014	49,330	61	27,300	86	49,269	27,213	1.81045374
2015	48,800	146	28,179	143	48,655	28,036	1.73546077
2016	66,115	142	35,869	151	65,973	35,718	1.84705783
2017	97,613	131	44,290	175	97,481	44,115	2.20969254
2018	82,400	115	48,560	169	82,285	48,391	1.70043027
2019	67,883	99	55,835	178	67,784	55,657	1.21788895

Appendix 32: India's ratio of reported to actual net capital inflow from Italy

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	Italy reported outflow (in US$ millions)	Italy reported inflow (in US$ millions)	India inflow-India outflow (in US$ millions)	Italy outflow-Italy inflow	Ratio of Reported to Actual
2010	1898	140	5018	322	1758	4696	0.374361158
2011	2597	162	6840	533	2435	6307	0.38607896
2012	3000	686	9892	520	2314	9372	0.246905676
2013	2345	318	10330	-190	2027	10520	0.192680608
2014	2528	192	9794	-365	2336	10159	0.229943892
2015	2968	251	11452	-92	2717	11544	0.23536036
2016	4540	140	12212	-183	4400	12395	0.354981848
2017	9522	136	14746	-28	9386	14774	0.635305266
2018	4700	170	13918	3	4530	13915	0.32554797
2019	4793	254	13660	57	4539	13603	0.333676395

Appendix 33: India's ratio of reported to actual net capital inflow from Germany

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	Germany reported outflow (in US$ millions)	Germany reported inflow (in US$ millions)	India inflow-India outflow (in US$ millions)	Germany outflow -Germany inflow (in US$ millions)	Ratio of Reported to Actual
2010	26908	470	17623	784	26438	16839	1.57004573
2011	26417	621	19676	976	25796	18700	1.37946524
2012	25807	761	21047	1248	25046	19799	1.26501338
2013	29105	725	31096	1151	28380	29945	0.94773752
2014	49421	694	42662	898	48727	41764	1.16672254
2015	40332	1260	48264	747	39072	47517	0.82227413
2016	45874	712	50356	918	45162	49438	0.91350783
2017	47876	1016	56338	948	46860	55390	0.84600108
2018	46842	790	52658	856	46052	51802	0.88900042
2019	41466	1172	54352	495	40294	53857	0.74816644

Appendix 34: India's ratio of reported to actual net capital inflow from Mauritius

Year	India reported inflow (in US$ millions)	India reported outflow (in US$ millions)	Mauritius exported outflow (in US$ millions)	Mauritius reported inflow (in US$ millions)	India inflow-India outflow (in US$ millions)	Mauritius outflow- Mauritius inflow (in US$ millions)	Ratio of Reported to Actual
2010	113842	22102	104	614	91740	-510	-179.8824
2011	112740	30666	312416	16778	82074	295638	0.2776165
2012	122592	24788	211207	37272	97804	173935	0.562302
2013	127554	24950	218310	45931	102604	172379	0.5952233
2014	137273	27263	216616	52442	110010	164174	0.6700817
2015	130044	32965	200450	45192	97079	155258	0.6252753
2016	140897	20364	203377	41786	120533	161591	0.7459141
2017	159678	20276	199596	47468	139402	152128	0.9163468
2018	141357	19884	241950	47732	121473	194218	0.6254467
2019	130862	21514	241026	50011	109348	191015	0.5724577

Appendix 35: India's share of Traded to GDP and Non-traded to GDP

Year	India's total exports in millions of US$	India's total imports in millions of US$	India's GDP in millions of US$	India's exports+ India's imports (in millions of US$)	Traded to GDP	Nontraded to GDP
2009	1,65,188.40	2,57,649.43	1342000	4,22,837.83	0.315080352	0.684919648
2010	2,22,906.89	3,50,780.18	1676000	5,73,687.07	0.342295386	0.657704614
2011	3,07,044.08	4,65,073.01	1823000	7,72,117.09	0.423542013	0.576457987
2012	2,97,197.47	4,90,405.33	1828000	7,87,602.80	0.430854922	0.569145078
2013	3,15,089.79	4,67,938.79	1857000	7,83,028.58	0.42166321	0.57833679
2014	3,17,719.33	4,60,501.29	2039000	7,78,220.62	0.381667788	0.618332212
2015	2,66,162.81	3,92,229.82	2104000	6,58,392.63	0.312924255	0.687075745
2016	2,61,861.69	3,56,320.28	2295000	6,18,181.97	0.269360337	0.730639663
2017	2,96,211.90	4,42,982.73	2653000	7,39,194.63	0.278625944	0.721374056
2018	3,23,269.27	5,08,987.98	2713000	8,32,257.25	0.306766403	0.693233597
2019	3,24,863.01	4,79,894.38	28,69,000	8,04,757.39	0.280501007	0.719498993

Appendix 36: India's Foreign Investment (FI) inflows from its investment partners in 2019

Countries	Inward (FI) reported by India (in millions US$)	% of inward
US	156060	17.08097648
UK	147309	16.12316778
Japan	67883	7.42988547
Germany	41466	4.53850936
France	17626	1.92918936
Italy	4793	0.524600284
Mauritius	130862	14.32302156
Total (all countries) inward (FI) (in millions US$)	913648	

Appendix 37: India's Foreign Investment (FI) outflows to its investment partners in 2019

Countries	Outward (FI) reported by India (in millions US$)	% of outward
US	26078	14.16597407
UK	12818	6.962936406
Japan	98	0.05323512
Germany	1172	0.636648578
France	244	0.132544584
Italy	254	0.13797674
Mauritius	21514	11.68673848
Total (all countries) outward (FI) (in millions US$)	184089	

Appendix 38: India's Aggregate Foreign Investment (FI) during 2010-2019

Countries	Total (FI) (to and from, out + in, country wise) reported by India (in US$ billions)	India's % of (FI) with its partner countries
EU	1497.869	18.27241751
USA	1260.762	15.3799629
UK	1084.96	13.23536444
Singapore	1036.529	12.64455747
Japan	535.536	6.532972765
Switzerland	373.318	4.554084743
Canada	30.966	0.377752447
Australia	26.069	0.318014227
China	7.187	0.087673798
New Zealand	1.148	0.014004386
Iceland	0.466	0.005684707
Norway	4.155	0.050686605
Total (all countries to and from, out+ in) (FI) reported by India (in US$ billions)	8197.432	

Appendix 39:

No	Questions	Answers	Remarks
1	Industry interviewed	Leather Manufacturing, Toy Industries, Handicraft, Textile, Cosmetics, Edible oil and fats, Copper Industry and Agro Industry.	
2	Exporter or Importer	Around 500 Interviewees both Exporters & Importers from 4 cities: Kolkata, Mumbai, Delhi & Chennai.	
3	Source & Destination	Goods are exported to countries like United States of America, European Union (countries like Denmark, Germany, Cyprus, Spain, Italy, Sweden, Romania, Switzerland, France), Asian Countries (like Vietnam, Japan, Singapore, Afghanistan, China, Malaysia, Taiwan, and the Indian Subcontinent), Middle Eastern Countries (like Iran, Israel, Egypt, Turkey, UAE) Kenya and select West African Countries. Goods are primarily imported from countries like China, Korea and other South Asian Countries like Bangladesh & Sri Lanka.	
4	Annual Trade Turnover	The amount varies between $100,000 and $67,000 annually.	Most of the Interviewees were not comfortable to disclose their annual trade turnover figure.
5	Year their business started	Most of the interviewees started their businesses between the year 1946 and 2016.	
6	General reasons behind Data Mismatch	One reason is to get tax benefit. Second is to receive government incentive. Third is to avoid custom duties and certain hawala transactions.	Other reasons of misreporting include procedural hurdles, bureaucratic delays and, dishonest business practices etc.
7	Extent of Misreporting	For some the extent of misreporting is around 5% while it is around 5% to 10% for others.	According to the respondents in Chennai, it was found that the misreporting there is 1% to 2%, which is minimal.

No	Questions	Answers	Remarks
8	Are regulations, taxes, and procedural delays reasons for misreporting	Yes, these are reasons behind misreporting.	Other reasons of misreporting include systematic challenges, unforseen events like COVID-19 pandemic government policies, structural problems in the short run, dishonest business practices etc.
9	Possibility of export earning parked overseas to finance import later	Yes, it is possible.	The exporters might choose advance licensing over duty drawback scheme which is refund of custom duties, taxes and fees paid during the production of an exportable good. The advance license allows exporters duty free import. It can also happen in countries which are tax havens, among others.
10	Does Exchange rate fluctuation matter?	Yes, the exchange rate fluctuations do matter.	Most of the times the seller sell on credit. Sometimes they receive their payment as late as six months after the sale of their goods. So, the sellers would like a favorable exchange rate after six months of their sell. Similarly, in case of importers, they would prefer to delay their payments for a few months to earn interests and favorable interest rates.
11	Does illegal money get channeled abroad through trade misreporting	Yes, there is a possibility of illegal money getting channeled abroad through trade misreporting.	

No	Questions	Answers	Remarks
12	Does misreporting help access to finance for exporters due to the difficulty they face in accessing finance/ forex through legal channels	The importers mostly said yes, and the exporters said that the exporters do receive a certain amount as advance from their clients to undertake production activities. However, stringent regulations to access forex compel exporters to either underreport export or overreport imports. They also said that the amount received through trade misreporting does help in financing production requirement. Easy access to forex as and when needed would eliminate these reasons to misreport.	In the energy sector it is not exceedingly difficult to access. The laws are quite friendly to the industry.
13	Does Changing rules and regulation help reduce misreporting?	The answers received were a mix of Yes and No	Since India is a labour-intensive country, this scope of inaccuracy will be more than a developed country, which is not labour intensive. The respondents opined that this inaccuracy needs to be addressed in some ways by the government. They also said that if all the countries adopt duty free trade and ease regulations then this problem of misreporting could perhaps be solved to a great extent. However, removal of regulations will lead to increase in competition and reduction of return from the export-import business.

No	Questions	Answers	Remarks
14	Any Rule, Law, Norm that could be the main reason behind misreporting?	Evasion of Import duties is considered the main reason for misreporting. Second is the rule of allowing an exporter 5% of yearly turnover as defective claim gives rise to chances of misreporting up to 5% of yearly turnover by that exporter. This rule has reduced misreporting on one hand as previously there was no restriction on defective claim and therefore no restriction on misreporting, on the other hand it has allowed for this 5% misreporting by the exporters. This rule is to protect the exporters from unforeseen circumstances of defective goods. But the dishonest businessmen exploit this opportunity to gain from it. Third is that since 2015-16 the realization of government incentive was done by exporters in two stages. An exporter receives 5% duty drawback (that is, refund of customs duties, taxes and fees paid during the production of an exportable good), and 2.75% additional focus license under Focus Product Scheme (duty free import of 5% of turnover) on realization of the full payment. Therefore, exporters are unable to acquire the complete benefit of over-reporting.	
15	Does Customs computation of assessable value for realization of FOB amount from exporters vary with the consignment value declared in the Commercial Invoice?	Mostly Yes, while some said No.	Currently, the procedure of customs' assessing the valuation of goods exported is computerized. The sample draw is random for the assessment of the price of good. Exporters cannot therefore, misreport much. The difference is much lesser nowadays than earlier. Earlier it was not computerized, so that exporters could manipulate the choosing of boxes by customs' for assessing its value.

No	Questions	Answers	Remarks
16	Customs computation of assessable value for calculation of import duty varies with the consignment value declared in the Commercial Invoice?	Cases were different with different countries. In India, this varies with most of the products	The respondents in Delhi said yes to this question. They said that a lot of dishonest businessmen are importing goods who want minimum landing cost for goods coming to India. So, in those cases they can ask the sellers to raise a lower value invoice. But customs intelligence has improved now. They have HS Code book with the market value. For example, If the value of a TV is $500 and it is being imported for $200, the duty will be charged on $500. Duty would be computed thus according to book value.
17	Is misreporting done in destination countries?	Yes	The scope of misreporting is considerably lesser in the developed countries than that of the developing countries. Importers might want to reduce the value to avoid custom duty or lower landing cost. Exporters want maximum value and importers want minimum value. This leads to manipulation of documents at importer's end. They may also resort to other channels to manipulate and reduce duties. Manipulation in Certificate of Origin (COO) is also another challenge pointed out by the respondents.

Appendix 40: India-US True and Reported BOT (in US$ millions)

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)-(Diff between Reported and True (equal wt.) BOT)
1980	-898.18	-773.9001321	-124.28	-760.644	137.54	-636.36
1981	-600.98	-601.7651698	0.79	-601.849	-0.87	-602.63
1982	-583.24	-420.8055425	-162.43	-403.479	179.76	-241.05
1983	-407.94	-71.90573773	-336.03	-36.0626	371.87	299.97
1984	-31.06	443.520527	-474.58	494.1422	525.2	968.72
1985	-206.54	195.6244138	-402.17	238.5225	445.07	640.69
1986	347.92	522.3227108	-174.4	540.9253	193	715.32
1987	610.89	815.3010806	-204.41	837.1053	226.22	1,041.52
1988	657.26	496.3828302	160.88	479.2226	-178.04	318.35
1989	2,113.98	1426.517696	687.47	1353.188	-760.8	665.72
1990	58.84	325.4979201	-266.65	353.941	295.1	620.59
1991	1,031.08	1071.609	-40.53	1075.932	44.85	1,116.46
1992	1,274.99	1540.597215	-265.61	1568.929	293.94	1,834.54
1993	1,714.42	1651.907593	62.51	1645.24	-69.18	1,582.73
1994	2,228.76	2568.615713	-339.85	2604.867	376.1	2,944.72
1995	1,960.74	2106.520528	-145.78	2122.07	161.33	2,267.85
1996	2,997.63	2819.763908	177.87	2800.791	-196.84	2,622.92
1997	3,033.23	3238.033179	-204.81	3259.879	226.65	3,464.69
1998	3,443.15	3927.123453	-483.97	3978.747	535.6	4,462.72
1999	4,517.05	4842.57966	-325.53	4877.303	360.25	5,202.83
2000	5,931.00	6234.427491	-303.43	6266.793	335.79	6,570.22
2001	5,259.96	5488.964493	-229	5513.391	253.43	5,742.39
2002	6,178.93	6789.979761	-611.05	6855.158	676.22	7,466.20
2003	6,473.51	7080.848088	-607.34	7145.631	672.12	7,752.97
2004	6,858.07	7951.844488	-1,093.78	8068.514	1,210.45	9,162.29
2005	7,626.79	8970.756831	-1,343.96	9114.113	1,487.32	10,458.08
2006	7,342.58	9168.51444	-1,825.93	9363.281	2,020.70	11,189.21
2007	1,576.97	3310.548974	-1,733.58	3495.464	1,918.50	5,229.05
2008	3,790.44	4705.563641	-915.13	4803.177	1,012.74	5,718.31

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)-(Diff between Reported and True (equal wt.) BOT)
2009	1,636.41	2490.867506	-854.46	2582.01	945.6	3,436.47
2010	4,475.83	6534.172781	-2,058.34	6753.729	2,277.89	8,812.07
2011	9,905.41	10589.35298	-683.95	10662.31	756.9	11,346.25
2012	11,054.37	12920.88147	-1,866.51	13119.98	2,065.61	14,986.49
2013	15,231.11	15776.53364	-545.42	15834.71	603.6	16,380.14
2014	21,261.37	20520.22913	741.14	20441.17	-820.2	19,700.03
2015	19,699.17	19543.3177	155.85	19526.69	-172.47	19,370.85
2016	21,376.02	20890.23751	485.78	20838.42	-537.6	20,352.64
2017	22,001.23	20318.65638	1,682.57	20139.18	-1,862.05	18,456.61
2018	18,611.01	17415.76531	1,195.24	17288.27	-1,322.74	16,093.03
2019	19,270.25	18598.73842	671.51	18527.11	-743.14	17,855.60

Appendix 41: India-UK True and Reported BOT (in US$ millions)

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
1980	-424.78	-517.7455849	92.97	-532.8524925	-108.07	-625.82
1981	-405.66	-607.109283	201.45	-639.8447915	-234.18	-841.29
1982	-526.44	-696.5736618	170.13	-724.2196885	-197.78	-894.35
1983	-466.28	-615.8915009	149.61	-640.2035994	-173.93	-789.82
1984	-463.88	-422.8029611	-41.08	-416.127587	47.75	-375.05
1985	-493.94	-600.0069311	106.07	-617.2430751	-123.3	-723.31
1986	-664.09	-760.020104	95.93	-775.6091107	-111.52	-871.54
1987	-738.83	-897.4814888	158.65	-923.2629204	-184.44	-1,081.92
1988	-811.1	-979.6367329	168.54	-1007.023952	-195.92	-1,175.56
1989	-449.15	-882.9602998	433.81	-953.4548771	-504.31	-1,387.27
1990	-555.47	-790.4232444	234.95	-828.6024532	-273.13	-1,063.55
1991	-48.79	-332.8229262	284.03	-378.9782767	-330.19	-663.01
1992	-59.9	-200.1271988	140.23	-222.9146053	-163.02	-363.14
1993	-193.39	-223.9255782	30.54	-228.8882722	-35.5	-259.43
1994	62.3	-102.3702247	164.67	-129.1284872	-191.42	-293.79
1995	197.71	-239.3171718	437.03	-310.3340873	-508.04	-747.36
1996	63.14	-191.6947648	254.84	-233.1060265	-296.25	-487.94
1997	-246.2	-237.9979284	-8.2	-236.6650918	9.53	-228.46
1998	-648.8	-290.886889	-357.91	-232.7260084	416.07	125.19
1999	-695.43	-458.7765009	-236.65	-420.3211198	275.1	-183.67
2000	-819.73	-1119.152651	299.43	-1167.809644	-348.08	-1,467.24
2001	-566.97	-589.7511996	22.78	-593.4533268	-26.48	-616.24
2002	-310.73	-341.652827	30.92	-346.677272	-35.94	-377.6
2003	-227.71	-605.2086128	377.5	-666.5523462	-438.84	-1,044.05
2004	32.59	-224.1945732	256.78	-265.9212653	-298.51	-522.7
2005	875.58	125.4394211	750.14	3.541666448	-872.04	-746.6
2006	1,365.20	804.8150356	560.39	713.7519194	-651.45	153.36
2007	1,669.99	1360.164772	309.82	1309.818972	-360.17	1,000.00

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
2008	738.11	240.6751179	497.44	159.8411434	-578.27	-337.6
2009	2,203.97	1806.481925	397.49	1741.890086	-462.08	1,344.40
2010	1,240.50	1272.878121	-32.37	1278.138953	37.64	1,310.51
2011	1,312.73	701.2491781	611.48	601.8829494	-710.85	-9.6
2012	1,781.99	1547.563838	234.42	1509.470163	-272.52	1,275.05
2013	3,124.19	1869.46597	1,254.72	1665.573589	-1,458.61	410.85
2014	4,891.49	3861.440532	1,030.05	3694.057352	-1,197.43	2,664.01
2015	3,517.87	2791.036389	726.84	2672.925377	-844.95	1,946.09
2016	5,156.51	4096.851349	1,059.66	3924.656859	-1,231.85	2,865.00
2017	4,692.72	3829.008196	863.71	3688.655027	-1,004.06	2,824.94
2018	2,735.35	2347.546922	387.8	2284.528922	-450.82	1,896.73
2019	1,925.61	2489.967031	-564.36	2581.675049	656.07	3,146.03

Appendix 42: India-Japan True and Reported BOT (in US$ millions)

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT -Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
1980	-39.24	-25.97026415	-13.27	-23.6093909	15.63	-10.34
1981	-323.33	-298.0693774	-25.26	-293.5751562	29.75	-268.31
1982	-269.83	-351.1110936	81.28	-365.5717378	-95.74	-446.85
1983	-430.89	-441.8147277	10.93	-443.7586422	-12.87	-454.68
1984	-258.44	-212.9745822	-45.47	-204.8847978	53.56	-159.41
1985	-442.95	-509.6971507	66.75	-521.5729545	-78.63	-588.32
1986	-913.86	-962.3983969	48.54	-971.0345726	-57.18	-1,019.58
1987	-543.26	-590.239399	46.98	-598.5985822	-55.34	-645.58
1988	-453.91	-479.1525472	25.24	-483.6435525	-29.73	-508.89
1989	642.96	183.7189838	459.24	102.0135497	-540.95	-357.23
1990	-144.83	-0.817854064	-144.01	24.80347567	169.63	168.81
1991	289.66	367.5127212	-77.85	381.3638189	91.7	459.22
1992	18.63	180.5345831	-161.9	209.339418	190.71	371.24
1993	280.07	404.6573036	-124.59	426.8237819	146.76	551.41
1994	83.64	206.2156258	-122.57	228.0228745	144.38	350.59
1995	-103.93	-23.84522132	-80.08	-9.597009163	94.33	70.49
1996	-55.55	26.1749001	-81.73	40.71547491	96.27	122.44
1997	-230.18	-31.64872671	-198.53	3.671898593	233.85	202.2
1998	-671.88	-585.8877878	-85.99	-570.5894494	101.29	-484.6
1999	-841.23	-647.0996675	-194.13	-612.5620317	228.66	-418.44
2000	-248.38	-199.3483951	-49.03	-190.6258703	57.75	-141.6
2001	-224.03	-96.6017631	-127.43	-73.92996573	150.1	53.5
2002	-138.23	-73.73903946	-64.49	-62.26514062	75.97	2.23
2003	-711.87	-600.324149	-111.54	-580.4791718	131.39	-468.94
2004	-1,010.87	-887.1694169	-123.7	-865.1611365	145.71	-741.46
2005	-1,461.69	-1091.927475	-369.76	-1026.142139	435.54	-656.38
2006	-1,694.63	-1282.88422	-411.75	-1209.628359	485	-797.88
2007	-2,285.32	-2448.560846	163.24	-2477.604217	-192.29	-2,640.85

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT -Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
2008	-4,542.63	-3977.765448	-564.87	-3877.267583	665.37	-3,312.40
2009	-3,199.87	-3196.658116	-3.21	-3196.087208	3.78	-3,192.88
2010	-3,469.24	-3851.345645	382.1	-3919.327097	-450.08	-4,301.43
2011	-5,532.78	-5424.299852	-108.48	-5404.9993	127.78	-5,296.52
2012	-5,705.48	-5163.773312	-541.71	-5067.396022	638.08	-4,525.69
2013	-3,777.32	-3114.598273	-662.72	-2996.690601	780.63	-2,333.97
2014	-4,236.35	-3125.142125	-1,111.21	-2927.442682	1,308.91	-1,816.24
2015	-4,903.14	-4450.772389	-452.37	-4370.289906	532.85	-3,917.92
2016	-6,015.66	-5146.071493	-869.58	-4991.360073	1,024.30	-4,121.78
2017	-5,965.71	-5149.09815	-816.61	-5003.81138	961.9	-4,187.20
2018	-7,791.93	-7136.947613	-654.98	-7020.417005	771.51	-6,365.43
2019	-7,928.41	-7251.556342	-676.85	-7131.134525	797.28	-6,454.28

Appendix 43: India-EU True and Reported BOT (in US$ millions)

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
1980	-1,025.18	-874.9087919	-150.27	-852.0827856	173.1	-701.81
1981	-1,767.74	-1647.003931	-120.74	-1628.664275	139.08	-1,507.93
1982	-1,641.84	-1289.944812	-351.89	-1236.4926	405.35	-884.6
1983	-1,304.13	-1250.963524	-53.17	-1242.887246	61.25	-1,189.72
1984	-1,911.12	-1711.992979	-199.13	-1681.745305	229.38	-1,482.61
1985	-2,406.78	-2211.261445	-195.51	-2181.563163	225.21	-1,986.05
1986	-2,422.56	-2845.94171	423.38	-2910.252861	-487.69	-3,333.63
1987	-2,272.19	-2743.554501	471.36	-2815.154062	-542.96	-3,286.52
1988	-2,234.44	-2568.640224	334.2	-2619.404318	-384.96	-2,953.60
1989	-1,559.55	-2322.052707	762.5	-2437.875187	-878.32	-3,200.37
1990	-2,379.81	-2147.758243	-232.05	-2112.509755	267.3	-1,880.46
1991	-730.77	-740.6995254	9.93	-742.2076558	-11.44	-752.14
1992	-1,479.56	-1185.5732	-293.99	-1140.916573	338.65	-846.93
1993	-1,084.94	-986.6693659	-98.27	-971.7415329	113.2	-873.47
1994	-217.86	-516.7076331	298.84	-562.1014758	-344.24	-860.94
1995	-1,041.21	-1827.748789	786.54	-1947.223035	-906.01	-2,733.76
1996	-1,683.97	-2014.632595	330.66	-2064.859425	-380.89	-2,395.52
1997	-1,358.08	-1468.413331	110.34	-1485.173584	-127.1	-1,595.51
1998	-959.07	-586.2499674	-372.83	-529.6183169	429.46	-156.79
1999	-810.67	-898.2044143	87.53	-911.5000215	-100.83	-999.03
2000	481.25	-143.1825786	624.43	-238.0330974	-719.28	-862.47
2001	545.16	125.7907358	419.37	62.08890261	-483.07	-357.28
2002	-481.8	-1136.039233	654.24	-1235.417059	-753.62	-1,889.65
2003	-420.65	-965.208643	544.56	-1047.92663	-627.28	-1,592.49
2004	-880.3	-1895.869705	1,015.56	-2050.132743	-1,169.83	-3,065.70
2005	-3,168.28	-4031.612688	863.33	-4162.751524	-994.47	-5,026.08
2006	-4,299.92	-5043.932321	744.02	-5156.947518	-857.03	-5,900.96
2007	-5,305.91	-7227.863434	1,921.95	-7519.805893	-2,213.90	-9,441.76

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)- (Diff between Reported and True (equal wt.) BOT)
2008	-3,641.95	-5591.119377	1,949.17	-5887.196422	-2,245.25	-7,836.37
2009	-4,166.77	-6441.303246	2,274.53	-6786.801707	-2,620.03	-9,061.33
2010	-2,088.11	-5302.272807	3,214.17	-5790.500792	-3,702.40	-9,004.67
2011	-2,032.64	-4802.716457	2,770.08	-5223.487747	-3,190.85	-7,993.57
2012	-6,301.87	-7360.76128	1,058.89	-7521.604872	-1,219.73	-8,580.49
2013	-2,368.72	-3704.724768	1,336.01	-3907.66239	-1,538.94	-5,243.67
2014	-2,016.62	-4164.663916	2,148.04	-4490.948363	-2,474.32	-6,638.99
2015	-2,879.03	-4199.966266	1,320.93	-4400.614057	-1,521.58	-5,721.55
2016	439.98	-2921.603515	3,361.58	-3432.223211	-3,872.20	-6,793.80
2017	1,252.42	-2440.316722	3,692.74	-3001.238756	-4,253.66	-6,693.98
2018	1,693.23	-3072.261522	4,765.49	-3796.133652	-5,489.36	-8,561.63
2019	3,555.99	26.41742056	3,529.57	-509.7201864	-4,065.71	-4,039.29

Appendix 44: India-Singapore True and Reported BOT (in US$ millions)

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)-(Diff between Reported and True (equal wt.) BOT)
1980	-348.33	-356.669975	8.34	-355.292066	-6.96	-363.63
1981	-368.31	-422.280753	53.97	-413.363846	-45.05	-467.33
1982	-312.38	-353.811134	41.43	-346.966093	-34.59	-388.4
1983	-219.48	-177.321552	-42.16	-184.28676	35.19	-142.13
1984	-320.63	-407.175922	86.54	-392.877247	-72.25	-479.42
1985	-218.36	-262.132087	43.77	-254.900975	-36.54	-298.67
1986	-79.76	-214.499457	134.74	-192.23763	-112.48	-326.98
1987	-121.64	-238.058936	116.41	-218.825308	-97.18	-335.24
1988	-147.65	-339.389421	191.74	-307.710734	-160.06	-499.45
1989	-120.77	-413.251636	292.48	-364.928626	-244.16	-657.41
1990	-380.75	-598.387309	217.63	-562.430539	-181.68	-780.06
1991	75.33	-296.219741	371.55	-234.833923	-310.16	-606.38
1992	-173.52	-330.848812	157.33	-304.85489	-131.34	-462.19
1993	134.25	-119.961073	254.21	-77.9615574	-212.21	-332.17
1994	17.97	-286.98598	304.95	-236.602473	-254.57	-541.56
1995	-159.14	-639.978428	480.84	-560.535557	-401.4	-1,041.37
1996	-31.62	-638.431998	606.81	-538.176621	-506.55	-1,144.99
1997	-335.1	-884.177276	549.08	-793.460161	-458.36	-1,342.54
1998	-754.58	-1383.7218	629.15	-1279.77581	-525.2	-1,908.92
1999	-862.95	-1414.77974	551.83	-1323.60787	-460.66	-1,875.44
2000	-655.52	-1341.91328	686.39	-1228.51	-572.98	-1,914.90
2001	-424.39	-1138.73054	714.34	-1020.70923	-596.32	-1,735.05
2002	-92.87	-904.465543	811.6	-770.37567	-677.51	-1,581.97
2003	26.29	-944.448274	970.74	-784.065868	-810.35	-1,754.80
2004	919.87	-437.670595	1,357.54	-213.380797	-1,133.25	-1,570.92
2005	1,890.94	-255.639384	2,146.58	99.01287069	-1,791.93	-2,047.57
2006	952.41	-1286.77748	2,239.19	-916.82486	-1,869.23	-3,156.01
2007	-417.73	-2740.58006	2,322.85	-2356.80478	-1,939.08	-4,679.66

Year	Reported BOT	True (equal wt.) BOT	Reported BOT- True (equal wt.) BOT	True weighted. BOT	True weighted. BOT-Reported BOT	(True weighted. BOT)-(Diff between Reported and True (equal wt.) BOT)
2008	365.11	-2157.10334	2,522.22	-1740.38911	-2,105.50	-4,262.61
2009	674.02	-1920.30122	2,594.32	-1491.67391	-2,165.70	-4,086.00
2010	1,824.10	-1803.23967	3,627.34	-1203.94065	-3,028.04	-4,831.28
2011	7,917.28	3147.701332	4,769.58	3935.718605	-3,981.56	-833.86
2012	7,089.27	3883.076755	3,206.19	4412.794839	-2,676.47	1,206.61
2013	6,481.56	1567.900635	4,913.66	2379.721947	-4,101.83	-2,533.93
2014	2,573.66	-710.836833	3,284.50	-168.180545	-2,741.84	-3,452.68
2015	295.36	-2785.50566	3,080.86	-2276.49327	-2,571.85	-5,357.36
2016	852.07	-1976.14337	2,828.21	-1508.87321	-2,360.94	-4,337.09
2017	4,371.36	-221.888912	4,593.25	536.9956909	-3,834.36	-4,056.25
2018	-3,901.43	-5066.46544	1,165.04	-4873.98132	-972.55	-6,039.02
2019	-4,109.27	-5138.60846	1,029.34	-4968.54384	-859.27	-5,997.88

Appendix 45: India-US True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	60464.00056	9635.943316	50828.05724	60,527
2011	50995.36237	8582.134623	42413.22775	52,149
2012	60969.85272	13205.0561	47764.79663	56,622
2013	63922.71758	14909.94666	49012.77092	63,647
2014	85871.92354	19111.46848	66760.45506	84,895
2015	88222.96966	18913.19112	69309.77855	87,176
2016	97221.67181	13910.17649	83311.49532	95,880
2017	118425.4286	17637.37658	100788.0521	1,22,595
2018	126309.3261	16934.56479	109374.7613	1,44,115
2019	123912.7916	18048.20083	105864.5907	1,29,982

Appendix 46: India-UK True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	44276.8064	6749.470005	37527.3364	73,827
2011	56302.8414	6649.478117	49653.36329	65,642
2012	38213.07341	5491.247953	32721.82546	67,506
2013	42286.63324	5740.561085	36546.07215	73,639
2014	52337.3338	7705.938529	44631.39527	91,339
2015	54902.9314	7024.03823	47878.89317	85,634
2016	60255.88409	4915.475066	55340.40902	98,118
2017	77546.66097	15040.67939	62505.98158	1,28,833
2018	80297.64373	7743.863768	72553.77996	1,32,696
2019	83961.5674	18237.22092	65724.34649	1,34,490

Appendix 47: India-Japan True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	27456.04099	67.83647866	27388.20451	27,721
2011	29389.76496	92.54724249	29297.21772	27,924
2012	30658.27862	89.12631202	30569.1523	31,117
2013	31474.24711	99.25423621	31374.99287	35,367
2014	38314.70754	73.73670227	38240.97084	49,269
2015	38489.52812	144.4879368	38345.04018	48,655
2016	50991.99777	146.5258023	50845.47197	65,973
2017	70951.3895	153.1724582	70798.21704	97,481
2018	65479.77385	141.8520359	65337.92181	82,285
2019	61858.92971	138.4075209	61720.52219	67,784

Appendix 48: India-Germany True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	22265.5	627	21638.5	26438
2011	23046.5	798.5	22248	25796
2012	23427	1004.5	22422.5	25046
2013	30100.5	938	29162.5	28380
2014	46041.5	796	45245.5	48727
2015	44298	1003.5	43294.5	39072
2016	48115	815	47300	45162
2017	52107	982	51125	46860
2018	49750	823	48927	46052
2019	47909	833.5	47075.5	40294

Appendix 49: India-Italy True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	3458	231	3227	1758
2011	4718.5	347.5	4371	2435
2012	6446	603	5843	2314
2013	6337.5	64	6273.5	2027
2014	6161	-86.5	6247.5	2336
2015	7210	79.5	7130.5	2717
2016	8376	-21.5	8397.5	4400
2017	12134	54	12080	9386
2018	9309	86.5	9222.5	4530
2019	9226.5	155.5	9071	4539

Appendix 50: India-Mauritius True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True Net inflow	Reported Net inflow
2010	56973	11358	45615	91740
2011	212578	23722	188856	82074
2012	166899.5	31030	135869.5	97804
2013	172932	35440.5	137491.5	102604
2014	176944.5	39852.5	137092	110010
2015	165247	39078.5	126168.5	97079
2016	172137	31075	141062	120533
2017	179637	33872	145765	139402
2018	191653.5	33808	157845.5	121473
2019	185944	35762.5	150181.5	109348

Appendix 51: India's Aggregate True (equal wt.) and Reported Net Capital Inflow (in US$ millions)

Year	Aggregate True Net Inflows	Aggregate Reported Net Inflows
2010	140609.0982	1,90,272
2011	147982.8088	1,73,947
2012	139321.2744	1,82,604
2013	152369.8359	2,03,060
2014	201125.8212	2,76,565
2015	205958.7119	2,63,253
2016	245194.8763	3,09,533
2017	297297.2507	4,05,155
2018	305415.9631	4,09,678
2019	289455.9594	3,77,090

Appendix 52: India-US True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	Net true weighted inflow	Net reported inflow
2010	59276.69383	9483.202696	49793.49114	60,527
2011	49609.19039	8234.493596	41374.69679	52,149
2012	59887.94843	13067.87678	46820.07165	56,622
2013	62405.6277	14953.79235	47451.83535	63,647
2014	83803.55836	18977.44518	64826.11319	84,895
2015	86356.19957	18952.10406	67404.0955	87,176
2016	95410.40015	13439.54433	81970.85582	95,880
2017	115427.4096	16965.44308	98461.96651	1,22,595
2018	121891.0513	16221.86454	105669.1868	1,44,115
2019	120483.6938	17191.64608	103292.0477	1,29,982

Appendix 53: India-UK True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True net weighted inflow	Reported net inflow
2010	38677.41286	7048.794029	31628.61883	73,827
2011	54020.05304	6964.834308	47055.21873	65,642
2012	32730.96148	5661.545361	27069.41612	67,506
2013	36337.24284	5818.731599	30518.51124	73,639
2014	45229.5111	8188.045458	37041.46564	91,339
2015	48899.05505	7155.306262	41743.74879	85,634
2016	53100.70292	4711.635088	48389.06784	98,118
2017	67825.80356	16097.92221	51727.88135	1,28,833
2018	70248.53912	7467.895434	62780.64369	1,32,696
2019	73667.7502	19117.89477	54549.85543	1,34,490

Appendix 54: India-Japan True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True net weighted inflow	Reported net inflow
2010	27399.00682	70.07480814	27328.93201	27,721
2011	29635.88131	94.38138843	29541.49993	27,924
2012	30564.83411	93.10212749	30471.73198	31,117
2013	30766.08437	101.4144293	30664.66994	35,367
2014	36354.96781	75.9612248	36279.00659	49,269
2015	36655.10891	144.276849	36510.83206	48,655
2016	48301.46771	147.4031813	48154.06453	65,973
2017	66207.97271	157.0295187	66050.9432	97,481
2018	62469.46643	146.6857661	62322.78066	82,285
2019	60787.23485	145.4988678	60641.73599	67,784

Appendix 55: India-Germany True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	Net true weighted inflow	Reported net inflow
2010	21486.9441	653.3291925	20833.61491	26438
2011	22481.26087	828.2670807	21652.99379	25796
2012	23027.86957	1045.335404	21982.53416	25046
2013	30267.4472	973.7204969	29293.72671	28380
2014	45474.75155	813.1055901	44661.64596	48727
2015	44963.10559	960.484472	44002.62112	39072
2016	48490.81988	832.2732919	47658.54658	45162
2017	52816.54658	976.2981366	51840.24845	46860
2018	50237.67702	828.5341615	49409.14286	46052
2019	48989.50311	776.7329193	48212.77019	40294

Appendix 56: India-Italy True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True net weighted inflow	Reported net inflow
2010	3686.535032	244.3312102	3442.203822	1758
2011	5029.292994	374.6751592	4654.617834	2435
2012	6950.828025	590.8407643	6359.987261	2314
2013	6922.388535	26.78980892	6895.598726	2027
2014	6693.22293	-127.2993631	6820.522293	2336
2015	7831.43949	54.37579618	7777.063694	2717
2016	8937.961783	-45.15923567	8983.121019	4400
2017	12516.64968	41.98726115	12474.66242	9386
2018	9984.203822	74.26751592	9909.936306	4530
2019	9875.993631	141.0700637	9734.923567	4539

Appendix 57: India-Mauritius True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	True inflow	True outflow	True net weighted inflow	Reported net inflow
2010	49587.41558	9962.675325	39624.74026	91740
2011	225543.974	22820.18182	202723.7922	82074
2012	172653.7208	31840.64935	140813.0714	97804
2013	178825.2468	36802.9026	142022.3442	102604
2014	182096.6429	41487.5	140609.1429	110010
2015	169818.8182	39872.46104	129946.3571	97079
2016	176194.1429	32466.03896	143728.1039	120533
2017	182229.0779	35637.71429	146591.3636	139402
2018	198185.513	35616.31169	162569.2013	121473
2019	193097.5065	37612.95455	155484.5519	109348

Appendix 58: India's Aggregate True (weighted) and Reported Net Capital Inflow (in US$ millions)

Year	Aggregate True weighted Net Inflows	Aggregate Reported Net Inflows
2010	133026.8607	1,90,272
2011	144279.0271	1,73,947
2012	132703.7412	1,82,604
2013	144824.342	2,03,060
2014	189628.7537	2,76,565
2015	197438.3612	2,63,253
2016	235155.6558	3,09,533
2017	280555.7019	4,05,155
2018	290091.6903	4,09,678
2019	276431.3329	3,77,090

Appendix 59: Regression dataset with [log (Net(weighted)Misreported Outflow)] as dependent variable

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
1995	US	5.083454754	1.65492165	-0.024297789	4.510838565
1996	US	5.282405346	1.984010477	-0.024140988	4.65439897
1997	US	5.423426324	1.284569744	-0.02545303	4.83279911
1998	US	6.28338255	1.522997409	-0.025874354	4.959966223
1999	US	5.886806074	1.380655945	-0.025792605	5.033316124
2000	US	5.816495164	0.886150546	-0.026469428	4.992871604
2001	US	5.535084869	1.564673545	-0.023716966	4.883922554
2002	US	6.516524573	2.05426094	-0.028438415	4.615903021
2003	US	6.510443724	2.039103141	-0.02711145	4.824358431
2004	US	7.098743947	1.932302023	-0.026898057	4.89522918
2005	US	7.304730863	1.446403027	-0.031354544	4.870670508
2006	US	7.611199397	1.480870342	-0.032083843	4.953388632
2007	US	7.559297848	1.452986436	-0.032565444	4.926185847
2008	US	6.920416256	1.913409671	-0.034833618	4.366615951
2009	US	6.85182241	2.273160487	-0.026368175	4.647738969
2010	US	7.73100686	1.588041125	-0.025836333	4.747399437
2011	US	6.629231949	1.705283549	-0.031660831	4.611463702
2012	US	7.633179172	1.845661681	-0.034130363	4.74717237
2013	US	6.402914763	1.885819472	-0.034063538	4.964198547
2014	US	6.709547866	1.864458389	-0.031754327	5.012149648
2015	US	5.150231483	1.832540737	-0.029470659	4.923965892
2016	US	6.287118433	1.87190727	-0.027622035	4.984643944
2017	US	7.529432313	1.591180278	-0.026789624	5.10326448
2018	US	7.187458701	1.446570655	-0.031686232	4.996479096
2019	US	6.610883754	1.236161098	-0.031574586	4.928506523
1995	UK	6.23056823	2.017783484	-0.009941028	4.596450007
1996	UK	5.691203001	2.17575354	-0.010127205	4.794998355
1997	UK	2.254959616	1.678099458	-0.010847016	4.887776368
1998	UK	6.030863109	1.797173506	-0.010750686	4.936177798
1999	UK	5.617148773	2.01704037	-0.010243813	5.168385466

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2000	UK	5.852445681	1.847805711	-0.011349132	5.046291313
2001	UK	3.276557724	1.802050466	-0.010141588	4.875559493
2002	UK	3.58196512	2.000224431	-0.010024897	4.644574907
2003	UK	6.084143157	1.90608358	-0.009942804	4.772029339
2004	UK	5.69879116	1.937949422	-0.009630633	4.757963295
2005	UK	6.770832753	1.730390445	-0.010481746	4.791346684
2006	UK	6.479202986	1.896958336	-0.010253899	4.936922165
2007	UK	5.886565343	2.07499519	-0.009234666	4.820637219
2008	UK	6.360047489	2.248160175	-0.011103991	4.157623761
2009	UK	6.135738202	2.524310817	-0.007600858	4.717310666
2010	UK	3.627939337	1.991126433	-0.006946804	4.802946697
2011	UK	6.566462439	2.123280793	-0.008961907	4.699452565
2012	UK	5.607698404	2.220226979	-0.008106627	4.65740204
2013	UK	7.285242445	2.175487353	-0.008721683	4.779123493
2014	UK	7.087935811	2.3052296	-0.007118189	4.700416727
2015	UK	6.739275094	2.337457376	-0.006813161	4.666312321
2016	UK	7.116274731	2.322294333	-0.005631464	4.681695947
2017	UK	6.911812012	2.124754	-0.005048584	4.761156323
2018	UK	6.111070538	2.197157593	-0.00622302	4.576904447
2019	UK	6.486259944	2.124541809	-0.005482422	4.671893818
1995	Germany	4.422526153	1.356415664	-0.012721367	3.105872708
1996	Germany	3.576017435	2.082428663	-0.011765139	3.281688078
1997	Germany	4.888192643	1.135305145	-0.010929364	3.619187982
1998	Germany	5.161668197		-0.009796411	3.889216469
1999	Germany	4.754656737	1.648783166	-0.008059833	4.178539455
2000	Germany	4.257827163	0.880626249	-0.007813191	4.180070548
2001	Germany	3.681892573	0.045729766	-0.007533661	4.009658885
2002	Germany	3.208458774	-0.58816613	-0.008459056	3.501428558
2003	Germany	1.793098818	1.632683025	-0.008635403	3.766488192
2004	Germany	4.314346548	1.809325987	-0.00885256	3.750016463
2005	Germany	5.170752176	1.643122959	-0.010929711	3.7434252
2006	Germany	5.549602845	1.767756045	-0.01181827	4.002400103

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2007	Germany	5.866829546	1.703039902	-0.01167098	4.119579745
2008	Germany	5.576537242	1.882027078	-0.015352627	3.393636559
2009	Germany	6.177229975	2.162081804	-0.012124417	3.638511031
2010	Germany	5.937154364	1.350033347	-0.010477755	3.739945617
2011	Germany	5.207354285	1.76982372	-0.012987177	3.454227378
2012	Germany	5.887233563	1.656324867	-0.012057006	3.740924513
2013	Germany	6.056381047	1.541932114	-0.01135676	3.948705588
2014	Germany	3.3111374	1.925557839	-0.010080083	3.801370333
2015	Germany	3.461002977	1.496219837	-0.00903755	3.934229896
2016	Germany	5.740454946	1.373230337	-0.008163659	3.901757077
2017	Germany	6.369871964	1.807411467	-0.007966142	4.117898256
2018	Germany	7.363313376	2.011358448	-0.008499528	3.790542525
2019	Germany	6.975509496	1.935229644	-0.007516287	3.995279377
1995	Italy	2.387213387	0.461374652	-0.005181742	3.037234037
1996	Italy	4.302874821	1.653569501	-0.005070993	2.91061002
1997	Italy	0.612581027	0.549646092	-0.004840029	3.149611488
1998	Italy	4.552228593		-0.005036263	3.579700547
1999	Italy	3.807031855	2.036680513	-0.004207928	4.063284803
2000	Italy	4.075087734	1.613363863	-0.004253099	4.207295506
2001	Italy	4.054077469	1.326820724	-0.004082971	3.811054424
2002	Italy	4.554926603	1.313410837	-0.004095519	3.625511882
2003	Italy	4.553931202	1.572200513	-0.004358007	3.665066741
2004	Italy	4.058980169	1.743997412	-0.004682474	3.779316234
2005	Italy	5.277201823	1.612903711	-0.005127541	3.76037023
2006	Italy	4.833664486	1.729159518	-0.006173348	3.964567258
2007	Italy	4.929216612	1.632355873	-0.00611698	3.882069972
2008	Italy	5.814791644	1.740377188	-0.007454174	3.080258454
2009	Italy	3.846394707	2.185212881	-0.005088271	3.366605937
2010	Italy	4.426621176	1.307220715	-0.005089745	3.272719863
2011	Italy	6.269255082	1.599519259	-0.005659809	3.003650839
2012	Italy	5.587494504	1.38817201	-0.004985729	3.113470864
2013	Italy	3.509446524	1.547444382	-0.005043163	3.321215783

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2014	Italy	3.614884698	1.937634159	-0.004771593	3.389293477
2015	Italy	4.310062273	1.689270666	-0.003979307	3.545326585
2016	Italy	3.412584119	1.840853888	-0.003637204	3.432760646
2017	Italy	3.888768282	1.717331759	-0.00377877	3.606991295
2018	Italy	6.359272203	1.949014293	-0.004003103	3.424523207
2019	Italy	4.858666437	1.850651501	-0.003455475	3.584157623
1995	Japan	4.546830978	2.562741443	-0.012188742	4.175341355
1996	Japan	4.567142546	2.690539343	-0.010776943	4.13472403
1997	Japan	5.454666622	2.363416856	-0.009861373	3.855169325
1998	Japan	4.617943761	2.175805287	-0.009776159	4.102594334
1999	Japan	5.432249165	2.214687876	-0.009185788	4.581496977
2000	Japan	4.056108278	2.416089319	-0.008108932	4.168177695
2001	Japan	5.011321287	2.313725992	-0.006796885	3.963097561
2002	Japan	4.330274332	2.264250766	-0.007190704	3.917713055
2003	Japan	4.878150479	2.211988566	-0.006948252	4.196097171
2004	Japan	4.981618308	2.270332714	-0.006836982	4.302510308
2005	Japan	6.076596497	2.242068761	-0.007644531	4.566034938
2006	Japan	6.184157794	2.384609048	-0.007718352	4.623475055
2007	Japan	5.258989806	2.170243711	-0.007834507	4.563486835
2008	Japan	6.500336032	2.172205138	-0.009872855	4.124666315
2009	Japan	1.329673286	2.33934361	-0.00715815	4.146258387
2010	Japan	6.109434444	1.741683785	-0.007843844	4.206970284
2011	Japan	4.850333222	1.983151424	-0.009291463	3.989092184
2012	Japan	6.458470137	2.355112013	-0.010503512	4.02679925
2013	Japan	6.660101416	2.244376104	-0.009362279	4.478688796
2014	Japan	7.176947455	2.306883543	-0.007730109	4.502696933
2015	Japan	6.278239107	1.985311124	-0.006854726	4.714158167
2016	Japan	6.931761118	2.234182389	-0.005974307	4.611803547
2017	Japan	6.868909061	2.0622846	-0.005659835	4.850944332
2018	Japan	6.648353516	2.081206641	-0.006388639	4.671917006
2019	Japan	6.681200258	2.038680421	-0.006140771	4.802619113
1995	Singapore	5.994947368	2.026148939	-0.00493162	5.127224422

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
1996	Singapore	6.227629909	2.318957094	-0.004890781	5.048670235
1997	Singapore	6.127655253	1.996991637	-0.004804873	4.647352255
1998	Singapore	6.263780676	1.744412055	-0.004568794	4.70772364
1999	Singapore	6.132655614	1.857099624	-0.004654795	5.410121434
2000	Singapore	6.350859536	1.842993111	-0.004938626	5.069349185
2001	Singapore	6.39077437	1.800687179	-0.004632083	4.858543621
2002	Singapore	6.518419489	1.910315109	-0.005279386	4.697469418
2003	Singapore	6.697470216	1.819327732	-0.00639154	5.024429878
2004	Singapore	7.032848169	1.750915942	-0.008263353	5.242106937
2005	Singapore	7.491046958	1.523607595	-0.01010387	5.305041269
2006	Singapore	7.533284144	1.840792312	-0.011621123	5.555095657
2007	Singapore	7.569966397	1.815995819	-0.011989006	5.697037188
2008	Singapore	7.652309899	1.935124377	-0.015007122	4.918947316
2009	Singapore	7.68049703	1.903620961	-0.009560435	5.512907384
2010	Singapore	8.015669889	0.735848052	-0.009811476	5.598021968
2011	Singapore	8.289429223	1.181222744	-0.013462319	5.366747196
2012	Singapore	7.892254161	1.445211845	-0.012271798	5.557876946
2013	Singapore	8.31918947	1.522653569	-0.011087499	5.4890431
2014	Singapore	7.916385345	1.660832277	-0.008232008	5.476910959
2015	Singapore	7.852381588	1.435711842	-0.00720775	5.33645621
2016	Singapore	7.766816789	1.539117549	-0.006246803	5.303205534
2017	Singapore	8.25175894	1.252651727	-0.007115561	5.439311721
2018	Singapore	6.879922848	1.37001016	-0.009167574	5.215718492
2019	Singapore	6.756087663	1.335845933	-0.008996454	5.233282879

Note: Net Outflow- log[(True(weighted)export-Reportedexport)-(True(weighted)import-Reported import)]

IRP- log (Interest rate parity)

NTGDP- log (Non-traded to GDP ratio)

Mkt- log (Market capitalization of listed foreign companies in foreign countries as a percentage of its GDP)

Appendix 60: Regression dataset with [log (Net (equal weight) Misreported Outflow)] as dependent variable

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
1995	US	4.98210226	1.654922	-0.024297789	4.510838565
1996	US	5.181052852	1.98401	-0.024140988	4.65439897
1997	US	5.32207383	1.28457	-0.02545303	4.83279911
1998	US	6.182030056	1.522997	-0.025874354	4.959966223
1999	US	5.78545358	1.380656	-0.025792605	5.033316124
2000	US	5.715142669	0.886151	-0.026469428	4.992871604
2001	US	5.433732375	1.564674	-0.023716966	4.883922554
2002	US	6.415172079	2.054261	-0.028438415	4.615903021
2003	US	6.40909123	2.039103	-0.02711145	4.824358431
2004	US	6.997391452	1.932302	-0.026898057	4.89522918
2005	US	7.203378369	1.446403	-0.031354544	4.870670508
2006	US	7.509846903	1.48087	-0.032083843	4.953388632
2007	US	7.457945354	1.452986	-0.032565444	4.926185847
2008	US	6.819063761	1.91341	-0.034833618	4.366615951
2009	US	6.750469916	2.27316	-0.026368175	4.647738969
2010	US	7.629654366	1.588041	-0.025836333	4.747399437
2011	US	6.527879455	1.705284	-0.031660831	4.611463702
2012	US	7.531826677	1.845662	-0.034130363	4.74717237
2013	US	6.301562269	1.885819	-0.034063538	4.964198547
2014	US	6.608195372	1.864458	-0.031754327	5.012149648
2015	US	5.048878989	1.832541	-0.029470659	4.923965892
2016	US	6.185765939	1.871907	-0.027622035	4.984643944
2017	US	7.428079818	1.59118	-0.026789624	5.10326448
2018	US	7.086106207	1.446571	-0.031686232	4.996479096
2019	US	6.50953126	1.236161	-0.031574586	4.928506523
1995	UK	6.079995371	2.017783	-0.009941028	4.596450007
1996	UK	5.540630143	2.175754	-0.010127205	4.794998355
1997	UK	2.104386757	1.678099	-0.010847016	4.887776368
1998	UK	5.88029025	1.797174	-0.010750686	4.936177798
1999	UK	5.466575914	2.01704	-0.010243813	5.168385466

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2000	UK	5.701872822	1.847806	-0.011349132	5.046291313
2001	UK	3.125984866	1.80205	-0.010141588	4.875559493
2002	UK	3.431392261	2.000224	-0.010024897	4.644574907
2003	UK	5.933570298	1.906084	-0.009942804	4.772029339
2004	UK	5.548218301	1.937949	-0.009630633	4.757963295
2005	UK	6.620259894	1.73039	-0.010481746	4.791346684
2006	UK	6.328630128	1.896958	-0.010253899	4.936922165
2007	UK	5.735992484	2.074995	-0.009234666	4.820637219
2008	UK	6.209474631	2.24816	-0.011103991	4.157623761
2009	UK	5.985165344	2.524311	-0.007600858	4.717310666
2010	UK	3.477366479	1.991126	-0.006946804	4.802946697
2011	UK	6.415889581	2.123281	-0.008961907	4.699452565
2012	UK	5.457125545	2.220227	-0.008106627	4.65740204
2013	UK	7.134669587	2.175487	-0.008721683	4.779123493
2014	UK	6.937362953	2.30523	-0.007118189	4.700416727
2015	UK	6.588702235	2.337457	-0.006813161	4.666312321
2016	UK	6.965701873	2.322294	-0.005631464	4.681695947
2017	UK	6.761239153	2.124754	-0.005048584	4.761156323
2018	UK	5.960497679	2.197158	-0.00622302	4.576904447
2019	UK	6.335687086	2.124542	-0.005482422	4.671893818
1995	Germany	4.267488555	1.356416	-0.012721367	3.105872708
1996	Germany	3.420979837	2.082429	-0.011765139	3.281688078
1997	Germany	4.733155045	1.135305	-0.010929364	3.619187982
1998	Germany	5.006630599		-0.009796411	3.889216469
1999	Germany	4.599619139	1.648783	-0.008059833	4.178539455
2000	Germany	4.102789565	0.880626	-0.007813191	4.180070548
2001	Germany	3.526854975	0.04573	-0.007533661	4.009658885
2002	Germany	3.053421176	-0.58817	-0.008459056	3.501428558
2003	Germany	1.63806122	1.632683	-0.008635403	3.766488192
2004	Germany	4.15930895	1.809326	-0.00885256	3.750016463
2005	Germany	5.015714578	1.643123	-0.010929711	3.7434252
2006	Germany	5.394565248	1.767756	-0.01181827	4.002400103

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2007	Germany	5.711791948	1.70304	-0.01167098	4.119579745
2008	Germany	5.421499645	1.882027	-0.015352627	3.393636559
2009	Germany	6.022192377	2.162082	-0.012124417	3.638511031
2010	Germany	5.782116766	1.350033	-0.010477755	3.739945617
2011	Germany	5.052316687	1.769824	-0.012987177	3.454227378
2012	Germany	5.732195965	1.656325	-0.012057006	3.740924513
2013	Germany	5.901343449	1.541932	-0.01135676	3.948705588
2014	Germany	3.156099802	1.925558	-0.010080083	3.801370333
2015	Germany	3.305965379	1.49622	-0.00903755	3.934229896
2016	Germany	5.585417349	1.37323	-0.008163659	3.901757077
2017	Germany	6.214834366	1.807411	-0.007966142	4.117898256
2018	Germany	7.208275778	2.011358	-0.008499528	3.790542525
2019	Germany	6.820471898	1.93523	-0.007516287	3.995279377
1995	Italy	2.250502342	0.461375	-0.005181742	3.037234037
1996	Italy	4.166163776	1.65357	-0.005070993	2.91061002
1997	Italy	0.475869982	0.549646	-0.004840029	3.149611488
1998	Italy	4.415517548		-0.005036263	3.579700547
1999	Italy	3.670320809	2.036681	-0.004207928	4.063284803
2000	Italy	3.938376688	1.613364	-0.004253099	4.207295506
2001	Italy	3.917366423	1.326821	-0.004082971	3.811054424
2002	Italy	4.418215558	1.313411	-0.004095519	3.625511882
2003	Italy	4.417220157	1.572201	-0.004358007	3.665066741
2004	Italy	3.922269123	1.743997	-0.004682474	3.779316234
2005	Italy	5.140490778	1.612904	-0.005127541	3.76037023
2006	Italy	4.696953441	1.72916	-0.006173348	3.964567258
2007	Italy	4.792505566	1.632356	-0.00611698	3.882069972
2008	Italy	5.678080598	1.740377	-0.007454174	3.080258454
2009	Italy	3.709683661	2.185213	-0.005088271	3.366605937
2010	Italy	4.289910131	1.307221	-0.005089745	3.272719863
2011	Italy	6.132544037	1.599519	-0.005659809	3.003650839
2012	Italy	5.450783459	1.388172	-0.004985729	3.113470864
2013	Italy	3.372735479	1.547444	-0.005043163	3.321215783

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
2014	Italy	3.478173653	1.937634	-0.004771593	3.389293477
2015	Italy	4.173351228	1.689271	-0.003979307	3.545326585
2016	Italy	3.275873073	1.840854	-0.003637204	3.432760646
2017	Italy	3.752057236	1.717332	-0.00377877	3.606991295
2018	Italy	6.222561158	1.949014	-0.004003103	3.424523207
2019	Italy	4.721955391	1.850652	-0.003455475	3.584157623
1995	Japan	4.383085807	2.562741	-0.012188742	4.175341355
1996	Japan	4.403397375	2.690539	-0.010776943	4.13472403
1997	Japan	5.29092145	2.363417	-0.009861373	3.855169325
1998	Japan	4.45419859	2.175805	-0.009776159	4.102594334
1999	Japan	5.268503994	2.214688	-0.009185788	4.581496977
2000	Japan	3.892363107	2.416089	-0.008108932	4.168177695
2001	Japan	4.847576116	2.313726	-0.006796885	3.963097561
2002	Japan	4.166529161	2.264251	-0.007190704	3.917713055
2003	Japan	4.714405308	2.211989	-0.006948252	4.196097171
2004	Japan	4.817873136	2.270333	-0.006836982	4.302510308
2005	Japan	5.912851326	2.242069	-0.007644531	4.566034938
2006	Japan	6.020412623	2.384609	-0.007718352	4.623475055
2007	Japan	5.095244634	2.170244	-0.007834507	4.563486835
2008	Japan	6.336590861	2.172205	-0.009872855	4.124666315
2009	Japan	1.165928115	2.339344	-0.00715815	4.146258387
2010	Japan	5.945689273	1.741684	-0.007843844	4.206970284
2011	Japan	4.68658805	1.983151	-0.009291463	3.989092184
2012	Japan	6.294724966	2.355112	-0.010503512	4.02679925
2013	Japan	6.496356245	2.244376	-0.009362279	4.478688796
2014	Japan	7.013202283	2.306884	-0.007730109	4.502696933
2015	Japan	6.114493936	1.985311	-0.006854726	4.714158167
2016	Japan	6.768015947	2.234182	-0.005974307	4.611803547
2017	Japan	6.70516389	2.062285	-0.005659835	4.850944332
2018	Japan	6.484608344	2.081207	-0.006388639	4.671917006
2019	Japan	6.517455087	2.03868	-0.006140771	4.802619113
1995	Singapore	6.175531305	2.026149	-0.00493162	5.127224422

Year	Countries	Net Outflow	IRP	NTGDP	Mkt
1996	Singapore	6.408213846	2.318957	-0.004890781	5.048670235
1997	Singapore	6.30823919	1.996992	-0.004804873	4.647352255
1998	Singapore	6.444364613	1.744412	-0.004568794	4.70772364
1999	Singapore	6.313239551	1.8571	-0.004654795	5.410121434
2000	Singapore	6.531443473	1.842993	-0.004938626	5.069349185
2001	Singapore	6.571358307	1.800687	-0.004632083	4.858543621
2002	Singapore	6.699003425	1.910315	-0.005279386	4.697469418
2003	Singapore	6.878054153	1.819328	-0.00639154	5.024429878
2004	Singapore	7.213432106	1.750916	-0.008263353	5.242106937
2005	Singapore	7.671630895	1.523608	-0.01010387	5.305041269
2006	Singapore	7.713868081	1.840792	-0.011621123	5.555095657
2007	Singapore	7.750550334	1.815996	-0.011989006	5.697037188
2008	Singapore	7.832893836	1.935124	-0.015007122	4.918947316
2009	Singapore	7.861080967	1.903621	-0.009560435	5.512907384
2010	Singapore	8.196253826	0.735848	-0.009811476	5.598021968
2011	Singapore	8.47001316	1.181223	-0.013462319	5.366747196
2012	Singapore	8.072838097	1.445212	-0.012271798	5.557876946
2013	Singapore	8.499773407	1.522654	-0.011087499	5.4890431
2014	Singapore	8.096969282	1.660832	-0.008232008	5.476910959
2015	Singapore	8.032965525	1.435712	-0.00720775	5.33645621
2016	Singapore	7.947400726	1.539118	-0.006246803	5.303205534
2017	Singapore	8.432342877	1.252652	-0.007115561	5.439311721
2018	Singapore	7.060506785	1.37001	-0.009167574	5.215718492
2019	Singapore	6.9366716	1.335846	-0.008996454	5.233282879

Note: Net Outflow-log [(True(equalweight)export-Reportedexport)-(True(equalweight)import-Reported import)]

IRP- log (Interest rate parity)

NTGDP- log (Non-traded to GDP ratio)

Mkt- log (Market capitalization of listed foreign companies in foreign countries as a percentage of its GDP)

Appendix 61: Regression dataset with [log (Net(weighted) Misreported Inflow)] as dependent variable

Year	Countries	Net Inflow	IRP	Mkt	NTGDP
2010	US	9.281136462	1.58804113	4.74739944	-0.025836333
2011	US	9.284961521	1.70528355	4.6114637	-0.031660831
2012	US	9.190292918	1.84566168	4.74717237	-0.034130363
2013	US	9.692439707	1.88581947	4.96419855	-0.034063538
2014	US	9.906921496	1.86445839	5.01214965	-0.031754327
2015	US	9.891994843	1.83254074	4.92396589	-0.029470659
2016	US	9.540301085	1.87190727	4.98464394	-0.027622035
2017	US	10.09134118	1.59118028	5.10326448	-0.026789624
2018	US	10.55699266	1.44657065	4.9964791	-0.031686232
2019	US	10.19204925	1.2361611	4.92850652	-0.031574586
2010	UK	10.65014038	1.99112643	4.8029467	-0.006946804
2011	UK	9.830202973	2.12328079	4.69945257	-0.008961907
2012	UK	10.6074873	2.22022698	4.65740204	-0.008106627
2013	UK	10.67174785	2.17548735	4.77912349	-0.008721683
2014	UK	10.90222773	2.3052296	4.70041673	-0.007118189
2015	UK	10.68943903	2.33745738	4.66631232	-0.006813161
2016	UK	10.81434003	2.32229433	4.68169595	-0.005631464
2017	UK	11.25292173	2.124754	4.76115632	-0.005048584
2018	UK	11.15504284	2.19715759	4.57690445	-0.00622302
2019	UK	11.28903901	2.12454181	4.67189382	-0.005482422
2010	Germany	8.631304623	1.35003335	3.73994562	-0.010477755
2011	Germany	8.329176941	1.76982372	3.45422738	-0.012987177
2012	Germany	8.027302181	1.65632487	3.74092451	-0.012057006
2013	Germany	6.81753152	1.54193211	3.94870559	-0.01135676
2014	Germany	8.310256112	1.92555784	3.80137033	-0.010080083
2015	Germany	8.503220247	1.49621984	3.9342299	-0.00903755
2016	Germany	7.822663689	1.37323034	3.90175708	-0.008163659
2017	Germany	8.513235058	1.80741147	4.11789826	-0.007966142
2018	Germany	8.118845551	2.01135845	3.79054253	-0.008499528
2019	Germany	8.976991193	1.93522964	3.99527938	-0.007516287

Year	Countries	Net Inflow	IRP	Mkt	NTGDP
2010	Italy	7.429048222	1.30722072	3.27271986	-0.005089745
2011	Italy	7.705090313	1.59951926	3.00365084	-0.005659809
2012	Italy	8.305480869	1.38817201	3.11347086	-0.004985729
2013	Italy	8.490561439	1.54744438	3.32121578	-0.005043163
2014	Italy	8.408387257	1.93763416	3.38929348	-0.004771593
2015	Italy	8.52913435	1.68927067	3.54532659	-0.003979307
2016	Italy	8.43013549	1.84085389	3.43276065	-0.003637204
2017	Italy	8.035493403	1.71733176	3.60699129	-0.00377877
2018	Italy	8.590431814	1.94901429	3.42452321	-0.004003103
2019	Italy	8.555629668	1.8506515	3.58415762	-0.003455475
2010	Japan	5.972345005	1.74168379	4.20697028	-0.007843844
2011	Japan	7.388523681	1.98315142	3.98909218	-0.009291463
2012	Japan	6.46923439	2.35511201	4.02679925	-0.010503512
2013	Japan	8.45591924	2.2443761	4.4786888	-0.009362279
2014	Japan	9.471900964	2.30688354	4.50269693	-0.007730109
2015	Japan	9.404567666	1.98531112	4.71415817	-0.006854726
2016	Japan	9.788019089	2.23418239	4.61180355	-0.005974307
2017	Japan	10.35552535	2.0622846	4.85094433	-0.005659835
2018	Japan	9.901601466	2.08120664	4.67191701	-0.006388639
2019	Japan	8.873791349	2.03868042	4.80261911	-0.006140771

Note: NetInflow-log[(True(weighted)Inflow-ReportedInflow)-(True(weighted)Outflow-Reported Outflow)]

IRP- log (Interest rate parity)

NTGDP- log (Non-traded to GDP ratio)

Mkt- log (Market capitalization of listed foreign companies in foreign countries as a percentage of its GDP)

Appendix 62: Regression dataset with [log (Net (equal weight) Misreported Inflow)] as dependent variable

Year	Countries	Net Inflow	IRP	Mkt	NTGDP
2010	US	9.179783968	1.588041125	4.74739944	-0.025836333
2011	US	9.183609027	1.705283549	4.6114637	-0.031660831
2012	US	9.088940424	1.845661681	4.74717237	-0.034130363
2013	US	9.591087213	1.885819472	4.96419855	-0.034063538
2014	US	9.805569002	1.864458389	5.01214965	-0.031754327
2015	US	9.790642349	1.832540737	4.92396589	-0.029470659
2016	US	9.43894859	1.87190727	4.98464394	-0.027622035
2017	US	9.989988686	1.591180278	5.10326448	-0.026789624
2018	US	10.45564017	1.446570655	4.9964791	-0.031686232
2019	US	10.09069676	1.236161098	4.92850652	-0.031574586
2010	UK	10.49956752	1.991126433	4.8029467	-0.006946804
2011	UK	9.679630114	2.123280793	4.69945257	-0.008961907
2012	UK	10.45691444	2.220226979	4.65740204	-0.008106627
2013	UK	10.52117499	2.175487353	4.77912349	-0.008721683
2014	UK	10.75165488	2.3052296	4.70041673	-0.007118189
2015	UK	10.53886617	2.337457376	4.66631232	-0.006813161
2016	UK	10.66376717	2.322294333	4.68169595	-0.005631464
2017	UK	11.10234887	2.124754	4.76115632	-0.005048584
2018	UK	11.00446998	2.197157593	4.57690445	-0.00622302
2019	UK	11.13846615	2.124541809	4.67189382	-0.005482422
2010	Germany	8.476267025	1.350033347	3.73994562	-0.010477755
2011	Germany	8.174139343	1.76982372	3.45422738	-0.012987177
2012	Germany	7.872264583	1.656324867	3.74092451	-0.012057006
2013	Germany	6.662493922	1.541932114	3.94870559	-0.01135676
2014	Germany	8.155218514	1.925557839	3.80137033	-0.010080083
2015	Germany	8.348182649	1.496219837	3.9342299	-0.00903755
2016	Germany	7.667626092	1.373230337	3.90175708	-0.008163659
2017	Germany	8.35819746	1.807411467	4.11789826	-0.007966142
2018	Germany	7.963807953	2.011358448	3.79054253	-0.008499528
2019	Germany	8.821953595	1.935229644	3.99527938	-0.007516287

Year	Countries	Net Inflow	IRP	Mkt	NTGDP
2010	Italy	7.292337176	1.307220715	3.27271986	-0.005089745
2011	Italy	7.568379268	1.599519259	3.00365084	-0.005659809
2012	Italy	8.168769824	1.38817201	3.11347086	-0.004985729
2013	Italy	8.353850393	1.547444382	3.32121578	-0.005043163
2014	Italy	8.271676211	1.937634159	3.38929348	-0.004771593
2015	Italy	8.392423304	1.689270666	3.54532659	-0.003979307
2016	Italy	8.293424445	1.840853888	3.43276065	-0.003637204
2017	Italy	7.898782357	1.717331759	3.60699129	-0.00377877
2018	Italy	8.453720768	1.949014293	3.42452321	-0.004003103
2019	Italy	8.418918622	1.850651501	3.58415762	-0.003455475
2010	Japan	5.808599834	1.741683785	4.20697028	-0.007843844
2011	Japan	7.224778509	1.983151424	3.98909218	-0.009291463
2012	Japan	6.305489219	2.355112013	4.02679925	-0.010503512
2013	Japan	8.292174068	2.244376104	4.4786888	-0.009362279
2014	Japan	9.308155792	2.306883543	4.50269693	-0.007730109
2015	Japan	9.240822495	1.985311124	4.71415817	-0.006854726
2016	Japan	9.624273918	2.234182389	4.61180355	-0.005974307
2017	Japan	10.19178018	2.0622846	4.85094433	-0.005659835
2018	Japan	9.737856295	2.081206641	4.67191701	-0.006388639
2019	Japan	8.710046177	2.038680421	4.80261911	-0.006140771

Note: NetInflow-log[(True(equalweight)Inflow-ReportedInflow)-(True(equalweight)Outflow-Reported Outflow)]

IRP- log (Interest rate parity)

NTGDP- log (Non-traded to GDP ratio)

Mkt- log (Market capitalization of listed foreign companies in foreign countries as a percentage of its GDP

Appendix 63: Fixed Effect Regression Results with [log (Net(weighted) Misreported Outflow)] as dependent variable

Fixed-effects (within) regression			Number of obs	=	142
Croup variable : panel			Number of groups	=	6
R-sq:	within	= 0.1173	Obs per group : min	=	23
	between	= 0.8008	avg	=	23.7
	overall	= 0.4007	max	=	24
corr (u_i, Xb)		= 0.1567	F (3, 5)	=	6.62
			Prob > F	=	0.0342

(Std. Err. adjusted for 6 clusters in panel)

Net Inflow	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
IRP	.7933238	.3145408	2.52	0.053	-.015292	1.601877
dNTGDP	-123.4054	48.87021	-2.53	0.053	-249.0303	2.219492
Mkt	1.150126	.6148563	1.87	0.120	-.4304122	2.730665
_cons	-.7340523	2.484125	-0.30	0.779	-7.1197	5.651595
sigma_u	.46989557					
sigma_e	1.082418					
rho	.15857296	(fraction of variance due to u_i)				

Note:

dNTGDP- Indicates that Non-traded to GDP ratio (NTGDP) is stationary at first difference

Appendix 64: Fixed Effect Regression Results with [log (Net (equal weight) Misreported Outflow)] as dependent variable

Fixed-effects (within) regression			Number of obs	=	142
Croup variable : panel			Number of groups	=	6
R-sq:	within	= 0.1173	Obs per group : min	=	23
	between	= 0.7643	avg	=	23.7
	overall	= 0.4144	max	=	24
corr (u_i, Xb)		= 0.2350	F (3, 5)	=	6.62
			Prob > F	=	0.0342

(Std. Err. adjusted for 6 clusters in panel)

Net Inflow	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
IRP	.7933238	.3145408	2.52	0.053	-.0152292	1.601877
Mkt	1.150126	.6148563	1.87	0.120	-.4304122	2.730665
dNTGDP	-123.4054	48.87021	-2.53	0.053	-249.0303	2.219492
_cons	-.8210403	2.484125	-0.33	0.754	-7.206688	5.564607
sigma_u	.57326388					
sigma_e	1.082418					
rho	.21904964	(fraction of variance due to u_i)				

Note:

dNTGDP- Indicates that Non-traded to GDP ratio (NTGDP) is stationary at first difference

Appendix 65: Fixed & Random Effects Regression Results with [log (Net(weighted)Misreported Inflow)] as dependent variable

Fixed-effects (within) regression — Number of obs = 45
Croup variable : panel — Number of groups = 5

R-sq: within = 0.4257 — Obs per group : min = 9
between = 0.1818 — avg = 9.0
overall = 0.2291 — max = 9

corr (u_i, Xb) = -0.3979 — F (3, 37) = 9.14
Prob > F = 0.0001

Net Inflow	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dIRP	-.0008517	.4625803	-0.00	0.999	-.9381283	.9364249
NTGDP	108.555	60.45405	1.80	0.081	-13.93658	231.0465
Mkt	1.548654	.5824516	2.66	0.012	.3684953	2.728814
_cons	3.738799	2.939985	1.27	0.211	-2.218176	9.695774
sigma_u	1.1194362					
sigma_e	.5514225					
rho	.80473544	(fraction of variance due to u_i)				

F test that all u_i=0; F(4, 37) = 12.72 Prof > F = 0.0000

Random-effects (within) regression — Number of obs = 45
Croup variable : panel — Number of groups = 5

R-sq: within = 0.4143 — Obs per group : min = 9
between = 0.6271 — avg = 9.0
overall = 0.5606 — max = 9

corr (u_i, Xb) = (assumed) — Wald chi2(3) = 11.17
Prob > chi2 = 0.0108

(Std. Err. adjusted for 5 clusters in panel)

Net Inflow	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dIRP	-.0161239	.3132017	-0.05	0.959	-.629988	.5977402
NTGDP	56.90194	36.62897	1.55	0.120	-14.88952	128.69334
Mkt	1.855063	.5914641	3.14	0.002	.6958148	3.014312
_cons	1.956892	2.601663	0.75	0.452	-3.142274	7.056058
sigma_u	.82142599					
sigma_e	.5514225					
rho	.68934975	(fraction of variance due to u_i)				

Note:

dNTGDP- Indicates that Non-traded to GDP ratio (NTGDP) is stationary at first difference

Appendix 66: Fixed & Random Effects Regression Results with [log (Net (equal weight) Misreported Inflow)] as dependent variable

Fixed-effects (within) regression — Number of obs = 45
Croup variable : panel — Number of groups = 5

R-sq: within = 0.4257 — Obs per group : min = 9
between = 0.1818 — avg = 9.0
overall = 0.2291 — max = 9

corr (u_i, Xb) = -0.3979 — F (3, 37) = 9.14
Prob > F = 0.0001

Net Inflow	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dIRP	-.0008517	.4625803	-0.00	0.999	-.9381283	.9364249
NTGDP	108.555	60.45405	1.80	0.081	-13.93658	231.0465
Mkt	1.548654	.5824516	2.66	0.012	.3684953	2.728814
_cons	3.738799	2.939985	1.27	0.211	-2.218176	9.695774
sigma_u	1.1194362					
sigma_e	.5514225					
rho	.80473544	(fraction of variance due to u_i)				

F test that all u_i=0; F(4, 37) = 12.72 Prof > F = 0.0000

Random-effects GLS regression — Number of obs = 45
Croup variable : panel — Number of groups = 5

R-sq: within = 0.4139 — Obs per group : min = 9
between = 0.6179 — avg = 9.0
overall = 0.5544 — max = 9

corr (u_i, Xb) = (assumed) — Wald chi2(3) = 11.05
Prob > chi2 = 0.0114

(Std. Err. adjusted for 5 clusters in panel)

Net Inflow	Coef.	Std. Err.	t	P>|z|	[95% Conf.	Interval]
dIRP	-.0177576	.3145542	-0.06	0.955	-.6342725	.5987573
NTGDP	55.83408	36.95236	1.51	0.131	-16.59121	128.2594
Mkt	1.85821	.5942864	3.13	0.002	.6934304	3.02299
_cons	1.789295	2.622985	0.68	0.495	-3.351661	6.930251
sigma_u	.82614632					
sigma_e	.5514225					
rho	.68179856	(fraction of variance due to u_i)				

Note:

dNTGDP- Indicates that Non-traded to GDP ratio (NTGDP) is stationary at first difference

Appendix 67: India's Aggregate True (equal weights) and Reported BOT (in US$ millions)

Year	Aggregate True BOT	Aggregate Reported BOT
1980	-2549.194748	-2,735.71
1981	-3576.228514	-3,466.02
1982	-3112.246244	-3,333.73
1983	-2557.897043	-2,828.71
1984	-2311.425917	-2,985.14
1985	-3387.4732	-3,768.57
1986	-4260.536957	-3,732.34
1987	-3654.033244	-3,065.03
1988	-3870.436095	-2,989.84
1989	-2008.027962	627.47
1990	-3211.88873	-3,402.02
1991	69.37952911	616.51
1992	4.582588122	-419.36
1993	726.0088803	850.4
1994	1868.7675	2,174.80
1995	-624.3690817	854.17
1996	1.179450275	1,289.63
1997	615.7959165	863.68
1998	1080.37701	408.83
1999	1423.719341	1,306.78
2000	3430.830588	4,688.63
2001	3789.67173	4,589.73
2002	4334.083118	5,155.30
2003	3965.65841	5,139.57
2004	4506.940198	5,919.35
2005	3717.016705	5,763.34
2006	2359.735459	3,665.65
2007	-7746.290598	-4,762.00
2008	-6779.74941	-3,290.91
2009	-7260.913155	-2,852.24

Year	Aggregate True BOT	Aggregate Reported BOT
2010	-3149.807218	1,983.09
2011	4211.287176	11,570.00
2012	5826.987472	7,918.27
2013	12394.57721	18,690.82
2014	16381.02679	22,473.55
2015	10898.10977	15,730.22
2016	14943.27049	21,808.92
2017	16336.36079	26,352.02
2018	4487.637656	11,346.23
2019	8724.958074	12,714.17

Appendix 68: India's Aggregate True (weighted) and Reported BOT (in US$ millions)

Year	Aggregate true. Weighted BOT	Aggregate Reported BOT
1980	-2524.480348	-2,735.71
1981	-3577.29699	-3,466.02
1982	-3076.729445	-3,333.73
1983	-2547.198801	-2,828.71
1984	-2201.492692	-2,985.14
1985	-3336.757713	-3,768.57
1986	-4308.208836	-3,732.34
1987	-3718.735526	-3,065.03
1988	-3938.559957	-2,989.84
1989	-2301.057084	627.47
1990	-3124.798266	-3,402.02
1991	101.2760572	616.51
1992	109.5823492	-419.36
1993	793.4723067	850.4
1994	1905.057187	2,174.80
1995	-705.6192377	854.17
1996	5.3645121	1,289.63
1997	748.2524467	863.68
1998	1366.037707	408.83
1999	1609.311784	1,306.78
2000	3441.81448	4,688.63
2001	3887.387792	4,589.73
2002	4440.422849	5,155.30
2003	4066.607165	5,139.57
2004	4673.918016	5,919.35
2005	4027.773813	5,763.34
2006	2793.631913	3,665.65
2007	-7548.931478	-4,762.00
2008	-6541.834699	-3,290.91
2009	-7150.662808	-2,852.24

Year	Aggregate true. Weighted BOT	Aggregate Reported BOT
2010	-2881.900698	1,983.09
2011	4571.421758	11,570.00
2012	6453.240183	7,918.27
2013	12975.65468	18,690.82
2014	16548.6595	22,473.55
2015	11152.2221	15,730.22
2016	14830.62082	21,808.92
2017	16359.78244	26,352.02
2018	3882.269484	11,346.23
2019	8499.387014	12,714.17

Appendix 69: India's Rate of Trade Misreporting (with equal weights data)

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
1995	US	-0.039925713	-3.992571325	-0.021885034	-2.188503388
1996	US	0.002075923	0.207592279	-0.049242897	-4.924289717
1997	US	-0.038023382	-3.802338241	-0.016360533	-1.636053264
1998	US	-0.069793172	-6.979317213	-0.013197632	-1.319763228
1999	US	-0.055661592	-5.566159172	-0.040671779	-4.067177876
2000	US	-0.068048491	-6.804849064	-0.102448822	-10.24488222
2001	US	-0.077061199	-7.706119859	-0.132100366	-13.2100366
2002	US	-0.065140588	-6.514058788	-0.025311283	-2.531128348
2003	US	-0.066147965	-6.614796477	-0.038836979	-3.883697927
2004	US	-0.094090366	-9.409036592	-0.038538695	-3.853869549
2005	US	-0.064581018	-6.458101808	0.023897601	2.389760136
2006	US	-0.078985897	-7.898589718	0.021770175	2.177017468
2007	US	-0.077464816	-7.746481649	0.001618472	0.161847188
2008	US	-0.062490229	-6.249022864	-0.030154638	-3.015463829
2009	US	-0.064374172	-6.43741716	-0.023656296	-2.365629588
2010	US	-0.101886576	-10.18865763	-0.03139655	-3.139655003
2011	US	-0.011094645	-1.109464516	0.013380445	1.338044489
2012	US	-0.027191724	-2.719172447	0.035194742	3.519474216
2013	US	-0.009354161	-0.935416072	0.007720875	0.772087522
2014	US	-0.002200274	-0.220027376	-0.037829023	-3.782902302
2015	US	-0.021892597	-2.189259664	-0.048715547	-4.871554664
2016	US	-0.016921979	-1.692197865	-0.055452566	-5.54525663
2017	US	0.002030565	0.203056524	-0.061950191	-6.195019074
2018	US	0.002780548	0.278054767	-0.030894802	-3.089480185
2019	US	-0.001658235	-0.165823492	-0.021325042	-2.132504169
	Avg	-0.045288691	-4.528869087	-0.028751425	-2.875142453
1995	UK	-0.063982007	-6.39820068	-0.25152365	-25.15236499
1996	UK	-0.082264524	-8.226452358	-0.182588652	-18.25886518
1997	UK	-0.084047553	-8.404755292	-0.072998468	-7.299846831
1998	UK	-0.081840131	-8.184013069	0.077798425	7.779842505
1999	UK	-0.065305868	-6.530586846	0.037705149	3.770514903
2000	UK	-0.03520184	-3.520184005	-0.110931539	-11.09315394
2001	UK	-0.071782467	-7.178246708	-0.065093344	-6.509334367

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2002	UK	-0.041081826	-4.108182616	-0.046989717	-4.698971674
2003	UK	-0.035138106	-3.513810576	-0.134014233	-13.40142327
2004	UK	-0.075094987	-7.509498707	-0.136365798	-13.63657979
2005	UK	-0.005261597	-0.526159745	-0.167971333	-16.79713325
2006	UK	0.016064478	1.606447807	-0.103280514	-10.32805136
2007	UK	-0.03408886	-3.408886038	-0.10135576	-10.13557601
2008	UK	-0.018379383	-1.837938268	-0.091332451	-9.133245138
2009	UK	0.014402361	1.440236141	-0.072216559	-7.221655887
2010	UK	-0.082294797	-8.229479679	-0.094938226	-9.493822601
2011	UK	-0.009547849	-0.954784924	-0.085192807	-8.519280734
2012	UK	-0.007547248	-0.754724843	-0.043814366	-4.381436606
2013	UK	0.060692094	6.069209351	-0.097711487	-9.771148731
2014	UK	0.018178052	1.817805168	-0.151925993	-15.19259933
2015	UK	0.035845215	3.584521467	-0.072167724	-7.216772431
2016	UK	0.080557523	8.055752277	-0.091009215	-9.100921488
2017	UK	0.029291338	2.929133843	-0.12282838	-12.28283796
2018	UK	0.045152317	4.515231709	0.004967822	0.496782182
2019	UK	-0.017680856	-1.768085589	0.062687413	6.268741309
	Avg	-0.006645822	-0.664582197	-0.086074211	-8.607421054
1995	Germany	-0.126000565	-12.60005652	-0.110442191	-11.04421909
1996	Germany	-0.14447615	-14.44761503	-0.093669066	-9.366906627
1997	Germany	-0.082714361	-8.271436136	-0.022197252	-2.219725186
1998	Germany	-0.095929145	-9.592914547	-0.021430394	-2.143039427
1999	Germany	-0.094326415	-9.432641494	-0.042262244	-4.226224407
2000	Germany	-0.03431985	-3.431985022	-0.066495747	-6.649574668
2001	Germany	-0.063027726	-6.302772636	-0.074752967	-7.475296715
2002	Germany	-0.016897238	-1.68972376	-0.023676341	-2.367634103
2003	Germany	-0.030980872	-3.098087249	-0.025397803	-2.539780315
2004	Germany	-0.099694941	-9.969494133	-0.088850775	-8.8850775
2005	Germany	-0.033370561	-3.337056089	0.006107784	0.610778384
2006	Germany	-0.065630464	-6.563046426	-0.06434994	-6.43499404
2007	Germany	-0.074075895	-7.407589475	-0.069052689	-6.905268888
2008	Germany	-0.025331376	-2.533137639	-0.031775138	-3.17751382
2009	Germany	-0.039429891	-3.942989063	-0.05601766	-5.601766008

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2010	Germany	-0.06701534	-6.701533997	-0.061769008	-6.176900782
2011	Germany	-0.020263631	-2.026363104	-0.020957075	-2.095707512
2012	Germany	-0.007847672	-0.784767224	0.01744873	1.744872959
2013	Germany	-0.000261184	-0.026118374	0.027586736	2.758673572
2014	Germany	0.018708818	1.870881768	0.009437085	0.943708453
2015	Germany	0.031798394	3.179839432	0.020945731	2.094573149
2016	Germany	0.042224459	4.222445921	0.002106228	0.210622788
2017	Germany	0.066939111	6.693911078	0.001325499	0.132549906
2018	Germany	0.063448185	6.34481845	-0.055067853	-5.506785288
2019	Germany	0.037545135	3.754513455	-0.044846689	-4.484668916
	Avg	-0.015874127	-1.587412704	-0.029902595	-2.990259467
1995	Italy	-0.130106413	-13.01064126	-0.132917494	-13.29174937
1996	Italy	-0.156853796	-15.68537958	-0.089426077	-8.942607701
1997	Italy	-0.081242075	-8.124207453	-0.090184735	-9.018473503
1998	Italy	-0.109739604	-10.97396038	-0.044876661	-4.487666148
1999	Italy	-0.053793161	-5.379316135	-0.027733765	-2.773376543
2000	Italy	-0.057594114	-5.759411402	-0.150252628	-15.02526276
2001	Italy	-0.05832419	-5.832418987	-0.15010447	-15.01044698
2002	Italy	-0.032719502	-3.271950193	-0.139772896	-13.97728963
2003	Italy	-0.044509068	-4.450906788	-0.136514988	-13.65149879
2004	Italy	-0.073341893	-7.334189257	-0.144619384	-14.4619384
2005	Italy	-0.025712906	-2.571290603	-0.119621532	-11.96215315
2006	Italy	-0.030314014	-3.031401417	-0.079501301	-7.950130053
2007	Italy	-0.066106958	-6.610695813	-0.098312606	-9.831260571
2008	Italy	-0.072239706	-7.223970559	-0.006169869	-0.616986894
2009	Italy	-0.080821884	-8.082188388	-0.063874879	-6.387487928
2010	Italy	-0.066010298	-6.601029824	-0.049337521	-4.93375212
2011	Italy	-0.107182448	-10.7182448	-0.027545184	-2.754518437
2012	Italy	-0.027575844	-2.757584416	0.023708843	2.370884345
2013	Italy	0.011716045	1.171604502	0.007093885	0.709388451
2014	Italy	0.013349464	1.334946376	0.008899635	0.889963461
2015	Italy	0.006355502	0.635550226	0.022804164	2.280416423
2016	Italy	0.006980688	0.698068797	0.001211871	0.121187083
2017	Italy	0.015500263	1.550026305	0.009991972	0.999197199

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2018	Italy	-0.055571044	-5.557104369	0.034794226	3.479422586
2019	Italy	-0.024022148	-2.402214839	-0.003243912	-0.324391199
	Avg	-0.038407203	-3.840720273	-0.053018329	-5.301832868
1995	Japan	-0.127262665	-12.7262665	-0.093541471	-9.354147091
1996	Japan	-0.128467174	-12.84671736	-0.095234669	-9.523466905
1997	Japan	-0.131285781	-13.12857811	-0.041123866	-4.112386584
1998	Japan	-0.0903431	-9.034310008	-0.034094165	-3.409416546
1999	Japan	-0.116395888	-11.63958876	-0.010526266	-1.052626559
2000	Japan	-0.169278965	-16.92789652	-0.133703878	-13.37038785
2001	Japan	-0.153275524	-15.32755245	-0.078652473	-7.865247313
2002	Japan	-0.052356377	-5.235637713	-0.01725854	-1.725853996
2003	Japan	-0.079744919	-7.974491934	-0.015972875	-1.597287532
2004	Japan	-0.126423769	-12.64237691	-0.049700401	-4.970040106
2005	Japan	-0.114692882	-11.46928824	0.015745687	1.574568717
2006	Japan	-0.167888973	-16.78889734	-0.031809945	-3.180994525
2007	Japan	-0.042174556	-4.217455634	-0.051827447	-5.182744705
2008	Japan	-0.15757804	-15.75780399	-0.0135328	-1.353279959
2009	Japan	-0.04954397	-4.954396953	-0.024870019	-2.487001926
2010	Japan	-0.053938559	-5.393855866	-0.073445817	-7.344581737
2011	Japan	-0.062420313	-6.242031274	-0.023425771	-2.342577071
2012	Japan	0.007556767	0.755676697	0.050118374	5.011837369
2013	Japan	0.006346721	0.634672148	0.071716956	7.171695557
2014	Japan	-0.069357157	-6.935715741	0.073670316	7.367031587
2015	Japan	0.015340703	1.534070337	0.057482646	5.748264621
2016	Japan	-0.070227473	-7.022747325	0.062673312	6.267331224
2017	Japan	-0.057321664	-5.7321664	0.054676331	5.467633103
2018	Japan	-0.045543064	-4.554306364	0.035411279	3.541127909
2019	Japan	-0.024509767	-2.450976659	0.045593878	4.559387844
	Avg	-0.073351589	-7.335158906	-0.002355559	-0.235555939
1995	Singapore	-0.037358405	-3.735840453	-0.346530914	-34.65309141
1996	Singapore	-0.006350647	-0.635064697	-0.386137523	-38.61375232
1997	Singapore	-0.087809726	-8.780972614	-0.350721175	-35.07211745
1998	Singapore	0.009850859	0.985085854	-0.317915598	-31.7915598
1999	Singapore	-0.047589972	-4.758997188	-0.280483177	-28.04831775

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2000	Singapore	-0.102598482	-10.25984819	-0.345138482	-34.51384818
2001	Singapore	-0.074085702	-7.408570186	-0.371102707	-37.11027069
2002	Singapore	0.090317567	9.031756717	-0.333991059	-33.39910593
2003	Singapore	0.17726028	17.72602801	-0.260489066	-26.0489066
2004	Singapore	0.124543154	12.45431541	-0.285768626	-28.57686255
2005	Singapore	0.136902337	13.69023371	-0.325850069	-32.58500687
2006	Singapore	0.123701078	12.37010778	-0.242773268	-24.27732682
2007	Singapore	0.119721274	11.97212743	-0.173836591	-17.38365909
2008	Singapore	0.064977043	6.497704262	-0.183534562	-18.35345625
2009	Singapore	0.118806834	11.88068339	-0.237204182	-23.72041819
2010	Singapore	0.02151229	2.151229028	-0.320937545	-32.09375445
2011	Singapore	0.095137928	9.513792791	-0.290321313	-29.0321313
2012	Singapore	0.091323024	9.13230235	-0.206337548	-20.63375485
2013	Singapore	0.220879562	22.0879562	-0.261302805	-26.13028053
2014	Singapore	0.105624677	10.56246767	-0.250476819	-25.04768189
2015	Singapore	0.169838775	16.98387747	-0.209445615	-20.94456148
2016	Singapore	0.154794839	15.47948394	-0.212495312	-21.24953117
2017	Singapore	0.256267208	25.62672078	-0.235891163	-23.58911627
2018	Singapore	0.206925279	20.69252789	0.045442587	4.544258727
2019	Singapore	0.285332559	28.53325587	0.100962854	10.0962854
	Avg	0.119359076	11.93590762	-0.230024564	-23.00245645

Note:

Rate of exp misrep- is used to represent 'Rate of export misreporting'

Rate of imp misrep- is used to represent 'Rate of import misreporting'

Appendix 70: India's Rate of Trade Misreporting (with weighted data)

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
1995	US	-0.043997084	-4.399708374	-0.024163031	-2.416303123
1996	US	0.002297863	0.229786338	-0.054210727	-5.421072692
1997	US	-0.041909233	-4.190923325	-0.018074115	-1.807411457
1998	US	-0.076667021	-7.666702146	-0.014584848	-1.458484794
1999	US	-0.06123526	-6.123525996	-0.044815677	-4.481567695
2000	US	-0.074764319	-7.476431907	-0.112151123	-11.21511231
2001	US	-0.084585776	-8.458577643	-0.144159759	-14.41597589
2002	US	-0.071591476	-7.15914761	-0.027935731	-2.793573087
2003	US	-0.072690857	-7.269085677	-0.042802277	-4.28022772
2004	US	-0.103092009	-10.30920087	-0.042474884	-4.247488417
2005	US	-0.070980699	-7.098069938	0.026514266	2.651426576
2006	US	-0.08668076	-8.668076007	0.024148403	2.414840291
2007	US	-0.085025175	-8.502517457	0.001791418	0.179141814
2008	US	-0.068697938	-6.869793838	-0.033264139	-3.326413911
2009	US	-0.070754906	-7.075490581	-0.02611374	-2.611374031
2010	US	-0.111542248	-11.15422476	-0.034629542	-3.462954223
2011	US	-0.012263561	-1.226356092	0.014828857	1.482885679
2012	US	-0.030005147	-3.000514664	0.039095617	3.909561707
2013	US	-0.010341619	-1.034161923	0.008551478	0.85514779
2014	US	-0.002434398	-0.243439829	-0.041695872	-4.169587197
2015	US	-0.024171362	-2.417136173	-0.053633176	-5.36331762
2016	US	-0.018693248	-1.869324819	-0.061006656	-6.100665597
2017	US	0.002247646	0.224764569	-0.068108151	-6.810815104
2018	US	0.003078052	0.307805235	-0.034077945	-3.407794537
2019	US	-0.001834789	-0.183478877	-0.023546153	-2.354615305
	Avg	-0.049741229	-4.974122943	-0.031533456	-3.153345555
1995	UK	-0.073613716	-7.361371551	-0.280914537	-28.09145375
1996	UK	-0.094370959	-9.437095909	-0.206142912	-20.61429123
1997	UK	-0.096388828	-9.638882793	-0.083865881	-8.386588127
1998	UK	-0.0938905	-9.389050017	0.091598682	9.159868201
1999	UK	-0.075120874	-7.512087407	0.044102455	4.410245532
2000	UK	-0.040689384	-4.068938361	-0.126674434	-12.66744337

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2001	UK	-0.08248496	-8.248495972	-0.074878967	-7.487896713
2002	UK	-0.047440917	-4.7440917	-0.054211595	-5.421159524
2003	UK	-0.040616132	-4.061613218	-0.152471134	-15.24711339
2004	UK	-0.086245475	-8.624547451	-0.155088564	-15.50885641
2005	UK	-0.006111382	-0.611138174	-0.190078419	-19.00784187
2006	UK	0.018723834	1.87238339	-0.11808182	-11.80818201
2007	UK	-0.039409991	-3.940999092	-0.115916884	-11.5916884
2008	UK	-0.02130241	-2.130240953	-0.104621236	-10.46212362
2009	UK	0.016782022	1.678202151	-0.082977987	-8.297798717
2010	UK	-0.094405229	-9.440522916	-0.108688894	-10.8688894
2011	UK	-0.01108218	-1.108218045	-0.097684313	-9.768431339
2012	UK	-0.008762929	-0.87629292	-0.050574121	-5.057412117
2013	UK	0.071257332	7.125733166	-0.111814205	-11.1814205
2014	UK	0.021194592	2.11945925	-0.172358778	-17.23587781
2015	UK	0.041914206	4.19142059	-0.082922526	-8.292252589
2016	UK	0.094890291	9.489029082	-0.104256365	-10.42563652
2017	UK	0.034214034	3.421403434	-0.13999377	-13.99937699
2018	UK	0.052877544	5.287754447	0.005779759	0.57797587
2019	UK	-0.02049511	-2.049510967	0.073624105	7.362410472
	Avg	-0.007359612	-0.735961213	-0.098194507	-9.819450747
1995	Germany	-0.144086471	-14.40864713	-0.126618407	-12.66184069
1996	Germany	-0.164714222	-16.47142223	-0.107685961	-10.76859608
1997	Germany	-0.09526427	-9.526426962	-0.025823643	-2.582364332
1998	Germany	-0.110243106	-11.02431063	-0.024934698	-2.493469809
1999	Germany	-0.108429909	-10.84299086	-0.049002399	-4.900239876
2000	Germany	-0.039846019	-3.984601918	-0.076790877	-7.679087686
2001	Germany	-0.072827813	-7.28278132	-0.086208452	-8.620845162
2002	Germany	-0.019675182	-1.96751823	-0.027537568	-2.753756779
2003	Germany	-0.035989438	-3.598943761	-0.029531281	-2.953128069
2004	Germany	-0.114499646	-11.4499646	-0.102227974	-10.22279737
2005	Germany	-0.038750009	-3.875000925	0.007139383	0.713938335
2006	Germany	-0.075802506	-7.580250641	-0.074339305	-7.43393049
2007	Germany	-0.085437203	-8.543720254	-0.079709892	-7.970989184
2008	Germany	-0.02945437	-2.945436975	-0.036907219	-3.690721874

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2009	Germany	-0.045739903	-4.573990319	-0.064803148	-6.480314804
2010	Germany	-0.077384247	-7.738424696	-0.07138829	-7.13882901
2011	Germany	-0.023581743	-2.35817431	-0.02438591	-2.438591039
2012	Germany	-0.009151697	-0.915169724	0.02043471	2.043470978
2013	Germany	-0.000304971	-0.030497138	0.032362804	3.236280427
2014	Germany	0.02191508	2.19150799	0.011037169	1.103716879
2015	Germany	0.037330113	3.733011273	0.024544586	2.454458594
2016	Germany	0.049657208	4.965720838	0.002460315	0.246031525
2017	Germany	0.079052351	7.905235135	0.001548132	0.154813185
2018	Germany	0.074885372	7.488537199	-0.063714433	-6.37144328
2019	Germany	0.044119316	4.411931595	-0.051976653	-5.197665267
	Avg	-0.018074265	-1.807426539	-0.034499695	-3.449969505
1995	Italy	-0.146376624	-14.63766236	-0.149478833	-14.9478833
1996	Italy	-0.175792906	-17.57929057	-0.101200916	-10.12009162
1997	Italy	-0.092048249	-9.204824859	-0.102048273	-10.20482725
1998	Italy	-0.123825427	-12.38254265	-0.051114905	-5.111490536
1999	Italy	-0.061191467	-6.119146717	-0.03166801	-3.166800952
2000	Italy	-0.065478999	-6.54789988	-0.168554027	-16.85540267
2001	Italy	-0.066301993	-6.630199329	-0.168391399	-16.83913989
2002	Italy	-0.037333852	-3.73338523	-0.157033713	-15.70337135
2003	Italy	-0.050698925	-5.069892544	-0.153445246	-15.34452458
2004	Italy	-0.083192398	-8.319239772	-0.162365737	-16.23657374
2005	Italy	-0.029369135	-2.936913549	-0.134783731	-13.47837314
2006	Italy	-0.03460126	-3.460125975	-0.090098637	-9.009863721
2007	Italy	-0.075064458	-7.506445831	-0.111114761	-11.11147608
2008	Italy	-0.081955269	-8.195526906	-0.007067347	-0.706734716
2009	Italy	-0.091577738	-9.157773845	-0.072553429	-7.255342939
2010	Italy	-0.074955752	-7.495575221	-0.056159403	-5.615940258
2011	Italy	-0.120984648	-12.0984648	-0.031453542	-3.145354226
2012	Italy	-0.031488411	-3.148841147	0.027276853	2.727685339
2013	Italy	0.013455503	1.345550284	0.008141577	0.814157699
2014	Italy	0.015335108	1.533510785	0.010216723	1.021672298
2015	Italy	0.007293354	0.729335365	0.026232538	2.623253769
2016	Italy	0.00801153	0.80115295	0.001389653	0.138965276

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
2017	Italy	0.017811447	1.781144737	0.011472558	1.14725575
2018	Italy	-0.063197535	-6.319753468	0.040095847	4.009584743
2019	Italy	-0.027444734	-2.744473399	-0.003717368	-0.371736818
	Avg	-0.043586908	-4.358690839	-0.05959563	-5.959562963
1995	Japan	-0.146585525	-14.65855252	-0.108380119	-10.83801189
1996	Japan	-0.147941918	-14.79419178	-0.110309226	-11.0309226
1997	Japan	-0.151113721	-15.11137213	-0.048088541	-4.808854126
1998	Japan	-0.104733006	-10.4733006	-0.039917863	-3.991786348
1999	Japan	-0.13432274	-13.43227398	-0.01237586	-1.237585962
2000	Japan	-0.193566419	-19.35664193	-0.153832351	-15.38323509
2001	Japan	-0.17575265	-17.57526497	-0.09136732	-9.136731986
2002	Japan	-0.061102153	-6.110215262	-0.020266848	-2.026684762
2003	Japan	-0.092618616	-9.261861629	-0.018761359	-1.87613592
2004	Japan	-0.145640512	-14.56405117	-0.058029682	-5.802968189
2005	Japan	-0.132396745	-13.23967451	0.01859917	1.859917044
2006	Japan	-0.192023096	-19.2023096	-0.037258521	-3.725852107
2007	Japan	-0.049308025	-4.930802478	-0.060490508	-6.049050824
2008	Japan	-0.180551569	-18.05515691	-0.015902188	-1.590218827
2009	Japan	-0.05784863	-5.784862992	-0.029165696	-2.916569636
2010	Japan	-0.062931076	-6.293107564	-0.085396978	-8.539697828
2011	Japan	-0.072718199	-7.271819852	-0.027479019	-2.747901949
2012	Japan	0.008913206	0.891320585	0.059566278	5.956627812
2013	Japan	0.007484344	0.748434389	0.085568218	8.556821804
2014	Japan	-0.080700955	-8.070095549	0.087929799	8.792979947
2015	Japan	0.018119485	1.811948497	0.06840924	6.840923958
2016	Japan	-0.08170112	-8.170112042	0.074656231	7.465623064
2017	Japan	-0.066838357	-6.683835704	0.065036679	6.503667853
2018	Japan	-0.053214632	-5.321463224	0.0419759	4.197590046
2019	Japan	-0.028745053	-2.874505327	0.054144885	5.414488494
	Avg	-0.084657039	-8.465703862	-0.002103204	-0.210320355
1995	Singapore	-0.031379831	-3.137983081	-0.306845803	-30.68458029
1996	Singapore	-0.005306978	-0.530697792	-0.344306484	-34.43064838
1997	Singapore	-0.074381131	-7.438113094	-0.310784414	-31.07844137
1998	Singapore	0.008209963	0.82099634	-0.280102867	-28.01028674

Year	Countries	Rate of exp misreporting	% of exp misreporting	Rate of imp misreporting	% of imp misreporting
1999	Singapore	-0.04004212	-4.004211969	-0.245520049	-24.55200493
2000	Singapore	-0.087124277	-8.712427662	-0.305538274	-30.55382745
2001	Singapore	-0.06261184	-6.261183981	-0.330024769	-33.00247694
2002	Singapore	0.074287021	7.428702097	-0.295093522	-29.50935223
2003	Singapore	0.143763473	14.37634729	-0.227231163	-22.72311632
2004	Singapore	0.101870305	10.18703049	-0.250375914	-25.03759138
2005	Singapore	0.111755922	11.17559223	-0.287491385	-28.74913849
2006	Singapore	0.101195322	10.1195322	-0.211131462	-21.11314624
2007	Singapore	0.09800274	9.80027399	-0.149406851	-14.94068514
2008	Singapore	0.053665587	5.366558696	-0.158002589	-15.80025894
2009	Singapore	0.097268598	9.726859779	-0.206090672	-20.60906719
2010	Singapore	0.017894485	1.789448514	-0.282914469	-28.29144687
2011	Singapore	0.078190456	7.819045564	-0.254565715	-25.45657152
2012	Singapore	0.075101726	7.510172557	-0.178326237	-17.83262368
2013	Singapore	0.177894488	17.78944876	-0.227973036	-22.79730364
2014	Singapore	0.086661314	8.666131364	-0.218120188	-21.81201876
2015	Singapore	0.137908693	13.79086934	-0.181108651	-18.1108651
2016	Singapore	0.125997675	12.59976746	-0.18384169	-18.38416902
2017	Singapore	0.205237686	20.52376858	-0.204903615	-20.49036148
2018	Singapore	0.167027351	16.70273507	0.037651994	3.765199393
2019	Singapore	0.227467411	22.74674115	0.082899208	8.289920789
	Avg	0.096572707	9.657270674	-0.20157945	-20.15794501

Note:

Rate of exp misrep- is used to represent 'Rate of export misreporting'

Rate of imp misrep- is used to represent 'Rate of import misreporting'

Appendix 71: Loss in Government Revenue (in US$ millions) for Import Misreporting in Indo-US trade

Year	Tariff rate	True (half weighted) import	Reported import	Import misreporting	Loss in Revenue
2000	33.4	3512.056	3,152.25	-359.81	-120.1752042
2001	31.79	3524.468431	3,058.88	-465.58	-148.0090167
2002	28.79	4236.645076	4,129.41	-107.23	-30.87293476
2003	25.63	5087.982143	4,890.38	-197.6	-50.64535595
2004	28.57	6220.952602	5,981.21	-239.75	-68.49583161
2005	16.5	8641.894551	8,848.42	206.52	34.07589091
2006	13.86	10934.83119	11,172.88	238.05	32.99417144
2007	14.66	18678.1741	18,708.40	30.23	4.431732587
2008	9.98	19207.1979	18,628.01	-579.19	-57.80277328
2009	10.28	17046.87801	16,643.61	-403.27	-41.45574377
2010	8.88	19755.90087	19,135.63	-620.27	-55.07972114
2011	10.56	23144.39778	23,454.08	309.68	32.70245501
2012	10.71	24286.85161	25,141.62	854.77	91.54581134
2013	10.59	23299.92822	23,479.82	179.9	19.05096929
2014	10.17	22069.10036	21,234.25	-834.85	-84.90449983
2015	9.75	21761.27648	20,701.16	-1,060.11	-103.3609667
2016	8.91	21782.40996	20,574.52	-1,207.89	-107.6230464
2017	8.88	25653.26464	24,064.04	-1,589.22	-141.1231478
2018	9.03	34055.15734	33,003.03	-1,052.13	-95.00709862
2019	10.21	35712.59252	34,951.02	-761.57	-77.75655476

Note:

Tariff rate- is represented by the variable 'Tariff rate, applied, simple mean, all products (%)'

Source of data on tariff rate: https://data.worldbank.org/

Appendix 72: Tabular Representation of Regression Results (using Export-Import data)

		Dependent Variables					
		Case (a): **Log [True (equal weights) capital outflow- Reported capital outflow]**			Case (b): **Log [True (weighted) capital outflow – Reported capital outflow]**		
		Fixed effects robust Results (Significance of F-stat = 0.0342)			Fixed effects robust Results (Significance of F-stat = 0.0342)		
		Sign of coefficient	(True capital outflow – Reported capital outflow)	Significance	Sign of coefficient	(True capital outflow – Reported capital outflow)	Significance
Independent Variables	Log (Interest rate parity)	positive	↑	0.053	positive	↑	0.053
	Log (Non-traded to GDP ratio)	negative	↓	0.053	negative	↓	0.053
	Log (Market capitalization of listed domestic companies in foreign country as a % of its GDP)	positive	↑	0.120	positive	↑	0.120

Appendix 73: Tabular Representation of Regression Results (using Capital Flows data)

Independent Variables		Dependent Variables							
		Case (a): **Log [True (equal weights) Net inflow – Reported Net inflow]**				Case (b): **Log [True (weighted) Net inflow – Reported Net inflow]**			
		Random effects robust Results (Significance of Chi sq = 0.01)			Fixed effects Result (Significance of F-stat = 0.0001)	Random effects robust Results (Significance of Chi sq = 0.01)			Fixed effects Result (Significance of F-stat = 0.0001)
		Sign of coefficient	True Net inflow – Reported Net inflow	Significance	Significance	Sign of coefficient	True Net inflow – Reported Net inflow	Significance	Significance
	Log (Interest rate parity)	negative	↓	0.95	0.99	negative	↓	0.96	0.99
	Log (Non-traded to GDP ratio)	positive	↑	0.1	0.08	positive	↑	0.1	0.08
	Log (Market capitalization of listed domestic companies in foreign country as % of GDP)	positive	↑	0.002	0.012	positive	↑	0.002	0.012

BACKGROUND PAPERS

- Aizenman, J. and Pasricha, G. K. (2013). Why do emerging markets liberalize capital outflow controls? fiscal versus net capital flow concerns. Journal of International Money and Finance,39:28-64.
- Bank of Mauritius Website: https://www.bom.mu/publications-and-statistics/statistics/external-sector-statistics/direct-investment-flows.
- Bayoumi, M. T. and Ohnsorge, F. (2013). Do inflows or outflows dominate? Global implications of capital account liberalization in China. Number 13-189. International Monetary Fund.
- Betz, T. (2018). Tariff evasion and trade policies. International Studies Quarterly.
- Bhagwati, J. N. (1974). On the Under invoicing of Imports. In Illegal transactions in International Trade, pages 138-147.Elsevier.
- Biswas, A. K. (2012). Import tariff led export under-invoicing: A paradox. The Journal of International Trade & Economic Development, 21.3:347-360.
- Biswas, A. K. and Marjit, S. (2005). Mis invoicing and trade policy. The Journal of Policy Reform, 8.3:189-205.
- Biswas, A. K. and Marjit, S. (2007). Preferential Trade and Mis-invoicing: Some analytical implications. International Review of Economics & Finance,16.1:130-138.
- Biswas, A. K. and Sengupta, S. (2011). Tariffs and Imports Mis invoicing under Oligopoly. Economics & Politics, 23.2:254-270.
- Biswas, A. K. and Sengupta, S. (2015). Corrupt Importers, Domestic Producers & Welfare: Role of trade policy. Economics & Politics, 27.3:459-487.
- Biswas, A. K., von Hagen, H and Sarkar, S. (2019a). Trade Mis-invoicing & Hidden Capital Movements: The Case of India and the USA. Mimeo. University of Bonn.
- Biswas, A. K., von Hagen, H and Sarkar, S. (2019b). Trade Misreporting, FDI Mismatch and Hidden Capital Movements: The USA - China Case. Mimeo. University of Bonn.
- Chandra, P. and Long, C. (2013). Vat rebates and export performance in China: Firm- level evidence. Journal of Public Economics,102:13-22.

- Chen, Chien-Hsun, C.-C. M. and Yu, H.-C. (2006). The effect of export tax rebates on export performance: Theory and evidence from China. China Economic Review, 17(2):226-235.
- Cheung, Y. and Herrala, R. (2014). China's capital controls: Through the prism of covered interest differentials. Pacific Economic Review,19.1:112-134.
- Cheung, Y. W., & Qian, X. (2009). Empirics of China's outward direct investment. Pacific economic review, 14(3),312-341.
- Cheung, Y.-W., Steinkamp, S., and Westermann, F. (2016). China's capital flight: pre-and post-crisis experiences. Journal of International Money and Finance,66:88-112.
- Cuddington, J. T. (1987). Capital flight. European Economic Review,31(1-2):382-388.
- Data Releases – Reserve Bank of India Website: https://www.rbi.org.in/Scripts/Statistics.aspx
- Direction of Trade Statistics – IMF Data website: https://data.imf.org
- Feltenstein, A., Lebow, D., and Van Wijnbergen, S. (1990). Savings, commodity market rationing, and the real rate of interest in China. Journal of Money, Credit and Banking, 22(2):234-252.
- Ferrantino, Michael J., X. L. and Wang, Z. (2012). Evasion behaviors of exporters and importers: Evidence from the US - China trade data discrepancy. Journal of international Economics,86(1):141-157.
- Fisman, R. and Wei, S.-J. (2004). Tax rates and tax evasion: evidence from missing imports in China. Journal of political Economy,112(2):471-496.
- Forstater, M. (2018). Illicit Financial flows, Trade Mis invoicing, and Multinational Tax Avoidance: The same or different? CGD policy paper123.
- Javorcik, B. S. and Narciso, G. (2008). Differentiated products and evasion of import tariffs. Journal of international Economics,76(2):208-222.
- Jianping, D. (1998). China's foreign exchange black market and exchange flight: analysis of exchange rate policy. The Developing Economies,36(1):42-44.
- Kar, D. and Freitas, S. (2012). Illicit Financial Flows from developing countries: 2001- 2010. Washington, DC: Global Financial Integrity.
- Kar, D. and Spanjers, J. (2014). Illicit Financial flows from developing countries: 2003- 2012. Washington, DC: Global Financial Integrity.
- Kellenberg, D. and Levinson, A. (2019). Misreporting trade: Tariff evasion, corruption, and auditing standards. Review of International Economics,27(1):106-129.
- Lucas Jr, R. E. (1976, January). Econometric policy evaluation: A critique. In Carnegie- Rochester conference series on public policy (Vol. 1, pp. 19-46). North-Holland.
- Marini, M., Dippelsman, R. J., & Stanger, M. (2018). New Estimates for Direction of Trade Statistics. IMF Working Papers 2018/016, International Monetary Fund.

- Ma, G., & McCauley, R. N. (2008). Efficacy of China's capital controls: Evidence from price and flow data. Pacific Economic Review, 13(1),104-123.
- Marjit, S , B. Dasgupta and S. Mitra (2000)- Currency Devaluation and Exports. Separating Actual from Statistical. Economic and Political Weekly, 35 (18),29th April
- Marjit, S., Biswas, A.K., Beladi, H. (2008). Minimize regulations to regulate — extending the Lucas Critique. Economic Modelling 25,623–627
- Marjit, Biswas and Sarkar (2019) – Mis-invoicing Trade and Informal Capital Movements- The USA-India case – Invited Paper presented at IMF's Annual Statistical Forum –Washington DC
- Marjit. S, S. Misra and S. Mitra- (2020)- Tax Evasion by Tax Deferment- Sham Litigation with an Informal Credit Market (with S. Mishra and S. Mitra) _European Journal of Political Economy (Forthcoming)
- Mishra, Prachi, A. S. and Topalova, P. (2008). Tariffs, enforcement, and customs evasion: Evidence from India. Journal of public Economics, 92(10-11):1907-1925.
- Morgenstern, O. et al. (1963). On the accuracy of economic observations. Princeton University Press.
- Poncet, Sandra, e. a. (2014). Export management and incomplete vat rebates to exporters: the case of China.
- Prasad, E. S., Rogoff, K., Wei, S.-J., and Kose, M. A. (2007). Financial globalization, growth and volatility in developing countries. In Globalization and poverty, pages 457{516. University of Chicago Press.
- Reuter, P. (2017). Illicit Financial Flows and governance: The importance of disaggregation. BACKGROUND PAPER, World Development Report.
- Stoyanov, A. (2012). Tariff evasion and rules of origin violations under the Canada-US free trade agreement. Canadian Journal of Economics/Revue canadienne d'_economique, 45(3):879-902.
- U.S. Bureau of Economic Analysis (BEA) Website:www.bea.gov.
- Von Hagen, J. and Zhang, H. (2008). A welfare analysis of capital account liberalization. Review of International Economics,16(3): 576-590.
- Von Hagen, J. and Zhang, H. (2014). Financial development, international capital flows, and aggregate output. Journal of Development Economics,106: 66-77.
- Von Hagen, J. and Zhou, J. (2008). The interaction between capital controls and exchange rate regimes: evidence from developing countries. International Economic Journal, 22(2):163-185.

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