Mozambican trade statistics: Mind the gap!

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1. Introduction

Between 2016 and 2018 the IGC Mozambique carried out three sector-level value chain studies, in close collaboration with the Ministry of Economy & Finance of Mozambique, on poultry, cotton and pigeon peas (Da Cruz and Oppewal 2018a, 2018b). The rationale behind these studies is the hypothesis that these can be very helpful in identifying sector-specific binding constraints and that, based on that analysis, it is possible to draw up the contours of concrete sector-specific pacts, with clear commitments from both the public and private sector. These commitments can also serve as a signalling mechanism, creating mutual trust and leveraging private investments in promising sub-sectors.

Collecting the relevant data and information for these studies, the research team was confronted time and again by severe discrepancies between Mozambican trade data and the corresponding data of its trade partners, both in relation to products imported by Mozambique and products exported by Mozambique. The size of the discrepancies is mind-boggling at times. The value of official pulses and sesame exports in recent years represented only a fraction of imports reported by trade partners. As this issue appeared to be relevant in different sectors, this article draws the various cases together to be able to compare, contrast and distill lessons and recommendations.

Trade misinvoicing is not something that is unique to Mozambique. Over the last two decades, the academic and policy literature has paid increasing attention to the issue of Illicit Financial Flows (IFFs), focusing on the definition, efforts at measuring such flows, and the implications for economic development. The methodology used in this article, based on mirror trade data, has been criticized by various authors as being inaccurate and prone to mistakes. This article will argue that the methodology indeed has several drawbacks which make that a serious effort at measuring overall IFFs cannot rely on discrepancies in aggregate trade data alone. Identified discrepancies should not be taken as direct evidence of illicit flows without understanding the context specific to the underlying trade flows. However, the article will also show clearly, using concrete commodity-country cases, that the methodology can be extremely useful to developing country governments for identifying potential red flags. The methodology is relatively simple to employ and can highlight specific commodities that warrant further investigation by the relevant authorities, such as the tax revenue authority, customs department and relevant ministries.

The next section will provide the general context and an overview of the international debate on illicit financial flows (IFFs) and trade misinvoicing. Sections 3 and 4 will present the detailed cases of two products imported by Mozambique (poultry and vegetable oil), while sections 5 and 6 will deal with two products exported by Mozambique (pulses and sesame). The final section will present the conclusions and recommendations.

2. Illicit Financial Flows (IFFs)

Trade misinvoicing has received increasing attention in recent years, as part of the literature on Illicit Financial Flows (IFFs). There is no consensus on the definition of IFFs, which is complicating the debate. Some argue that the definition should only include financial flows related to illegality, such as financing criminal activities, or facilitating corruption (Forstater 2018). Others, however, find such an interpretation too limited. Khan et al. (2019) argue that a definition based on legality faces problems of both false positives and false negatives. In particular, it excludes large flows aimed at avoiding taxes that may not be strictly illegal, but that are certainly undesirable, and have a signficant negative impact on the development prospects of the countries where such flows originate.

Baker (2005), an influential publication at a time when the international debate was slowly gathering steam, used the broader definition to estimate annual IFFs from the developing world at just over $500 billion. The author then created the influential NGO Global Financial Integrity (GFI), which has been publishing regular reports on the topic. A widely cited estimate from GFI (2015) put the number as high as $1 trillion per year. Using a similar methodology, the High Level Panel of AU/UNECA (2015) estimated that the African continent is drained of $50 billion per year through IFFs, which is roughly equal to the continent's total receipts of Overseas Development Assistance (ODA).

The effort to get attention for IFFs was successful as the aim of reducing them was included in the Sustainable Development Goals (SDGs). However, the debate on the definition and measurement of IFFs is still far from reaching a consensus (The Economist 2019). The methodology behind the high-level numbers has been criticized, calling their usefulness into doubt (Forstater 2018, Ostensson 2018). The criticism focuses on the estimates of trade misinvoicing, which account for the bulk of the overall IFF estimates. According to GFI (2015), 83% of the $1 trillion estimate is attributable to trade misinvoicing, thus deemed to be responsible for draining over $800 billion a year from developing countries. The basic idea behind this part of the methodology is that trade data could be seen as a mirror. What leaves country A as exports to country B should be reflected in country B's statistics as imports from country A. If these data points do not match, allowing for some difference on account of transport costs[1], then this could be seen as an illicit financial flow related to trade misinvoicing. The discrepancy can go in either of two directions. An excessive normal discrepancy, whereby the value of imports exceeds the value of exports by more than what could be justified by transport costs, would suggest underinvoiced exports or overinvoiced imports. A perverse discrepancy, on the other hand, suggests overinvoiced exports or underinvoiced imports.

A report by UNCTAD (2016a) investigated trade misinvoicing for specific country-commodity combinations, including gold, iron, silver and platinum from South Africa, cocoa from Cote d'Ivoire and copper from Chile and Zambia. Zooming in on concrete cases provided an opportunity to take a closer look at the actual numbers underlying the IFF estimates. The first version of the report reached dramatic conclusions, alleging for instance that "virtually all gold exported by South Africa leaves the country unreported" (p.28), labelling this as a case of pure smuggling. For all investigated commodities, the report identifies substantial overinvoicing and/or underinvoicing with regard to specific trade partners.

The report provoked widespread condemnation from various quarters. Although the report was marginally adjusted in response (UNCTAD 2016b), the main conclusions were not changed and the new version was still criticized. In particular, the South African Revenue

[1] Essential the difference between fob and cif prices. A normal difference is usually assumed to be 10%.

Service disputed the findings and the country's Chamber of Mines commissioned an independent assessment of the report, which found (Eunomix 2017) that the conclusions are easily refuted and plagued by basic mistakes. For the case of gold exports from South Africa, for instance, it turned out that South Africa simply reported these in a different category, under monetary exports rather than manufactured goods. For silver and platinum, similarly dramatic conclusions were explained by errors in the UN Comtrade database (Forstater 2018). Discrepancies on Zambian copper exports can be explained by transit trade and use of bonded warehouses, while smaller discrepancies on Chilean copper and South African iron ore exports can in fact be explained by transport costs (Ostensson 2018, Forstater 2018).

This episode has had a significant impact on the debate. It clearly shows the danger of blindly interpreting mismatches in UN Comtrade data as evidence of misinvoicing, without investigating alternative hypotheses based on country- and commodity-specific dynamics and cross-checking the data with other sources. Importantly, the high-level numbers quoted by GFI (2015) and AU/UNECA (2015) are based on the same methodology as the controversial UNCTAD study, thus seriously calling into question the validity of those numbers. In fact, the particular error on South African gold exports is possibly responsible for a substantial part of the $50 billion figure disseminated by AU/UNECA (Forstater 2016).

The fact that mirror trade data analysis at a macro-level leads to erroneous conclusions does not mean, however, that it has no value at all as a tool for economic analysis. This report will show that, if the tool is used in combination with country- and commodity-specific knowledge and with thorough efforts to explore possible explanations for any identified discrepancies, it can be extremely useful to highlight cases where misinvoicing or misreporting may be occurring. Such cases then merit further investigation by the relevant authorities in the field to ascertain the validity of the findings and, if applicable, identify measures required to remedy the situation. Ensuring that official trade data reflect actual trade flows is important for various reasons.

Firstly, trade statistics are an important source of market information for different agents and stakeholders, including for firms operating in the sector, potential new investors, the government, donors and civil society organisations. They all need reliable market information in order to take decisions on their investments, policies and programmes. Especially in a low-information environment like Mozambique, where it is often difficult to obtain reliable production data, trade data could be a relatively reliable and easily collectable source of information on the dynamics of a particular sector. Erroneous trade data thus have an impact by affecting stakeholders' behaviour. This became very clear during the pigeon pea crisis of 2017 (Da Cruz and Oppewal 2018a). Since official pigeon pea exports were negligible in preceding years, few high up in the policy community had a true grasp of how important the sector had become. This inhibited a focused and rapid response when the market collapsed due to a change in Indian trade policy. If the official export statistics had represented the true value of pigeon pea exports in preceding years, the response would likely have been stronger and more effective.

Secondly, at a macro-economic level, trade data are an important component of the Balance of Payments, a crucial indicator of the general state of the economy. It is important that Balance of Payments statistics are an accurate depiction of a country's dealings with the rest of the world, so that crucial economic decisions by investors and policymakers are made on solid grounds.

Thirdly, inaccurate trade data could reflect efforts by economic agents that result in forgone fiscal revenues for the state. For instance, one source of inaccurate import data could be if

imports of a product with an import tariff are underreported or reported as if they were a different product with a lower import tariff. Underreported exports, on the other hand, could be an indicator of capital flight and be part of a strategy to have lower domestic taxable income.

3. Mozambican poultry imports

The Mozambican poultry sector is important from different perspectives, indirectly affecting the vast majority of Mozambicans. From a consumption perspective, it is an important source of protein. From the production angle, meanwhile, millions of Mozambicans are linked to the poultry value chain, either directly as poultry producers or traders, or as farmers growing maize or soybeans that are used to produce poultry feed (Da Cruz and Oppewal 2016). Import substitution on a competitive basis would thus be favourable, providing additional income opportunities. To properly track progress and identify additional opportunities, it is crucial to have good data on poultry imports.

Between 2005 and 2017, Mozambique reported the import of USD 150 million worth of poultry meat products. The countries of origin, however, reported having exported more than double that amount worth of poultry (USD 311.7 million) to Mozambique over the same period (see **Table 1**). This is a perverse discrepancy, given that under normal circumstances, the value of imports should exceed the value of exports due to transport costs. The discrepancy has gradually increased over the years. In 2017 the value of reported exports exceeded official imports by more than four times.

Table 1. Mozambican poultry imports, 2005 - 17[2]

Year	COMTRADE Imported by MOZ (USD Million)	COMTRADE Exported to MOZ (USD Million)	% discrepancy (EXP – IMP) / EXP
2005	6.7	13.7	51 %
2006	8.4	11.8	29 %
2007	6.0	9.7	38 %
2008	8.6	12.9	34 %
2009	10.2	16.2	37 %
2010	5.6	21.4	74 %
2011	10.2	22.0	53 %
2012	14.5	23.9	39 %
2013	19.5	33.0	41 %
2014	23.9	47.1	49 %
2015	18.7	36.2	48 %
2016	9.7	29.6	67 %
2017	8.1	34.3	76 %
Total	**150.0**	**311.7**	**52 %**

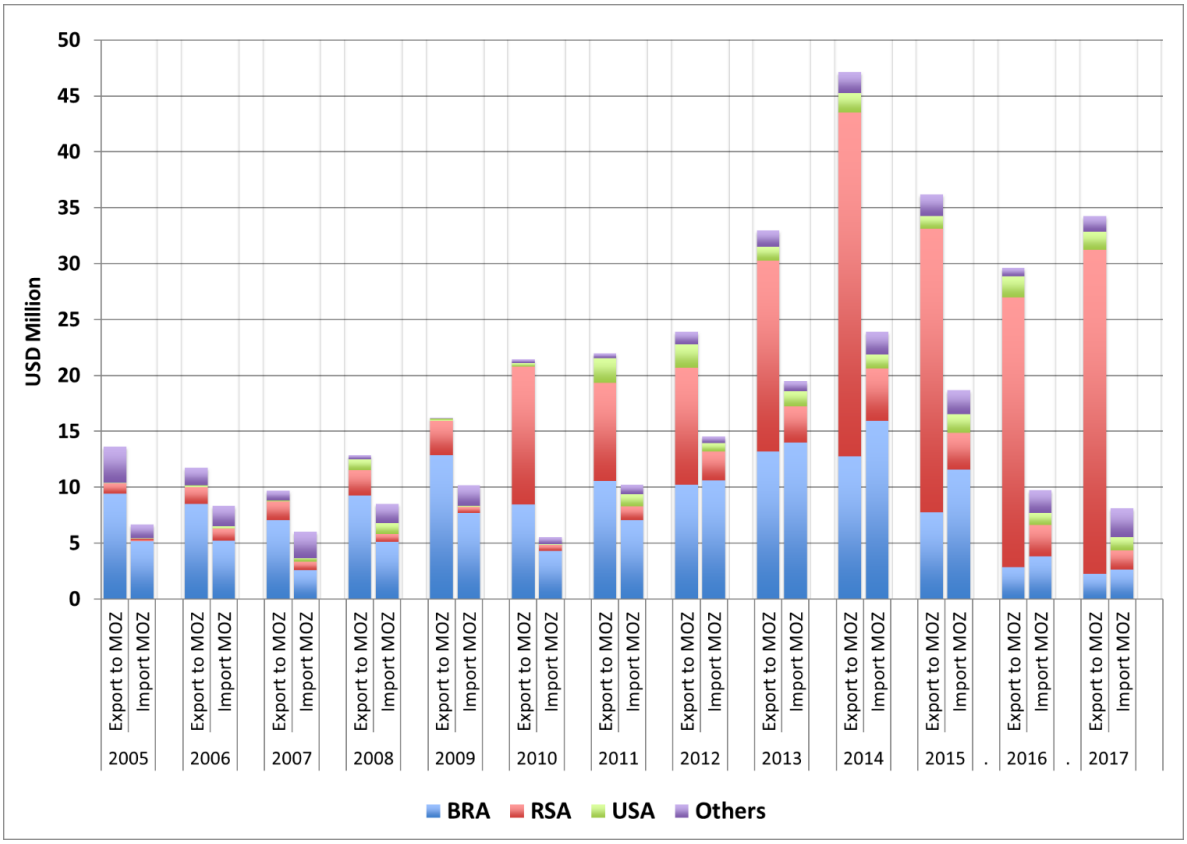
Source: Authors based on UN COMTRADE

It is also remarkable that the source of the discrepany changed drastically during the period under review (see **Figure 1**). Between 2005 and 2009, most of the discrepancy could be attributed to poultry imported from Brazil. Since 2010, however, the Brazilian and

[2] The numbers refer to the trade of species *Gallus Domesticus* in particular (HS codes 020710, 020711, 020712, 020713, 020714) and do not include other species such as turkey.

Mozambican data have been largely consistent with each other. Although we do not have any evidence to substantiate this, the explanation could possibly be linked to improved customs management at the ports. At the same time, however, a major discrepancy emerged in relation to poultry imports from neighbouring South Africa. Between 2010 and 2017, official Mozambican imports of poultry from South Africa amounted to USD 20 million, while South African export data suggest that almost USD 160 million of poultry were exported to Mozambique over the same period, a discrepancy of more than 85%.

Figure 1. Mozambican poultry imports by origin, 2005 - 17



Source: Authors based on UN COMTRADE

Although these numbers by themselves do not constitute evidence of smuggling, they do hint at the possibility and should encourage relevant stakeholders to further investigate. Further clues can already be obtained from a quick look at other trade data and contextual knowledge.

The discrepancy between Mozambican import and South African export data does not tell us where the discrepancy originates. There could be an issue with the Mozambican or with the South African data. In this case, we have reasons to believe that the problem is on the Mozambican side.

Firstly, taking a closer look at South Africa's poultry exports, three countries account for more than 75% of South Africa's total poultry exports, namely Lesotho, Mozambique and Namibia. Looking at the import data of Lesotho and Namibia, we do not find such major discrepancies we found for Mozambique. Lesotho's import from South Africa is approximately 20% lower than reported South African exports to Lesotho, while Namibia's import data are fully consistent with South African data.

Secondly, awareness of the local context also helps in interpreting the numbers. Mozambique has an official import quota, which the Ministry of Industry & Trade sets on a yearly basis and distributes among major importers through tender procedures. This could provide an explanation of why additional poultry imported by informal traders across land borders do not show up in official Mozambican import statistics. Such unofficial imports, not recorded in Mozambican data, undermine the objectives of the import quota and also distort market information available to policymakers and economic actors.

4. Mozambican vegetable oil imports

Vegetable oils account for a significant share of imports for many Sub-Saharan African countries. Considering the agricultural potential of the continent, vegetable oils appear to be a potentially low-hanging fruit in terms of import substitution. If Mozambique managed to increase domestic production of vegetable oils, based on locally grown oilseed crops, this would have multiple benefits, namely: (i) save foreign exchange; (ii) create jobs in agro-processing and oil refinery; (iii) provide a boost to farmers by increasing demand for locally grown oilseed crops.

In order to move forward this import-substitution agenda on vegetable oils, it is crucial to have a clear picture of recent dynamics on vegetable oil imports, in terms of values, volumes, and countries of origin. This chapter examines official import data and confronts these data with the mirror data from the export statistics of the countries of origin. To facilitate the analysis and presentation of the results, it will focus on three types of vegetable oils, namely soy oil, palm oil and sunflower oil. Together, these three accounted for 90% of Mozambique's total vegetable oil imports between 2010 and 2017.

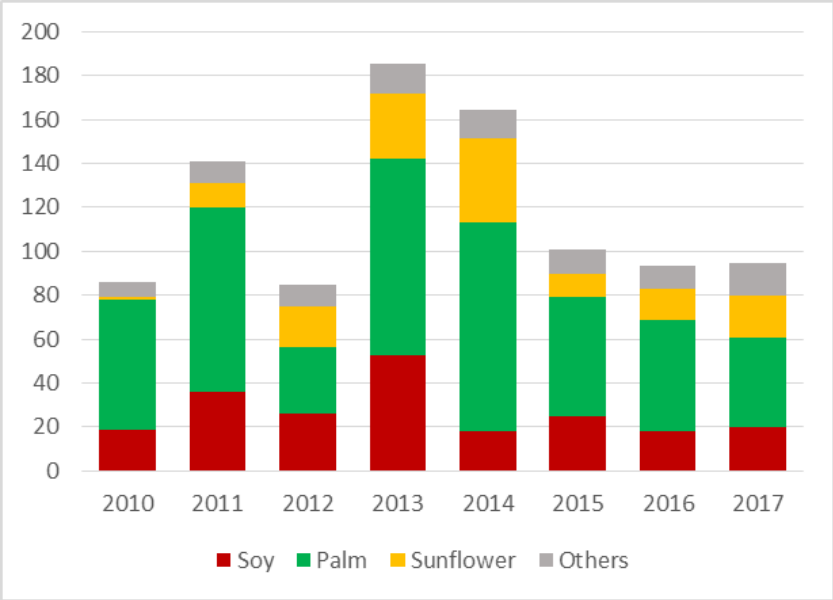
Although the analysis reveals that globally reported exports of vegetable oils to Mozambique exceed official Mozambican vegetable oil imports, it is shown that such macro discrepancies cannot simply be taken as evidence of illicit activities, because there is a plausible explanation for the discrepancy. Exporting countries do not always seem to correctly report the final destination, and exports destined to landlocked countries such as Zambia and Malawi may appear in their export statistics as going to Mozambique. A much more serious issue, however, is the large discrepancy within the palm oil trade data. Most palm oil exports to Mozambique leave the country of origin as refined palm oil, but then appear in Mozambican import statistics as crude palm oil, suggesting potential misreporting to avoid customs duties.

4.1 Official import data

Figure 2 and **Table 2** show the value of imported vegetable oils, according to data from the National Statistics Institute (INE). The trade statistics point at a pattern of increasing imports between 2010 and 2013, when it reached USD 185 million, followed by a decline, with annual imports reducing to just under USD 95 million in 2016 and 2017.

This pattern appears to fit well with general macro-economic developments in Mozambique. The first half of the 2010s was a period of strong economic growth, at 7% per year on average. This changed

Figure 2. Mozambique vegetable oil imports (Million USD)



Source: National Statistics Institute (INE)

drastically from about 2015, as details started emerging of large amounts of newly contracted state- guaranteed debts, on behalf of the public companies Ematum, Proindicus and MAM. The discovery of these debts undermined confidence in the health of the economy and led donors to withhold budget support. From late 2014, the Metical slowly started depreciating, a trend that intensified in 2015 and 2016. The depreciation fuelled inflation and eroded the purchasing power of the Mozambican consumer, particularly in relation to imported goods. The rate of economic growth fell back to below 4% per year. The dramatic decline in the value of imported vegetable oils between 2013 and 2016 should be seen in this context. The low value reported for 2012, which is mostly due to much lower values of imported soy oil and palm oil, seems not to fit the general trend. There is no obvious explanation for this low value. It could potentially reflect mistakes in the underlying data.

Table 2. Mozambique vegetable oil imports (Million USD)

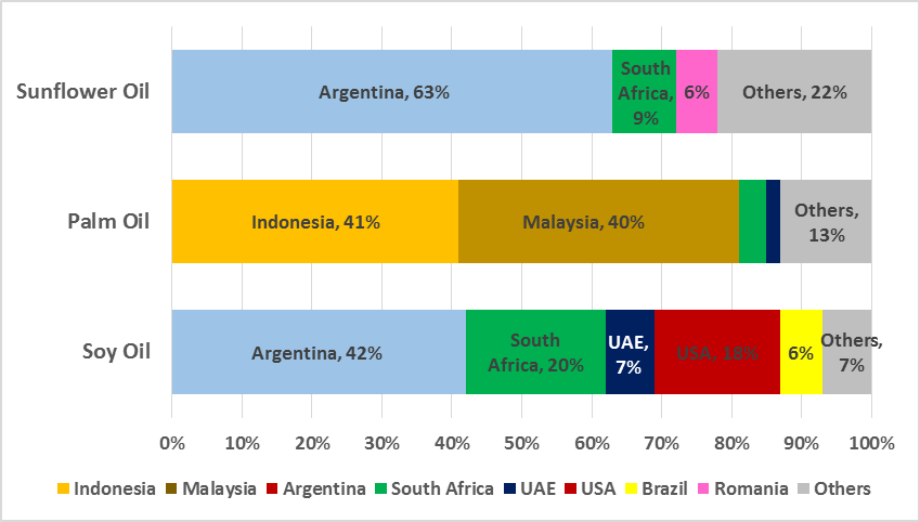
	Soy	Palm	Sunflower	Others	Total
2010	18.4	59.7	1.2	6.7	85.9
2011	35.8	84.3	11.0	10.2	141.2
2012	25.8	30.5	18.6	9.9	84.7
2013	52.8	89.2	29.7	13.8	185.5
2014	18.1	95.2	38.1	13.1	164.6
2015	25.0	54.2	10.6	10.9	100.5
2016	18.0	50.9	14.3	10.3	93.5
2017	19.9	41.0	19.1	14.8	94.8
AVERAGE	26.7	63.1	17.8	11.2	118.8
%	22%	53%	15%	9%	100%

Source: National Statistics Institute (INE)

In terms of the composition of vegetable oil imports, **Table 2** shows that between 2010 and 2017 palm oil accounted for 53% of the total value of imported vegetable oil, followed by soy oil (22%), sunflower oil (15%) and others (9%).

Figure 3 shows the major origins of Mozambican vegetable oil imports. It reveals a clear distinction between palm oil on the one hand, and soy oil and sunflower oil on the other. In the case of palm oil, more than 80% of imports come from South East Asia, particularly Indonesia and Malaysia. For soy oil and sunflower oil, on the other hand, Argentina is the main source of origin, accounting for 42% and 63%, respectively. South Africa is another significant source of imported soy and sunflower oil.

Figure 3. Origin of Mozambican vegetable oil imports, by value, 2010-17 (cumulative)



Sources: National Statistics Institute (INE), UN COMTRADE

Value of vegetable oil imports by other SADC countries

Extending the analysis to four of Mozambique's neighbouring countries, we rely on data from COMTRADE, the international trade statistics database of the United Nations. Unfortunately, there are still major data gaps for 2016 and 2017 for some countries, so we restrict our analysis to the period 2010-15. Furthermore, in order to focus on the most important types of vegetable oils, we now restrict our analysis to soy oil, palm oil and sunflower oil.

For Mozambique, the official INE data and the import data reported on COMTRADE are generally consistent, with the exception of 2012, unfortunately. In that year, INE data suggest that the import of these three types of vegetable oils amounted to USD 74.8 million, whereas the equivalent COMTRADE data refer a value of USD 54.9 million. To maintain consistency in the comparison with the other countries, **Table 3** reports the COMTRADE data.

Of the selected countries, Tanzania is by far the largest vegetable oil importer. This is not surprising, considering that it also has the highest population. There are interesting differences between these countries in terms of the relative weight of specific vegetable oils in the import data. Malawi imports mostly soy oil, while Zimbabwe's imports are dominated by sunflower oil. For the other three countries, palm oil is the most imported vegetable oil. In Tanzania, palm oil imports represent more than 90% of the total import of these three types of oil. In Mozambique and Zambia, the distribution between the different oils is more equal, with palm oil being the largest, followed by soy oil imports.

Table 3. Imports of soy, palm and sunflower oil, selected SADC countries (Million USD), 2010-15

		2010	2011	2012	2013	2014	2015	Average	%
Mozambique	Soy	17.6	35.8	19.2	52.8	18.1	25.0	28.1	25.2%
	Palm	52.3	84.3	24.8	89.2	93.1	54.2	66.3	59.6%
	Sunflower	1.2	11.0	11.0	29.7	38.2	10.5	16.9	15.2%
	Total	**71.1**	**131.1**	**54.9**	**171.7**	**149.4**	**89.6**	**111.3**	
Tanzania	Soy	19.4	18.7	14.0	3.6	7.1	3.4	11.0	4.1%
	Palm	173.3	274.6	247.7	192.7	367.6	230.5	247.7	93.2%
	Sunflower	4.8	6.6	8.6	1.8	13.1	8.0	7.1	2.7%
	Total	**197.4**	**299.8**	**270.4**	**198.1**	**387.8**	**241.9**	**265.9**	
Zambia	Soy	8.9	19.2	35.8	13.7	21.2	16.9	19.3	22.0%
	Palm	54.4	95.5	76.3	67.0	56.8	49.1	66.5	75.7%
	Sunflower	2.1	1.8	2.0	2.5	2.7	1.4	2.1	2.4%
	Total	**65.5**	**116.5**	**114.2**	**83.2**	**80.7**	**67.4**	**87.9**	
Malawi	Soy	22.3	29.6	14.6	11.1	12.8	10.3	16.8	64.2%
	Palm	6.9	7.3	2.4	3.5	5.2	12.9	6.4	24.4%
	Sunflower	3.5	2.2	3.3	4.1	1.9	2.8	3.0	11.4%
	Total	**32.7**	**39.2**	**20.3**	**18.7**	**19.8**	**26.0**	**26.1**	
Zimbabwe	Soy	8.9	19.2	35.8	13.7	21.2	16.9	19.3	20.5%
	Palm	7.0	16.3	8.4	7.6	6.5	5.4	8.5	9.1%
	Sunflower	94.9	123.9	108.5	45.5	19.0	4.9	66.1	70.4%
	Total	**110.8**	**159.5**	**152.7**	**66.8**	**46.7**	**27.3**	**94.0**	

Source: UN COMTRADE

4.2 Mirror data analysis

Having examined the official import data of the selected SADC countries, we now confront the Mozambican import data with the export statistics reported by its trade partners, the countries of origin. For this purpose, we narrow our focus to soy oil and palm oil, which dominate Mozambican imports of vegetable oils.

Table 4 shows that reported vegetable oil exports to Mozambique consistently exceed official Mozambican vegetable oil imports. Over the period 2010-15, the total value of soy oil exports to Mozambique, declared by the countries of origin, exceeded official Mozambican soy oil imports by USD 97.4 million. For the case of palm oil, the difference over the same period was USD 95 million. Similar to the case of poultry, these are perverse discrepancies given that normally we would expect the import value to exceed the export value due to transport costs. This substantial discrepancy in the trade data raises the possibility that real Mozambican imports are higher than what is officially reported in Mozambican import statistics.

Table 4. Mirror data analysis of Mozambican soy and palm oil imports, 2010-15 (USD Millions)

		2010	2011	2012	2013	2014	2015	TOTAL
Soy Oil	**IMP** reported by MOZ	17,6	35,8	19,2	52,8	18,1	25,0	168,4
	EXP reported to MOZ	24,1	59,6	49,9	35,2	36,8	60,2	265,7
	Difference	**- 6,6**	**- 23,8**	**- 30,7**	**17,7**	**- 18,7**	**- 35,2**	**- 97,4**
Palm Oil	**IMP** reported by MOZ	52,3	84,3	24,8	89,2	93,1	54,2	397,8
	EXP reported to MOZ	40,6	68,6	66,2	67,1	133,6	116,9	492,8
	Difference	**11,8**	**15,7**	**- 41,4**	**22,2**	**- 40,6**	**- 62,7**	**- 95,0**

Source: Authors based on UN COMTRADE

Tables 5 and 6 break down the mirror trade data by country of origin. **Table 5** shows that, in the case of soy oil, there is a large discrepancy concerning imports from Argentina. Argentina reported the export of almost USD 210 million to Mozambique during 2010-15, while Mozambique only reported the import of USD 69 million. On the other hand, there are positive discrepancies in relation to soy oil from South Africa and the United Arab Emirates, meaning that Mozambican reported imports from these countries exceeded their reported exports to Mozambique. It is possible that some Argentinian soy oil is exported to Mozambique via ports in South Africa or the UAE. However, even if that is the case, it could only explain a small part of the negative discrepancy with respect to soy oil imported from Argentina.

Table 5. Mozambican soy oil imports, mirror data analysis by country of origin, 2010-15

Soy Oil			
	Value (Million USD)		
Exporter	**Moz Reported**	**Partner Reported**	**Difference**
Argentina	*69,1*	*209,4*	*-140,3*
South Africa	*38,8*	*2,2*	*36,6*
USA	*33,5*	*35,1*	*-1,6*
UAE	*13,8*	*0,0*	*13,8*
Others	*13,3*	*19,1*	*-5,8*
Total	**168,4**	**265,7**	**-97,4**

Source: UN COMTRADE

A closer examination of palm oil imports yields a similar picture, in the sense that the negative discrepancy, of USD 95 million in this case, is mostly related to trade flows from the main sources of origin. For palm oil, these are Malaysia and Indonesia (**Table 6)**. Similar to the case of soy oil imports, the data balance with other countries reveals a positive discrepancy. This is again sustained by imports from countries that are known to be global or regional shipping hubs, such as Singapore, United Arab Emirates, Mauritius and South Africa. Thus, it seems plausible that a large part of the Mozambican palm oil imports from these countries in fact concern Indonesian palm oil, which is reported as destined for Mozambique in Indonesian export statistics. Even if this is the case, however, it could only explain part of the negative discrepancy related to imports from South East Asia, and we remain with a gap of USD 95 million.

Table 6. Mozambican palm oil imports, mirror data analysis by country of origin, 2010-15

Palm Oil			
	Value (Million USD)		
Exporter	Moz Reported	Partner Reported	Difference
Malaysia	*149,7*	*168,9*	-19,2
Indonesia	*195,1*	*318,3*	-123,3
Others	*53,1*	*5,6*	47,5
Total	**397,8**	**492,8**	**-95,0**

Source: UN COMTRADE

Mirror data analysis for other SADC countries

The trade data discrepancies in relation to vegetable oil imports raise the possibility that true Mozambican vegetable oil imports are higher than what is reported in official import statistics. However, before reaching such a conclusion we should also explore other potential explanations of the data discrepancies. It could be, for instance, that exports reported as destined for Mozambique are in fact unloaded at Mozambican ports, but then transported by land to countries of the hinterland, such as Malawi, Zambia and Zimbabwe.

In **Table 7**, numbers in columns "*self-declared import*" refer to import data from the selected SADC countries, over the period 2010 to 2015. Numbers in columns "*exports reported*" refer to the sum of all globally reported exports of that product to the individual countries.

Table 7. Mirror data analysis, 2010-15

Value (USD Million), 2010-15						
	Soy Oil			Palm Oil		
	Self-declared imports	Reported exports	Difference	Self-declared imports	Reported exports	Difference
Mozambique	168,4	265,7	-97,4	397,8	492,8	-95,0
Tanzania	66,2	55,4	10,8	1486,3	1772,7	-286,4
Zambia	115,8	54,7	61,1	399,2	13,4	385,8
Malawi	100,6	10,5	90,2	38,2	8,2	30,1
Zimbabwe	364,6	410,8	-46,3	51,1	25,2	25,9

Source: UN COMTRADE

The consistent negative discrepancy with regards to Mozambique, in both soy and palm oil imports, stands in sharp contrast to the consistent positive discrepancies with regards to Zambia and Malawi. It is plausible that these are two sides of the same coin. Exporting countries may report vegetable oil exports to Mozambique, when in fact Mozambique just serves as a transit hub for landlocked Zambia and Malawi.

Looking across the five countries, the case of palm oil lends particular support to this hypothesis. The two coastal countries (Mozambique and Tanzania) have negative discrepancies, while the three landlocked countries have positive discrepancies, which come close to cancelling each other out. The negative discrepancy for Tanzania and the positive discrepancy for Zambia are particularly large.

For soy oil, we observe some data that do not seem to fit the hypothesis, as coastal Tanzania has a positive discrepancy while landlocked Zimbabwe has a negative discrepancy. These are not very large, however, and it would appear that transit dynamics between coastal and landlocked countries could indeed explain a significant part of the discrepancies observed across the board. Indeed, the soy oil discrepancies across the five countries largely cancel each other out. Thus, when examining Southern African vegetable oil imports, importer-reported data seem more credible than exporter-reported data, as it appears that the latter do not always correctly state the final destination.

4.3 Crude or refined

While data reported by the importing countries may be more reliable when it comes to overall vegetable oil imports, this is not necessarily the case for distinguishing between crude and refined oil within total vegetable oil imports. Under normal circumstances, we would expect the share of crude vegetable oil in total vegetable oil trade to be similar in the declared exports in the country of origin and declared imports in the country of destination. However, this is not always the case (**Table 8**).

Table 8. Mirror data analysis, crude vs refined, 2010-15 (USD Million)

		SOY OIL				PALM OIL			
		Crude	Refined	Total	% Crude	Crude	Refined	Total	% Crude
Mozambique	IMP	165,9	2,5	168,4	**98%**	391,1	6,7	397,8	**98%**
	EXP	262,2	3,5	265,7	**99%**	18,1	474,7	492,8	**4%**
Malawi	IMP	95,0	5,6	100,6	**94%**	30,2	8,0	38,2	**79%**
	EXP	5,4	5,1	10,5	**51%**	0,1	8,1	8,2	**1%**
Tanzania	IMP	58,9	7,3	66,2	**89%**	851,0	635,3	1486,3	**57%**
	EXP	55,1	0,3	55,4	**100%**	703,9	1068,8	1772,7	**40%**
Zambia	IMP	88,7	27,2	115,8	**77%**	108,2	290,9	399,2	**27%**
	EXP	14,6	40,1	54,7	**27%**	2,2	11,2	13,4	**17%**
Zimbabwe	IMP	150,7	213,9	364,6	**41%**	12,3	38,8	51,1	**24%**
	EXP	78,0	332,8	410,8	**19%**	0,4	24,8	25,2	**2%**

Source: UN COMTRADE

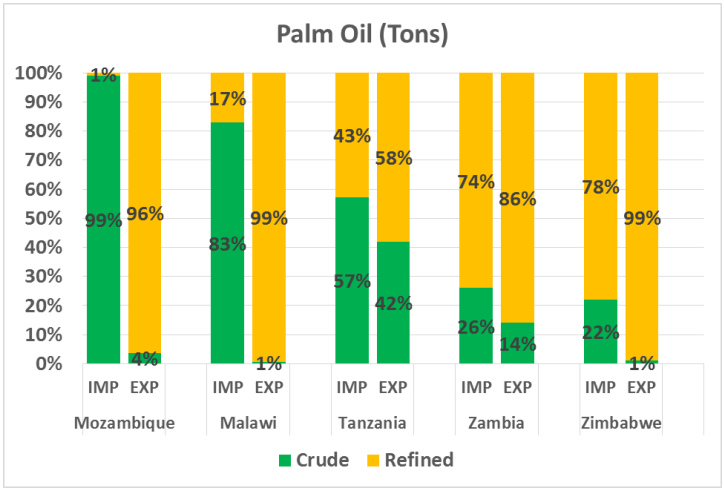
Looking at soy oil, Mozambican import statistics indicate that almost all imported soy oil is crude (99%). This is consistent with the export statistics of the countries of origin (mostly Argentina), which also indicate that almost all soy oil exported to Mozambique is crude (99%). The picture for Tanzania is similar, with both reported imports and reported exports dominated by crude soy oil. Larger differences are observed for Malawi and Zambia, where the share of crude oil in reported imports is much larger than in reported soy oil exports to these countries. However, as shown above, the total volume of reported soy oil exports to Malawi and Zambia are very small, which may distort the share of crude oil in those statistics. Thus, if some of the crude soy oil that shows up in Argentinian export statistics as being destined for Mozambique is in fact going to Malawi, then the share of crude oil in total soy oil exports to Malawi would increase significantly.

However, small volumes cannot explain the major inconsistency in the data on Mozambican palm oil imports. ***Whereas 99% of imported palm oil shows up in Mozambican import statistics as crude oil, the export statistics of its partners (mostly Malaysia and Indonesia) refer that 96% of their palm oil exports to Mozambique consist of refined oil***

(also see **Figure 4**). This is a major discrepancy, and low total volumes are not a plausible factor in this case. During the 2010-15 period, Mozambique officially imported USD 398 million worth of palm oil, of which USD 391 million entered as crude oil. For the same period, other countries reported USD 493 mllion of palm oil exports to Mozambique, of which only USD 18 million were exported as crude oil (Table 8).

For Tanzania, the other country with large volumes of palm oil appearing in both the official import statistics and in partners' export statistics, the consistency between the two in terms of the share of crude palm oil is much larger (57% vs 42%) than it is for Mozambique.

Figure 4. Mirror data analysis, crude vs refined palm oil, 2010-15



Source: UN COMTRADE

The relevant Mozambican authorities should further investigate this particular inconsistency in the data, because it may have important implications for customs revenues and trade policy. Many African countries, including Mozambique, have a differential import tariff for crude and refined vegetable oils, to stimulate local processing of imported crude oil (**Table 9**). In Mozambique, imported crude oil faces a 2.5% import tariff, while refined oil faces a much higher tariff of 20%. This tariff structure could be one of the factors behind the data discrepancies, as importers of refined oil have an incentive to get their product imported as crude oil, so that they pay the much lower import tariff.

Importantly, Malaysia and Indonesia also seek to promote domestic refinery and have export taxes on crude oil (UNECA 2016, Balchin et al. 2018), which means that exporters of crude oil may have an incentive to declare their exports as refined oil. This could be another factor behind the observed data discrepancies. It is hard to say which factor dominates. However, considering that comparable neighbouring countries such as Zambia and Tanzania have declared substantial volumes of refined palm oil imports, it is plausible that misreporting of imports on the Mozambican side is a significant factor indeed.

Even if we assume that the true division between crude and refined oil in Mozambican palm oil imports is somewhere between the two extremes (i.e. 50% crude), the loss of customs revenues would be substantial. We can make a rough calculation of this loss. Assessing collected customs revenue from palm oil imports on the basis of the official Mozambican import statistics, we get to a total of USD 11.1 million during 2010-15. If we take the total imported value of USD 398 million and divide this equally between crude and refined, then total customs revenue should have been more than USD 44 million.

Table 9. SADC import duties on soy and palm oil, crude vs refined[3] [4]

	Soy Oil		Palm Oil	
	Crude	Refined	Crude	Refined
Mozambique	2.5%	20%	2.5%	20%
Malawi	10%	25%	10%	25%
Tanzania	**0%**	25%	10%	10% - 25%
Zambia	0%	25%	0%	5% - 25%
Zimbabwe	5%	15% - 40%	5%	15% - 40%
Cameroon	30%	30%	30%	30%
ECOWAS	10%	20%	10%	10% - 35%
Kenya	0%	25%	0%	10% - 25%
Madagascar	7.5%	10%	7.5%	10%
Nigeria	10%	20%	10%	10% - 35%
SACU	10%	10%	10%	10%

Source: Market Access Map, International Trade Centre

4.4 Policy implications

It is important to address the large discrepancy identified in the trade data between crude and refined palm oil. Firstly, it suggests that the Mozambican state may be missing out on substantial customs revenues. Secondly, the entry of crude palm oil at the lower import tariff undermines the objective of the differential tariff, which is to stimulate local value addition. Furthermore, it may undermine efforts to develop a local vegetable oils industry based on locally grown oilseed crops.

However, enforcing the correct classification of the imported vegetable oil and collection of the appropriate tariff revenue may be complicated. The importers could either collude with customs officials, or mislead them, as the difference between crude and refined oil is not always directly observable.

If enforcing the differential tariff on crude and refined palm oil proves difficult, then revising the tariff structure could be an alternative response. Compared to other African countries, the difference between the tariffs on crude and refined oil is relatively large in Mozambique. Reducing or eliminating this difference could be an effective way of combating misreporting. For instance, ***Mozambique could adopt the same trade policy on vegetable oils as its neighbours of the Southern African Customs Union (SACU), which has a uniform 10% import tariff on vegetable oils.*** With such a policy in place, Mozambique could have collected approximately USD 40 million in customs revenues from soy and palm oil imports during 2010-15.[5] This is USD 29 million more than actual revenues, which would translate, on average, into USD 4.8 million of additional revenues per year. These revenues could have been earmarked for stimulating the production chains of oilseeds, including cotton, sunflower and soybeans.

Finally, it is important to note that any potential revision of the tariff policy on vegetable oils must be preceded by a thorough analysis of the likely impacts on the various (sub-)sectors that may be affected (see Balchin et al. 2018).

[3] In the refined oil category, a range of tariffs means that the country distinguishes between semi-refined and fully refined vegetable oil.

[4] Recently, Tanzania increased the import tariff on crude palm oil to 25% and the tariff on refined palm oil to 35%, for the period 2018-19.

[5] This is on the basis of a rough calculation, and does not take into account that the total volume of imported soy and palm oil may have been different with a uniform 10% import tariff.

5. Mozambican export of pulses

Mozambican production and export of pulses has expanded dramatically during the past decade, particularly driven by the production of pigeon peas for the Indian market (see Da Cruz and Oppewal 2018). Although pigeon pea has had a long history in Mozambique as a relatively marginal crop for consumption purposes, the high prices of recent years attracted increasing numbers of Mozambican farmers to start producing pigeon pea as a cash crop. It is a relatively easy crop to cultivate, with lower climate-related risks than other cash crops, and it is good for soil fertility. By 2017, the majority of farmers in Central and Northern Mozambique, particularly in the populous provinces of Zambezia and Nampula, were producing pigeon peas. Unfortunately, Indian demand and supply dominate the world market to such an extent that a production boom in India made prices collapse in Mozambique, leaving local farmers with a practically worthless harvest (Da Cruz and Oppewal 2017, Da Cruz and Oppewal 2018).

The study also highlighted that, oddly enough, the boom in pigeon pea exports was not reflected in Mozambican trade statistics, and thus neither in the annual reports on the balance of payments published the Bank of Mozambique. Besides the potentially worrying implications of capital flight and/or tax evastion, this lack of good official statistics also proved an impediment at the time of the 2017 price collapse to mobilising key political players into action, because they simply did not have a good understanding of the importance of the crop.

This chapter will examine the discrepancy between Mozambican data on pulses exports and the import data of its partners, mostly India. Between 2011 and 2016, official Mozambican pulses exports represented only 33% of total imports of Mozambican pulses declared by the countries of destination, with the total difference between the two in absolute terms amounting to more than USD 300 million during this period.

After describing and tracking the evolution of the discrepancy, we will examine possible explanations, such as data erros related to the misclassification of the product or the country of origin. We do not find evidence, however, that such data errors can explain the discrepancy, which opens the door to a more worrying possibility, that the difference occurs because of capital flight and/or tax evasion dynamics. The existence of this possibility justifies full attention being paid to the discrepancy, and further investigations by the relevant authorities to ascertain its origin and take remedying measures.

5.1 Mirror data analysis of pulses exports

Figure 5 shows that both the Mozambican export data and the import data of its trade partners suggest that pulses exports were very low until 2008. After 2009, however, the two data sources start diverging significantly. The partner data (driven by India) show a dramatic increase in the import of pulses from Mozambique, even surpassing the USD 100 million mark in all years since 2015. The official Mozambican export data, meanwhile, paint a radically different picture, of pulses exports languishing around the USD 20 million per year. Thus, pulses or pigeon peas are not even mentioned in any of the balance of payments reports by the Bank of Mozambique. However, if we take the partners' import data as correct, then pulses were the second most important agricultural export from Mozambique between 2015 and 2017, after tobacco.

Figure 5. Mozambican pulses exports: Mirror data analysis (USD), 2001-17

Source: authors based on INE, UN COMTRADE (HS 0713)

Table 10 shows the exact values and also presents the breakdown by country of destination. The final column calculates the discrepancy between pulses exports reported by Mozambique and pulses imports from Mozambique, as declared by the countries of destination. It confirms that the absolute values were extremely low until 2008, both for reported exports and imports. Small differences could thus translate into large relative discrepancies. From 2010 onwards, however, the absolute difference between the two data sources increases progressively, reaching more than USD 90 million in recent years. Since 2010, the relative discrepancy has been consistently above 50%, suggesting that the discrepancy cannot be explained by transport costs (difference between CIF and FOB prices). The actual difference between CIF and FOB depends on various trade flow-specific factors, such as the distance between the partners and the type of product. In a specific study on trade misinvoicing, UNCTAD (2016) suggests to use 10% as the average difference between FOB and CIF. In 2017, the discrepancy regarding Mozambican pulses export data was 87%. In other words, Mozambican pulses exports that year represented only 13% of the reported import of pulses from Mozambique by its trade partners.

The table also shows the dominance of India as the export market for Mozambican pulses. Judging by the Mozambican export data, USD 191 million worth of pulses were exported to India between 2001 and 2017, representing 77% of total pulses exports. If we consider the sum of reported imports of pulses from Mozambique, however, we find that India imported USD 593 million of pulses from Mozambique, representing 89% of global imports of Mozambican pulses over that period. The cumulative difference between reported exports and imports between 2001 and 2017 amounted to USD 415 million. India accounted for 97% of that discrepancy, with a cumulative difference of USD 401 million between official Mozambican pulses exports to India and Indian reported imports of pulses from Mozambique.

Table 10. Mozambican pulses exports (USD), Mirror data analysis, 2001-17

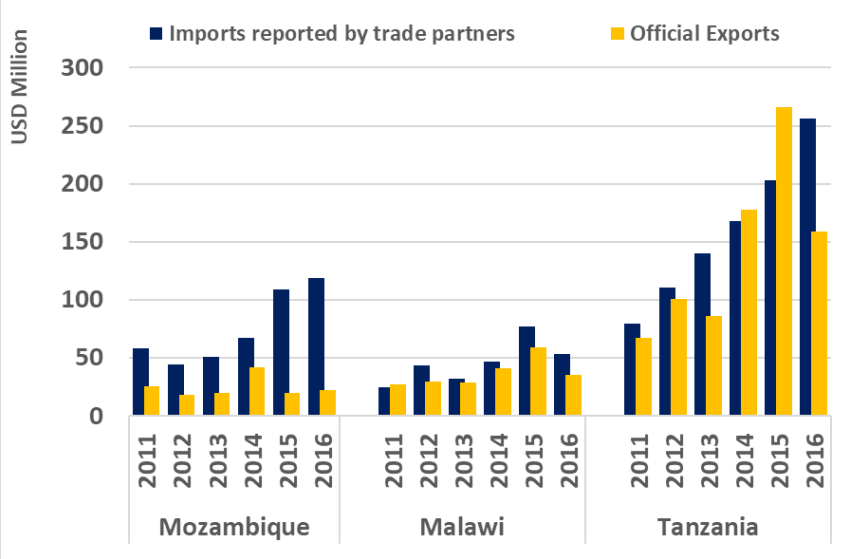
Year	Exports declared by MOZ			Imports from MOZ declared by trade partners			Difference (Exp - Imp)			% Discrepancy (Exp-Imp)/Imp
	India	*Others*	**Total**	*India*	*Others*	**Total**	*India*	*Others*	**Total**	
2001	*0,2*	*0,3*	**0,5**	*1,3*	*0,2*	**1,4**	*-1,1*	*0,1*	**-0,9**	-65%
2002	*0,4*	*0,5*	**0,9**	*0,5*	*0,7*	**1,2**	*-0,1*	*-0,2*	**-0,2**	-20%
2003	*0,4*	*0,5*	**0,9**	*0,7*	*3,2*	**3,9**	*-0,4*	*-2,7*	**-3,0**	-77%
2004	*2,2*	*1,1*	**3,3**	*3,5*	*3,6*	**7,1**	*-1,4*	*-2,5*	**-3,8**	-54%
2005	*3,3*	*1,8*	**5,1**	*3,2*	*1,0*	**4,2**	*0,1*	*0,8*	**1,0**	23%
2006	*1,0*	*0,6*	**1,6**	*1,7*	*1,2*	**2,9**	*-0,7*	*-0,6*	**-1,2**	-43%
2007	*4,8*	*1,2*	**6,0**	*5,6*	*1,8*	**7,4**	*-0,8*	*-0,6*	**-1,4**	-19%
2008	*6,8*	*1,7*	**8,5**	*6,6*	*1,5*	**8,1**	*0,2*	*0,2*	**0,4**	5%
2009	*32,6*	*5,9*	**38,6**	*24,9*	*0,9*	**25,7**	*7,8*	*5,1*	**12,8**	50%
2010	*12,0*	*10,5*	**22,4**	*43,5*	*2,3*	**45,9**	*-31,6*	*8,1*	**-23,4**	**-51%**
2011	*20,3*	*4,6*	**24,9**	*51,1*	*6,6*	**57,7**	*-30,8*	*-2,0*	**-32,8**	**-57%**
2012	*16,9*	*0,9*	**17,8**	*41,6*	*2,1*	**43,8**	*-24,8*	*-1,2*	**-25,9**	**-59%**
2013	*14,0*	*5,8*	**19,9**	*44,7*	*6,3*	**51,0**	*-30,6*	*-0,5*	**-31,1**	**-61%**
2014	*32,3*	*9,4*	**41,7**	*58,6*	*8,4*	**67,0**	*-26,3*	*1,0*	**-25,3**	**-38%**
2015	*15,8*	*3,7*	**19,4**	*99,9*	*8,8*	**108,7**	*-84,1*	*-5,1*	**-89,3**	**-82%**
2016	*20,1*	*1,8*	**22,0**	*114,3*	*4,7*	**119,0**	*-94,2*	*-2,9*	**-97,1**	**-82%**
2017	*8,5*	*5,6*	**14,1**	*91,3*	*17,2*	**108,4**	*-82,8*	*-11,6*	**-94,4**	**-87%**
TOTAL	*191,5*	*56,2*	**247,7**	*592,9*	*70,5*	**663,4**	*-401,4*	*-14,3*	**-415,7**	**-63%**

Source: authors based on INE, UN COMTRADE (HS 0713)

Comparator countries

To further investigate the nature of the discrepancy, we next assess whether similar discrepancies appear in relation to the pulses export of other East African countries. In this exercise, we consider the two other large African pulses exporters, namely Malawi and Tanzania. Data for 2017 are not yet available for all countries, so we consider the period 2011-16. **Figure 6** shows, first of all, that Tanzania appears to be the largest pulses exporter of the three. It is also striking that the large and consistent discrepancy between self-reported exports and imports declared by trading partners seems to be a particular Mozambican phenomenon.

Figure 6. Pulses exports values, mirror data analysis, 2011-16



Source: authors based on INE, UN COMTRADE (HS 0713)

Table 11 confirms that the discrepancy for the case of Mozambique is much larger than for the other countries, in both absolute and relative terms. During the period 2011-16, globally reported pulses imports from Mozambique exceeded official Mozambican pulses exports by USD 301 million, equivalent to a 67% discrepancy. The discrepancy for Malawi is much smaller, at USD 58 million, equivalent to a discrepancy of 21% over the whole period. The discrepancy for the case of Tanzania is positive for some years and negative for others, which could point at underlying data weaknesses, or lagged effects. However, the overall discrepancy over the whole period is only 10%, which could plausibly be explained by the difference between FOB and CIF prices. Just like Mozambican pulses, the vast majority of Malawi's and Tanzania's pulses exports are destined for India. Therefore, we have no reason to think that the large discrepancy for Mozambique is due to reporting errors on the importing side. As a corollary, we do have additional reason to suspect that Mozambican pulses exports are not registered correctly on the Mozambican side.

Table 11. Pulses export values, mirror data analysis, 2011-16

Value (Million USD)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	24,9	17,8	19,9	41,7	19,4	22,0	145,7
	IMP reported from	57,7	43,8	51,0	67,0	108,7	119,0	447,2
	Difference (Exp - Imp)	-32,8	-25,9	-31,1	-25,3	-89,3	-97,1	-301,5
	% Discrepancy	**-57%**	**-59%**	**-61%**	**-38%**	**-82%**	**-82%**	**-67%**
Malawi	**EXP** reported by	26,7	29,0	28,6	41,1	58,6	34,9	218,8
	IMP reported from	24,5	43,5	32,0	46,7	76,9	53,5	277,1
	Difference (Exp - Imp)	2,2	-14,5	-3,4	-5,6	-18,3	-18,7	-58,2
	% Discrepancy	**9%**	**-33%**	**-11%**	**-12%**	**-24%**	**-35%**	**-21%**
Tanzania	**EXP** reported by	67,3	101,0	86,0	177,7	265,9	159,0	856,9
	IMP reported from	79,1	110,2	140,1	168,1	202,6	255,8	956,0
	Difference (Exp - Imp)	-11,9	-9,3	-54,1	9,6	63,4	-96,8	-99,1
	% Discrepancy	**-15%**	**-8%**	**-39%**	**6%**	**31%**	**-38%**	**-10%**

Source: authors based on INE, UN COMTRADE (HS 0713)

5.2 Investigating possible causes of the discrepancy

Before concluding that the data discrepancy on Mozambican pulses exports reflects some type of illicit financial flows, we must investigate alternative hypotheses that could potentially explain the discrepancy. It could be that Mozambique reports pulses exports in the wrong product category, or that the countries of destination erroneously report Mozambique as the country of origin.

Product misclassification

A potential explanation for the discrepancy regarding Mozambican trade data could be that Mozambique misclassifies some of its pulses exports under a different product category. However, in that case we would expect to find a reverse discrepancy for the product category in which pulses exports had erroneously been recorded. Practically all Mozambican beans

and peas are exported as dried pulses, for which the correct code would be HS 0713[6]. That is also the code under which the imports from Mozambique appear in the Indian data. The most obvious candidates for misreporting pulses exports would be HS 0708 (fresh or chilled leguminous vegetables) and 0710 (which includes frozen legumes). If Mozambique reported its pigeon pea exports under these codes, then we would expect the discrepancy for the overall category HS 07 (all vegetables) to be much smaller than the discrepancy found in HS 0713. This does not appear to be the case. **Table 12** shows the difference between self-reported exports and partner-reported imports for the pulses-specific 4-digit code (HS 0713) and for the 2-digit code capturing all vegetables (HS 07). Although there is some positive discrepancy in HS 0708 and HS 0710, these are not nearly enough to compensate the negative discrepancy in HS 0713. For the 2-digit category HS 07, the discrepancy is USD 292 million between 2011 and 2016, which is about USD 10 million less than the discrepancy for HS 0713. Thus, the discrepancy is a little bit smaller, but still of the same order of magnitude.

It does not seem likely that pulses exports are reported under a different 2-digit code altogether. At the 2-digit level, no category of agricultural products presents a significant and consistent positive discrepancy, with Mozambique´s reported exports exceeding partner-reported imports.

Table 12. Mozambican vegetable (HS 07) exports (USD), Mirror data analysis, 2011-16

Value (Million USD)								
		2011	2012	2013	2014	2015	2016	TOTAL
HS 0713 (Dried Legumes)	**EXP** reported by MOZ	24,9	17,8	19,9	41,7	19,4	22,0	145,7
	IMP reported from MOZ	57,7	43,8	51,0	67,0	108,7	119,0	447,2
	Difference (Exp - Imp)	**-32,8**	**-25,9**	**-31,1**	**-25,3**	**-89,3**	**-97,1**	**-301,5**
HS 07 (Vegetables)	**EXP** reported by MOZ	35,2	22,0	26,4	49,0	30,6	35,2	198,3
	IMP reported from MOZ	63,1	51,6	58,9	73,9	115,9	126,9	490,2
	Difference (Exp - Imp)	**-27,9**	**-29,6**	**-32,5**	**-25,0**	**-85,3**	**-91,6**	**-291,9**

Source: Authors based on UN COMTRADE

Misreporting of county of origin at final destination

Another possible explanation relates to Mozambique's geographic position as a transit country for its landlocked neighbouring countries, notably Malawi, Zambia and Zimbabwe. If India reports the import of pulses from Zimbabwe as if it had been imported from Mozambique, from where it was shipped, then the total reported import of pulses from Mozambique would be artificially inflated. In this case, however, we would expect a significant positive discrepancy in trade statistics on pulses flows between Zimbabwe and India, so that Zimbabwe's declared exports to India exceed Indian imports from Zimbabwe.

Looking at the three countries, **Table 13** shows that there is indeed a small positive discrepancy on pulses exports from Zambia. This, however, cannot explain the Mozambican discrepancy, as the total value of the positive Zambian discrepancy over 2011-16 is only USD 16.2 million, or just above 5% of the negative discrepancy identified for Mozambique. For Malawi, another major African pigeon pea producer, we had already seen that it also, like Mozambique, has a negative discrepancy with regards to pulses exports.

[6] This also includes the 6-digit specific code for pigeon pea (HS 071360)

To investigate the possibility that Mozambique's landlocked neighbours misclassify their own pulses exports, **Table 13** also presents the difference between self-reported exports and partner-declared imports for the overall category HS 07. Again, we find a positive discrepancy for Zambia. However, it is still too small to provide an explanation for the Mozambican discrepancy. Furthermore, it appears that this positive Zambian discrepancy is related to exporting to neighbouring DRC, which do not show up in DRCs import statistics.

Table 13. Mozambican oilseed (HS 12) exports (USD), mirror data analysis, 2011-16

Value (Million USD) of Self-Reported Exports minus Partner-Reported Imports								
		2011	2012	2013	2014	2015	2016	TOTAL
HS 0713 (Dried Legumes)	Malawi	2,2	-14,5	-3,4	-5,6	-18,3	-18,7	-58,2
	Zambia	0,0	-0,2	-0,2	2,5	6,9	7,3	16,2
	Zimbabwe	0,5	0,1	0,2	0,9	0,2	1,4	3,3
HS 07 (Vegetables)	Malawi	2,4	-12,7	-4,4	-1,0	-12,2	-17,8	-45,7
	Zambia	-2,0	5,7	24,1	2,5	5,3	7,3	42,9
	Zimbabwe	-11,3	-14,6	-22,8	-22,8	-22,1	-23,2	-116,7

Source: Authors based on UN COMTRADE

It is very likely that pulses from Malawi find its way across the border to Mozambique through informal trade and end up being exported to India from there (see CISANET 2014[7]). In theory, this could explain the discrepancy between Mozambican and Indian statistics. However, this would imply that, despite Malawian pulses having crossed the border to Mozambique informally without any registration in Malawi's export statistics, the Mozambican customs officials then still manage to distinguish this from Mozambican pulses, while at the same time the Indian officials do not manage to make that distinction. This is a possibility to be aware of, but it appears highly implausible. It would be more likely that Malawian pulses that entered Mozambique informally and are subsequently shipped overseas would be included in Mozambican export statistics.

Quantity or price

The discrepancy on the Mozambican pulses trade data in value terms can be due to differences in reported quantities, or in prices. In order to assess the origin of the discrepancy, we rely on volumetric trade data. An important caveat to bear in mind is that, unfortunately, such volumetric data is often of much poorer quality than data on the value of trade flows. Different units of measurement are sometimes mixed up, giving rise to incorrect volumes, and in general there is a larger share of improbable data entries. Finally, when volume data submitted by individual countries is incomplete, COMTRADE uses statistical methods to estimate the quantity. To the extent that such estimates are partially based on average prices reported by other countries, the estimated quantities could be too low in the case of under-invoicing.

Tables 14 and **15** show the discrepancies between self-reported pulses export data and partner-reported pulses import data in terms of volumes and prices. In both dimensions, the Mozambican data display a much larger discrepancy than those of Tanzania or Ethiopia. In terms of volumes, Mozambique reported the export of 268 thousand tons during 2011-16,

[7] CISANET (2014). Sesame Value Chain Analysis Policy Study. Report by Civil Society Agriculture Network (CISANET).

while its trading partners reported the import of 600 thousand tons of pulses from Mozambique during the same period, implying a discrepancy of 55%. It is remarkable that the discrepancies for Malawi and Tanzania, in volume terms, are close to zero, and well within acceptable margins of error.

Finally, in terms of prices (reported in Table 15), calculated by dividing reported values by reported volumes, Mozambique´s export statistics suggest that its sesame was exported at an average price of USD 544/ton during the period 2011-16. This is 27% lower than the average price reported by its trading partners for pulses imported from Mozambique, at USD 745/ton. Thus, the discrepancy significantly exceeds the commonly assumed 10% difference between FOB and CIF prices. Furthermore, the discrepancy on prices is again much lower for the cases of Tanzania (8%) or Malawi (19%). It raises the possibility that there may be some under-invoicing of sesame exports, with potentially negative implications for foreign exchange inflows and tax collection.

On first sight, the discrepancy in volumes appears larger than the discrepancy in prices. However, the above results should be interpreted with caution, due to the aforementioned issues around the quality of volumetric export data. If volumes of pulses export are much larger than what appears in the COMTRADE data, then under-invoicing (discrepancy on prices) could be more significant than what appears from the analysis above.

Table 14. pulses export volumes, mirror data analysis, 2011-16

Volume ('000 tons)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	38,2	27,6	42,5	86,6	41,4	31,6	268,0
	IMP reported from	91,4	72,8	80,7	96,5	110,6	148,4	600,5
	Difference (Exp - Imp)	-53,2	-45,3	-38,2	-9,9	-69,2	-116,8	-332,5
	% Discrepancy	**-58%**	**-62%**	**-47%**	**-10%**	**-63%**	**-79%**	**-55%**
Malawi	**EXP** reported by	61,7	76,6	43,7	62,4	51,9	44,9	341,3
	IMP reported from	37,3	70,8	46,8	62,6	75,8	55,1	348,4
	Difference (Exp - Imp)	24,5	5,8	-3,1	-0,2	-23,9	-10,2	-7,1
	% Discrepancy	**66%**	**8%**	**-7%**	**0%**	**-31%**	**-18%**	**-2%**
Tanzania	**EXP** reported by	116,4	164,2	175,7	228,5	196,7	319,2	1200,6
	IMP reported from	113,7	155,2	222,6	219,2	209,3	315,0	1235,0
	Difference (Exp - Imp)	2,7	9,0	-47,0	9,3	-12,6	4,2	-34,4
	% Discrepancy	**2%**	**6%**	**-21%**	**4%**	**-6%**	**1%**	**-3%**

Source: Authors based on UN COMTRADE

Table 15. pulses export prices, mirror data analysis, 2011-16

Price (USD/ton)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	651,3	646,2	467,9	481,7	469,3	694,8	543,8
	IMP reported from	631,7	600,6	631,8	694,6	982,3	801,9	744,7
	Difference (Exp - Imp)	19,6	45,5	-163,9	-212,9	-513,0	-107,0	-200,9
	% Discrepancy	**3%**	**8%**	**-26%**	**-31%**	**-52%**	**-13%**	**-27%**
Malawi	**EXP** reported by	432,5	378,7	654,1	658,5	1127,9	776,6	641,2
	IMP reported from	658,2	614,2	683,0	745,7	1013,8	971,9	795,3
	Difference (Exp - Imp)	-225,7	-235,5	-28,9	-87,2	114,1	-195,2	-154,1
	% Discrepancy	**-34%**	**-38%**	**-4%**	**-12%**	**11%**	**-20%**	**-19%**
Tanzania	**EXP** reported by	578,0	614,9	489,7	777,8	1351,6	498,1	713,7
	IMP reported from	696,0	710,4	629,2	767,1	967,8	812,2	774,1
	Difference (Exp - Imp)	-118,0	-95,4	-139,5	10,8	383,8	-314,1	-60,4
	% Discrepancy	**-17%**	**-13%**	**-22%**	**1%**	**40%**	**-39%**	**-8%**

Source: Authors based on UN COMTRADE

6. Mozambican sesame exports

Sesame production has grown rapidly in Mozambique since the mid-2000s, mostly destined for exports markets in Asia. Smallholder farmers in Central and Northern Mozambique account for most of the production. Being a smallholder-based export crop, sesame production has many potential advantages for the Mozambican economy. Firstly, it contributes to rural development and poverty reduction by generating revenue for farmers. Secondly, it strengthens Mozambique's economy by diversifying exports and generating foreign exchange.

This chapter examines the evolution of Mozambican sesame exports and finds a significant discrepancy between Mozambican export data and the import data of its trade partners. Between 2011 and 2016, official Mozambican sesame exports represented only 36% of total imports of Mozambican sesame declared by the countries of destination, with the difference in absolute terms amounting to USD 244 million during the entire period.

The case of sesame exports is remarkably similar to that of pulses exports, discussed in the previous chapter. Although we do not have evidence of the factors explaining the discrepancies, the similarity in trends suggests that discrepancies in pulses and sesame data may be driven by one set of underlying factors. For this reason, the structure of this chapter is identical to that of the chapter on pulses, to facilitate comparison.

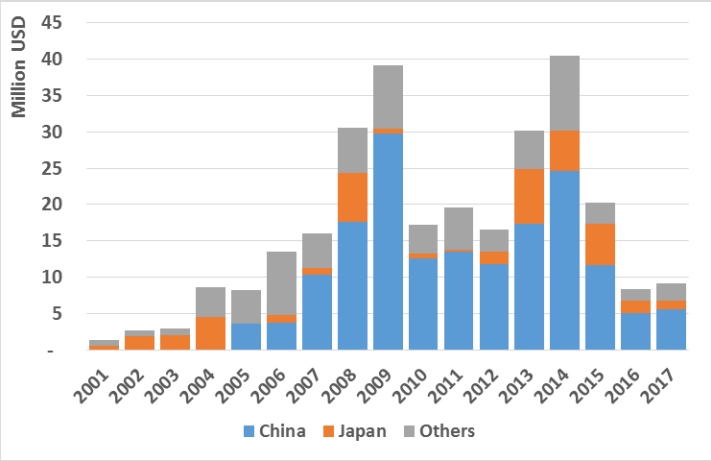
After describing the discrepancy, we will examine possible explanations, such as data erros related to the misclassification of the product or country of origin. We do not find evidence, however, that such data errors can explain the discrepancy, which opens the door to a more worrying possibility, that the difference occurs because of capital flight and/or tax evasion dynamics. The existence of this possibility justifies full attention being paid to the discrepancy, and further investigations by the relevant authorities to ascertain its origin and take remedying measures.

6.1 Mirror data analysis of sesame exports

According to official Mozambican statistics, sesame exports grew significantly during the 2000s (**Figure 7**). Whereas the total value of sesame exports was negligible at the beginning

of the decade, it reached almost USD 40 million in 2009. The growth was mostly based on exports to China. After 2009, however, the Mozambican statistics point at a sharp drop, and much lower export between 2010 and 2012. Another peak of almost USD 40 million was reached in 2014, while subsequent years saw a dramatic fall, with total export of below USD 10 million per year in 2016 and 2017.

Figure 7. Official Mozambican sesame exports (USD), 2001-17



Source: INE, UN COMTRADE

The question is whether the mirror data, of Mozambican imports reported by the countries of destination, are in accordance with these numbers. In **Figure 8**, the green line is equivalent to the data presented in Figure 5, whereas the red line indicates the total value of imports of sesame from Mozambique, as declared by the countries of destination. In the early 2000s, the two lines are practically overlapping. From the late 2000s, however, a significant and growing gap starts to appear. Whereas the two series present very similar trends, the absolute value is increasingly diverging. In 2014, for instance, Mozambique reported USD 40 million of sesame exports, while its trading partners reported the import of almost USD 120 million of sesame from Mozambique.

Figure 8. Mozambican sesame exports: Mirror data analysis (USD), 2001-17

Source: Authors based on UN COMTRADE

Table 16 shows the exact values and also presents the breakdown by country of destination. The final column calculates the discrepancy between sesame exports reported by Mozambique and sesame imports from Mozambique, as declared by the countries of destination. It confirms the widening gap between the two. In the early 2000s, the gap was still small, below 15% in most years. Transport costs could possibly explain a significant part of this gap, as the reported exports are FOB while the imports reported in the countries of destination are CIF. The actual difference between CIF and FOB depends on various trade flow-specific factors, such as the distance between the partners and the type of product. In a specific study on trade misinvoicing, UNCTAD (2016) suggests to use 10% as the average difference between FOB and CIF.

From 2008 onwards, however, the gap increases significantly and to such an extent that differences between FOB and CIF can certainly not explain it. In 2016 and 2017, total sesame exports reported by Mozambique were 84% lower than total sesame imports from Mozambique, reported by the countries of destination. Between 2012 and 2017, Mozambique-reported exports averaged USD 21 million per year, while partner-reported sesame import from Mozambique averaged USD 67 million per year; giving rise to an average annual discrepancy of USD 46 million.

The table also shows that, during the entire period 2001-17, the total difference amounts to USD 336 million. The difference in trade statistics regarding exports to China, of USD 273 million, accounts for 81% of the total difference.

Table 16. Mozambican sesame exports (USD), mirror data analysis, 2001-17

	Exports declared by MOZ				Imports from MOZ declared by partners				Difference (Exp - Imp)				% Discrepancy (Exp-Imp)/Imp
	China	*Japan*	*Others*	**Total**	*China*	*Japan*	*Others*	**Total**	*China*	*Japan*	*Others*	**Total**	
2001	-	*0.5*	*0.8*	**1.3**	-	*1.6*	*0.2*	**1.8**	-	- *1.1*	*0.6*	- **0.5**	**-27%**
2002	-	*1.9*	*0.7*	**2.7**	-	*1.8*	*0.9*	**2.7**	-	*0.1*	- *0.2*	- **0.1**	**-3%**
2003	*0.0*	*2.0*	*0.8*	**2.9**	-	*3.4*	*0.1*	**3.5**	*0.0*	- *1.4*	*0.7*	- **0.6**	**-18%**
2004	-	*4.5*	*4.1*	**8.6**	*0.1*	*7.0*	*3.0*	**10.1**	- *0.1*	- *2.5*	*1.2*	- **1.5**	**-15%**
2005	*3.6*	*0.0*	*4.6*	**8.2**	*2.6*	*1.3*	*5.3*	**9.2**	*1.0*	- *1.3*	- *0.7*	- **1.1**	**-11%**
2006	*3.7*	*1.0*	*8.8*	**13.5**	*5.2*	*1.3*	*7.9*	**14.4**	- *1.5*	- *0.3*	*0.9*	- **0.9**	**-6%**
2007	*10.3*	*1.0*	*4.7*	**16.0**	*9.8*	*1.3*	*6.5*	**17.6**	*0.5*	- *0.3*	- *1.8*	- **1.6**	**-9%**
2008	*17.6*	*6.7*	*6.3*	**30.6**	*25.1*	*15.1*	*2.6*	**42.9**	- *7.5*	- *8.5*	*3.6*	- **12.3**	**-29%**
2009	*29.8*	*0.6*	*8.7*	**39.1**	*37.1*	*2.1*	*13.0*	**52.1**	- *7.3*	- *1.4*	- *4.2*	- **13.0**	**-25%**
2010	*12.5*	*0.7*	*4.0*	**17.2**	*23.6*	*0.6*	*6.0*	**30.2**	- *11.1*	*0.2*	- *2.0*	- **12.9**	**-43%**
2011	*13.5*	*0.2*	*5.9*	**19.6**	*30.4*	*1.3*	*2.8*	**34.5**	- *16.9*	- *1.1*	*3.0*	- **14.9**	**-43%**
2012	*11.8*	*1.7*	*3.0*	**16.5**	*33.3*	*2.4*	*6.2*	**41.9**	- *21.5*	- *0.7*	- *3.2*	- **25.4**	**-61%**
2013	*17.4*	*7.5*	*5.3*	**30.2**	*47.3*	*7.6*	*3.9*	**58.7**	- *29.9*	- *0.1*	*1.4*	- **28.5**	**-49%**
2014	*24.7*	*5.5*	*10.3*	**40.5**	*92.7*	*9.5*	*14.8*	**117.0**	- *68.0*	- *4.0*	- *4.5*	- **76.5**	**-65%**
2015	*11.6*	*5.7*	*2.9*	**20.3**	*59.4*	*13.2*	*3.9*	**76.5**	- *47.8*	- *7.4*	- *1.0*	- **56.2**	**-73%**
2016	*5.1*	*1.7*	*1.6*	**8.4**	*37.7*	*9.6*	*3.6*	**50.9**	- *32.6*	- *8.0*	- *2.0*	- **42.5**	**-84%**
2017	*5.6*	*1.1*	*2.4*	**9.1**	*35.7*	*8.6*	*12.5*	**56.8**	- *30.0*	- *7.5*	- *10.1*	- **47.7**	**-84%**
TOTAL	**167.3**	**42.3**	**75.0**	**284.5**	**439.9**	**87.6**	**93.2**	**620.7**	**- 272.6**	**- 45.4**	**- 18.2**	**- 336.2**	

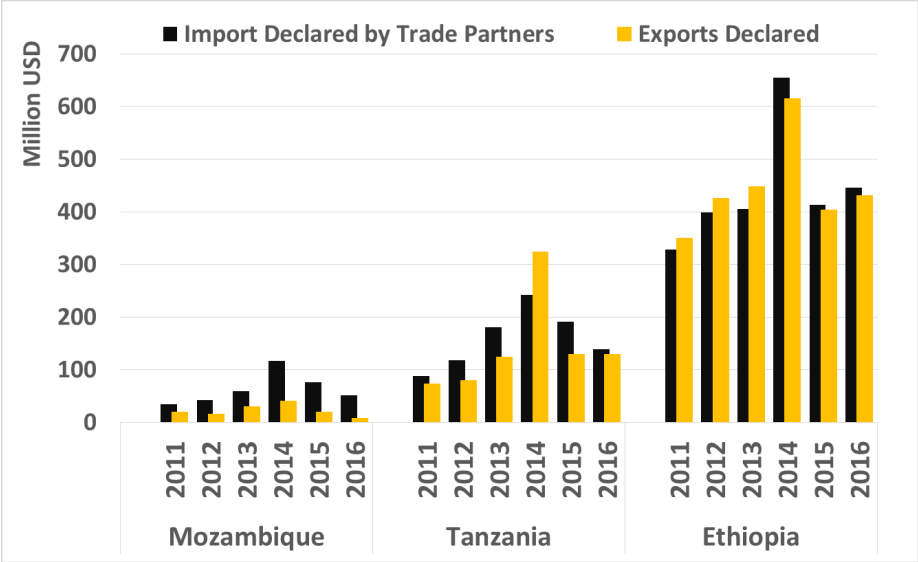
Source: Authors based on UN COMTRADE

Comparator countries

To further investigate the nature of the discrepancy, we next assess whether similar discrepancies appear in relation to the sesame export of other East African countries. In this exercise, we consider the two largest East African sesame exporters, namely Tanzania and Ethiopia. Data for 2017 are not yet available for all countries, so we consider the period

2011-16. **Figure 9** shows, first of all, that Tanzania and Ethiopia export much more sesame than Mozambique. It is also clear, however, that the discrepancy between self-reported exports and imports declared by trading partners is larger for the case of Mozambique

Figure 9. Sesame exports values, mirror data analysis, 2011-16



Source: Authors based on UN COMTRADE

Table 17 confirms that this discrepancy for Mozambique is much larger in both absolute and relative terms. During the period 2011-16, globally reported sesame imports from Mozambique exceeded official Mozambican sesame exports by USD 244 million, equivalent to a 64% discrepancy. The discrepancy for the case of Tanzania is only 10%, which could be explained by the difference between FOB and CIF prices, while Ethiopia's official exports marginally exceeded globally reported sesame imports from Ethiopia. Based on these findings, we have no reason to assume that the countries of destination, which are largely similar, make large errors in reporting sesame imports. As a corollary, we do have reason to suspect that Mozambican sesame exports are not registered correctly.

Table 17. Sesame export values, mirror data analysis, 2011-16

Value (Million USD)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	19.6	16.5	30.2	40.5	20.3	8.4	135.4
	IMP reported from	34.5	41.9	58.7	117.0	76.5	50.9	379.4
	Difference (Exp - Imp)	-14.9	-25.4	-28.5	-76.5	-56.2	-42.5	-244.0
	% Discrepancy	**-43%**	**-61%**	**-49%**	**-65%**	**-73%**	**-84%**	**-64%**
Tanzania	**EXP** reported by	73.1	79.7	124.5	324.4	129.8	129.6	861.1
	IMP reported from	88.6	118.7	180.8	241.8	190.9	138.7	959.4
	Difference (Exp - Imp)	-15.5	-39.0	-56.2	82.7	-61.1	-9.1	-98.4
	% Discrepancy	**-17%**	**-33%**	**-31%**	**34%**	**-32%**	**-7%**	**-10%**
Ethiopia	**EXP** reported by	350.0	426.9	449.0	615.0	403.7	431.3	2675.9
	IMP reported from	328.7	399.4	405.0	655.3	413.5	446.1	2647.8
	Difference (Exp - Imp)	21.4	27.5	44.0	-40.3	-9.8	-14.8	28.1
	% Discrepancy	**7%**	**7%**	**11%**	**-6%**	**-2%**	**-3%**	**1%**

Source: Authors based on UN COMTRADE

6.2 Investigating possible causes of the discrepancy

Before concluding that the data discrepancy on Mozambican sesame exports reflects illicit financial flows, we must investigate alternative hypotheses that could potentially explain the discrepancy. It could be that Mozambique reports sesame exports in the wrong product category, or that the countries of destination erroneously report Mozambique as the country of origin.

Product misclassification

A potential explanation for the discrepancy regarding Mozambican trade data could be that Mozambique misclassifies some of its sesame exports under a different product category. However, in that case we would expect to find a reverse discrepancy for the product category in which sesame exports had erroneously been recorded. This does not appear to be the case. **Table 18** shows the difference between self-reported exports and partner-reported imports for the sesame-specific 6-digit code (HS 120740), its 4-digit category of "other oilseeds" (HS 1207) and for the 2-digit code capturing all oilseeds (HS 12). In fact, the overall difference gets progressively larger as we include other product lines. At the 4-digit level, the negative discrepancy is of USD 251.0 million during the 2011-16 period, while it is USD 273.9 million at the 2-digit level. Therefore, we have no reason to believe that sesame exports are mistakenly classified as a different type of oilseed in the Mozambican statistics. It does not seem likely that sesame exports are reported under a different 2-digit code altogether. At the 2-digit level, no category of agricultural products presents a significant and consistent positive discrepancy, with Mozambique´s reported exports exceeding partner-reported imports.

Table 18. Mozambican oilseed (HS 12) exports (USD), mirror data analysis, 2011-16

Value (Million USD)								
		2011	2012	2013	2014	2015	2016	TOTAL
HS 120740 (Sesame)	**EXP** reported by MOZ	19.6	16.5	30.2	40.5	20.3	8.4	135.4
	IMP reported from MOZ	34.5	41.9	58.7	117.0	76.5	50.9	379.4
	Difference (Exp - Imp)	**-14.9**	**-25.4**	**-28.5**	**-76.5**	**-56.2**	**-42.5**	**-244.0**
HS 1207 (Other Oilseeds)	**EXP** reported by MOZ	23.2	18.3	35.9	47.5	22.8	10.1	157.9
	IMP reported from MOZ	36.8	46.6	68.2	125.7	79.2	52.5	409.0
	Difference (Exp - Imp)	**-13.6**	**-28.3**	**-32.3**	**-78.2**	**-56.4**	**-42.4**	**-251.0**
HS 12 (Oilseeds)	**EXP** reported by MOZ	28.4	25.9	51.7	56.8	24.2	19.5	206.4
	IMP reported from MOZ	46.2	55.3	88.7	139.5	88.1	62.5	480.3
	Difference (Exp - Imp)	**-17.8**	**-29.4**	**-37.0**	**-82.7**	**-63.9**	**-43.1**	**-273.9**

Source: Authors based on UN COMTRADE

Misreporting of county of origin at final destination

Another possible explanation relates to Mozambique's geographic position as a transit country for its landlocked neighbouring countries, notably Malawi, Zambia and Zimbabwe. If China reports the import of sesame from Malawi as if it had been imported from Mozambique, from where it was shipped, then the total reported import of sesame from Mozambique would be artificially inflated. In this case, however, we would expect a significant positive discrepancy in trade statistics on sesame flows between Malawi and China, so that Malawi's declared exports to China exceed Chinese imports from Malawi. However, Malawi's official export statistics hardly refer any sesame exports at all, whether to China or Mozambique, under HS code 120740. To investigate the possibility that

Mozambique's landlocked neighbours misclassify their sesame exports, **Table 19** presents the difference between self-reported exports and partner-declared imports for Malawi, Zambia and Zimbabwe for categories HS 12 and HS 1207. In category HS 1207 we do not find large discrepancies during 2011-16. For Malawi and Zimbabwe, self-declared exports exceeded their partner-declared imports, but only by USD 16.6 million and USD 5.5 million respectively, which is negligible compared to Mozambique's negative discrepancy in this category. Looking at the overall category HS 12, Malawi does present a significant positive difference, of USD 102.5 million. However, this is mostly due to discrepancies in exports under category HS 1202 (groundnuts) to neighbouring countries, and it seems implausible that this difference relates to misclassified Malawian sesame exports.

Table 19. Mozambican oilseed (HS 12) exports (USD), mirror data analysis, 2011-16

Value (Million USD) of Self-Reported Exports minus Partner-Reported Imports								
		2011	2012	2013	2014	2015	2016	TOTAL
HS 1207 (Other Oilseeds)	Malawi	0.4	3.0	8.2	3.3	0.0	1.1	16.0
	Zambia	1.0	-15.3	-10.4	-3.6	-0.5	1.0	-27.7
	Zimbabwe	2.4	1.5	-0.6	-0.2	2.1	0.2	5.5
HS 12 (Oilseeds)	Malawi	16.1	-19.6	55.6	45.9	2.4	2.1	102.5
	Zambia	1.7	7.7	16.5	-24.5	-16.2	5.5	-9.3
	Zimbabwe	2.1	-0.8	0.4	-2.1	-1.1	-1.7	-3.2

Source: Authors based on UN COMTRADE

It is very likely that sesame from Malawi finds its way across the border to Mozambique through informal trade and ends up being exported to China from there (see CISANET 2014[8]). In theory, this could explain the discrepancy between Mozambican and Chinese statistics. However, this would imply that, despite Malawian sesame having crossed the border to Mozambique informally without any registration in Malawi's export statistics, the Mozambican customs officials then still manage to distinguish this from Mozambican sesame. This is a possibility to be aware of, but it appears highly implausible. It would be more likely that Malawian sesame that entered Mozambique informally and is subsequently shipped overseas would be included in Mozambican export statistics. A further factor to consider is that Malawi does appear to correctly register other agricultural exports that are shipped out from Mozambican ports. For instance, Malawi's data on the export of pulses (HS 0713) largely match partner-declared imports of pulses from Malawi.

Quantity or price

The discrepancy on the Mozambican sesame trade data in value terms can be due to differences in reported quantities, or in prices. In order to assess the origin of the discrepancy, we rely on volumetric trade data. An important caveat to bear in mind is that, unfortunately, such volumetric data is often of much poorer quality than data on the value of trade flows. Different units of measurement are sometimes mixed up, giving rise to incorrect volumes, and in general there is a larger share of improbable data entries. Finally, when volume data submitted by individual countries is incomplete, COMTRADE uses statistical methods to estimate the quantity. To the extent that such estimates are partially based on

[8] CISANET (2014). Sesame Value Chain Analysis Policy Study. Report by Civil Society Agriculture Network (CISANET).

average prices reported by other countries, the estimated quantities could be too low in the case of under-invoicing.

Tables 20 and **21** show the discrepancies between self-reported sesame export data and partner-reported sesame import data in terms of volumes and prices. In both dimensions, the Mozambican data display a much larger discrepancy than those of Tanzania or Ethiopia. In terms of volumes, Mozambique reported the export of 111,800 tons during 2011-16, an average 18,600 tons per year. Its trading partners, however, reported the import of 247,700 tons of sesame from Mozambique during the same period, an average 41,300 tons per year. This implies a discrepancy of 55%, while the discrepancies for Tanzania and Ethiopia are close to zero, and within acceptable margins of error.

Finally, in terms of prices (reported in Table 21), calculated by dividing reported values by reported volumes, Mozambique´s export statistics suggest that its sesame was exported at an average price of USD 1211/ton during the period 2011-16. This is 21% lower than the average price reported by its trading partners for sesame imported from Mozambique, at USD 1532/ton. Thus, the discrepancy significantly exceeds the commonly assumed 10% difference between FOB and CIF prices. Furthermore, the discrepancy on prices is again much lower for the cases of Tanzania (7%) or Ethiopia (2%). It raises the possibility that there may be some under-invoicing of sesame exports, with potentially negative implications for foreign exchange inflows and tax collection.

On first sight, the discrepancy in volumes appears larger than the discrepancy in prices. However, the above results should be interpreted with caution, due to the aforementioned issues around the quality of volumetric export data. If volumes of sesame export are much larger than what appears in the COMTRADE data, then under-invoicing (discrepancy on prices) could be more significant than what appears from the analysis above.

Table 20. Sesame export volumes, mirror data analysis, 2011-16

Volume ('000 tons)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	15.2	17.5	22.9	33.1	17.2	5.9	111.8
	IMP reported from	25.9	29.3	30.7	60.0	57.2	44.5	247.7
	Difference (Exp - Imp)	-10.6	-11.8	-7.8	-26.9	-40.1	-38.6	-135.9
	% Discrepancy	**-41%**	**-40%**	**-25%**	**-45%**	**-70%**	**-87%**	**-55%**
Tanzania	**EXP** reported by	76.0	76.7	87.7	116.9	135.1	133.8	626.2
	IMP reported from	69.2	89.4	95.2	120.5	143.2	128.8	646.3
	Difference (Exp - Imp)	6.8	-12.7	-7.5	-3.7	-8.1	5.0	-20.1
	% Discrepancy	**10%**	**-14%**	**-8%**	**-3%**	**-6%**	**4%**	**-3%**
Ethiopia	**EXP** reported by	277.6	272.0	350.6	256.9	315.8	314.7	1787.7
	IMP reported from	298.4	258.0	319.0	250.8	313.8	290.8	1730.8
	Difference (Exp - Imp)	-20.9	14.0	31.7	6.1	2.0	23.9	56.9
	% Discrepancy	**-7%**	**5%**	**10%**	**2%**	**1%**	**8%**	**3%**

Source: Authors based on UN COMTRADE

Table 21. Sesame export prices, mirror data analysis, 2011-16

Price (USD/ton)								
		2011	2012	2013	2014	2015	2016	TOTAL
Mozambique	**EXP** reported by	1285.5	945.5	1316.8	1222.8	1181.0	1413.2	1210.9
	IMP reported from	1332.6	1428.6	1910.1	1948.9	1335.7	1144.0	1531.8
	Difference (Exp - Imp)	-47.0	-483.1	-593.2	-726.1	-154.7	269.2	-320.8
	% Discrepancy	**-4%**	**-34%**	**-31%**	**-37%**	**-12%**	**24%**	**-21%**
Tanzania	**EXP** reported by	961.3	1039.0	1419.6	2775.7	960.5	968.7	1375.1
	IMP reported from	1279.8	1327.4	1899.3	2005.7	1333.3	1077.3	1484.5
	Difference (Exp - Imp)	-318.4	-288.4	-479.6	770.0	-372.8	-108.5	-109.4
	% Discrepancy	**-25%**	**-22%**	**-25%**	**38%**	**-28%**	**-10%**	**-7%**
Ethiopia	**EXP** reported by	1261.1	1569.2	1280.6	2393.8	1278.3	1370.6	1496.9
	IMP reported from	1101.3	1547.8	1269.7	2612.9	1317.7	1533.8	1529.8
	Difference (Exp - Imp)	159.8	21.4	10.8	-219.1	-39.4	-163.2	-32.9
	% Discrepancy	**15%**	**1%**	**1%**	**-8%**	**-3%**	**-11%**	**-2%**

Source: Authors based on UN COMTRADE

7. Conclusions and recommendations

This report has documented large and consistent discrepancies between Mozambican trade data and the mirror images of those trade data reported by its trade partners. The use of trade data mirror analysis to identify illicit financial flows has recently come under criticism, particularly in response to a controversial UNCTAD (2016b) study which made radical claims on the basis of discrepancies identied in macro-level trade data. These claims were easily refuted by others (Eunomix 2017, Forstater 2018) pointing out basic mistakes in the underlying data and the analysis, and identifying plausible alternative explanations for the discrepancies, linked to reporting of trade flows under different product categories or accounting for transit trade.

We agree with the critics that trade data mirror analysis is not a tool that should be used in isolation, without context-specific knowledge of the trade flows that are being analysed. That context-specific knowledge is essential for critically evaluating the identified discrepancies in the trade data and formulating and testing alternative hypotheses that could explain those discrepancies. However, with that caveat in mind, trade data mirror analysis can certainly be a useful tool for economic analysis and for identifying potential red flags on illicit economic activities that warrant further investigation by the relevant authorities. The fact that some of the discrepancies highlighted in the UNCTAD report had plausible alternative explanations that have nothing to do with illicit activity does not mean that that is the case for all discrepancies.

The case of Mozambican vegetable oil imports provides a good illustration of the importance of combining trade data mirror analysis with context-specific knowledge. Purely looking at the data, one could reach the conclusion that there are illicit flows, as the discrepancy between the Mozambican data and those of its trade partners is significant, at around 30%. However, context-specific knowledge of the function of Mozambican ports as transit hubs for neighbouring landlocked countries, leads one to investigate the trade data of those countries as well. The analysis showed that the negative discrepancy on the Mozambican data is largely off-set by countervailing positive discrepancies on vegetable oil import data of its landlocked neighbours. It is very likely that these are two sides of the same coin and that the discrepancies can be easily explained by countries of origin sometimes reporting Mozambique as the destination when in fact the produce simply transits through a Mozambican port to be transported by road to neighbouring countries.

Knowledge of specific trade policy instruments can also help to interpret discrepancies in trade data, as shown by the chapters on Mozambican poultry and vegetable oil imports. Thus, discrepancies in poultry import data could be linked to Mozambique's poultry import quota and the efforts of traders to circumvent the quota. Regarding palm oil imports, the differential import tariff on crude and refined palm oil could provide an explanation for the severe discrepancy between Mozambican import data and export data of its trade partners regarding the share of crude palm oil in total Mozambican palm oil imports. Importers may be reporting refined palm oil imports as crude palm oil, in order to pay the lower import tariff. Although the trada data mirror analyis cannot prove such illicit behaviour, the analysis is very helpful in identifying potential cases that merit investigation by the authorities, or adjustments in trade policy.

The chapters on the Mozambican export of pulses and sesame identified a remarkably similar pattern of a major discrepancy opening up between Mozambican export data and the import data of its trade partners since 2009. During the period 2011-16 the value of reported Mozambican sesame exports represented only 36% of sesame imports from Mozambique as reported by its trade partners. For pulses, the equivalent percentage is only 34%. In absolute terms, the average annual value of the discrepancy across these two products was around USD 90 milion over the same period. The chapters analysed alternative hypotheses to explain these discrepancies, based on context-specific factors, but could not uncover plausible explanations. The export data of pulses and sesame by comparable countries in the region do not display similar discrepancies with the import data of the countries of destination. This is worrying from the Mozambican perspective, as it means that the widespread occurence of capital flight or tax evasion linked to Mozambican exports remains a possibility. It is important that the relevant authorities further investigate these discrepancies.

Redoubling efforts to ensure that official trade statistics provide an accurate picture of trade flows is not only important in order to tackle and minimise potentially illicit economic behaviour. It is also crucial that policymakers, investors, donor organisations and civil society have access to reliable trade statistics in order to inform their decision-making.

General Recommendations

- The government should create a **permanent taskforce** on trade statistics, consisting of the Ministry of Economy & Finance, the Ministry of Industry & Trade, the Ministry of Agriculture and the Bank of Mozambique. The taskforce needs to include relevant subordinate agencies, such as the Revenue Authority and the National Institute of Statistics.
- The overall objective of the taskforce is to **ensure that official trade statistics reflect actual trade flows**, in order to improve the availability of good quality economic information to relevant stakeholders, both in government and the private sector.
- The taskforce should **routinely employ trade data mirror analysis** to identify potential red flags on illicit economic behaviour, such as smuggling or tax evasion. The taskforce should then mobilise the relevant agencies to investigate those cases on the ground.
- Based on the findings, the taskforce then should **provide specific policy recommendations**. These could consist of recommending changes in policy, or changes in procedures to improve implementation and enforcement of existing policies.

- The taskforce should elaborate a plan to improve the collection of **volumetric trade data**.

Specific recommendations

- The Ministry of Industry & Trade should evaluate the possibility of revising the import tariff schedule on **vegetable oils**. This assessment should specifically include the option of eliminating the differential tariff between crude and refined vegetable oil and align the import tariffs with the SACU import tariff of 10% on all vegetable oils.
- The government, led by the Ministry of Industry & Trade, should as a matter of urgency improve oversight of the export of **pulses and sesame** and investigate the very large discrepancy between Mozambican export data and the import data of its trade partners.

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