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Malaysia's experience in using mirror data to complement external sector statistics[1]

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[1] This contribution was prepared for the conference. The views expressed are those of the authors and do not necessarily reflect the views of the European Central Bank, the Bank of Spain, the BIS, the IFC or the other central banks and institutions represented at the event.

Malaysia's experience in using mirror data to complement external sector statistics[1]

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Abstract

Comprehensive and reliable external sector statistics are essential for policy-making, surveillance and research, especially in this challenging era of globalisation and digitalisation. Apart from the traditional statistical methodology for compilation and analysis, adoption of additional measures such as exploring complementary data published by international agencies and counterparts can provide new insights to analysis, especially to address evolving needs for statistics, e.g. sectoral and country breakdown as well as to navigate around the complexity of analysing data under the new economy landscape. By leveraging on mirror data, countries can detect data gaps and asymmetries as well as gain valuable insights on their economic transactions with the rest of the world and external position.

This paper presents Malaysia's experience in applying mirror data analysis specifically by comparing the country's deposit abroad with deposit accepted by the rest of the world, particularly for non-bank entities, as well as country's foreign direct investment with direct investment abroad by counterpart economy. While the data sourced from Bank for International Settlements' International Banking Statistics and International Monetary Fund's Coordinated Direct Investment Survey were found to be useful for the assessment, the paper also aims to discuss challenges and limitations in integrating the mirror data into national statistics frameworks, thus, create an avenue for refinement and expanded usage of such technique.

Keywords: mirror data, non-bank deposits, foreign direct investment, international investment position

JEL classification: C800, C820, F300

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Abbreviation

BIS	Bank for International Settlements
BOP	Balance of Payments
BPM6	Balance of Payments and International Investment Position Manual – sixth edition
CDIS	Coordinated Direct Investment Survey
CPIS	Coordinated Portfolio Investment Survey
DIA	Direct Investment Abroad
DTC	Deposit Taking Corporations
ESS	External Sector Statistics
FDI	Foreign Direct Investment
IBS	International Banking Statistics
IIP	International Investment Position
ISS-ESS	Integrated Statistical System - External Sector Statistics
ITRS	International Transactions Reporting System
IMF	International Monetary Fund
LBS	Locational Banking Statistics

1. Introduction

The external sector statistics (ESS) presents an overview and detailed information on the size and composition of Malaysia's external trade in goods and services, as well as the country's financial transactions with other countries and its international investment position, which includes external liquidity and national debt obligation. Hence, the statistics play a major role as key economic indicators and determinants for policy-making, surveillance and research, especially in this challenging era of globalisation and digitalisation.

Mirror data analysis is a data analysis method which compares data captured from different sources based on similar concepts for the same period. By leveraging on mirror data, countries can validate its own data compiled against its partner countries, detect data gaps and asymmetries as well as gain valuable insights on their economic transactions with the rest of the world.

This paper focuses on Malaysia's experience in mirror data analysis by comparing – the country's deposit placed abroad with deposit accepted by counterpart countries, particularly for non-bank entities, as well as – the country's foreign direct investment (FDI) with direct investment abroad (DIA) by counterpart economies. The comparisons were made by using data published by Bank for International Settlements (BIS) and International Monetary Fund (IMF) on their respective data sharing platforms. It aims to demonstrate the application of this data analysis technique to measure the comprehensiveness of current ESS compilation in Malaysia, as well as to explore new insights for internal economic surveillance, analysis and research.

There are five sections in this paper. Following the introduction, Section 2 presents data sources used for the mirror data analysis. Section 3 and 4 explain the linkages between the pairs of comparable data, findings from the analysis and plausible arguments for the discrepancies and asymmetries. Lastly, Section 5 describes the challenges and limitations encountered while performing the mirror data analysis.

2. Data Sources

Direct reporting system and statistical imputation

The compilation of Malaysia's ESS is managed by both Bank Negara Malaysia (BNM) and the national statistics office, Department of Statistics Malaysia (DOSM) through the Memorandum of Understanding (MOU) instituted since 2008 that led to the establishment of BNM-DOSM Joint IIP Survey. The Survey collects quarterly data on cross-border flows and stocks, directly from all banks, selected non-bank enterprises, custodians managing funds on behalf of foreign investors in Malaysia as well as residents' portfolio investments overseas and relevant government agencies. The data comprises all financial instruments, such as equity capital, retained earnings, loans, deposits, etc. and augmented with further details on respective non-resident counterparty, country, institutional sector, industry and currency denomination of such exposure. Additional attributes such as name, relationship, percentage shareholdings of investors and affiliated companies are collected to facilitate more in-depth analysis of external flows and positions.

Given the fact that the Survey does not cover all non-bank enterprises and individuals in Malaysia, the compilation of deposits and real estates of these non-surveyed entities is further complemented with data imputation based on cross-border transactions reported by the domestic banks via International Transactions Reporting System (ITRS), inclusive of the estimation for informal economies. These data are compiled via Integrated Statistical System - External Sector Statistics (ISS-ESS) – a single repository to produce Balance of Payments (BOP) and other related statistics including International Investment Positions (IIP), External Debt Statistics, Coordinated Portfolio Investment Survey (CPIS), Coordinated Direct Investment Survey (CDIS) and International Banking Statistics (IBS). The aggregated data are published on quarterly basis from as early as 1Q 2008 by 7th week after the end of reference period on DOSM and BNM's websites.

IMF Coordinated Direct Investment Survey (CDIS)

The IMF collects annual data on direct investment position by immediate counterpart economy via CDIS. It is collected to improve the quality and availability of direct investment position in the IIP statistics. The survey comprises data on inward direct investment position (FDI in the reporting economy) and outward direct investment position (DIA by the reporting economy). Both datasets are cross-classified by economy of immediate investors and direct investment enterprises respectively and components of direct investment, namely equity and investment fund shares and debt instruments. All reporting economies provide data on their inward direct investment, while a subset of them contributed data on their outward direct investment. In principle, CDIS data concept and methodology are consistent with the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6). The participation in the survey is voluntary and its accessible outputs date back to year 2009. Data is published 12 months after the end of reference year.

BIS Locational Banking Statistics (LBS)

The BIS collects quarterly data on locational banking statistics (LBS) from reporting countries, with focus on internationally active banks. It is collected to observe the change in the financial landscape and identify emerging vulnerabilities within the banking sector (BIS, 2019). It captures the outstanding financial assets and liabilities of banks with breakdown by instruments (loans and deposits, debt securities, derivatives and other instruments), currencies, bank nationalities, counterparty sectors and geographical location. The LBS comprises two data subsets, the LBS by residence (LBS/R) and the LBS by nationality (LBS/N), where the latter provide the same information as LBS/R on on-balance sheet claims and liabilities but aggregated by reporting banks' nationality. In principle, LBS data concept and methodology are consistent with the BPM6, as they correspond to claims/liabilities of one country vis-à-vis those of non-resident countries. Currently, the LBS data is submitted by 48 countries and the earliest data available is from 2007 onwards. Data is published about 4 months after the end of reference quarter.

3. Linkages of Malaysia’s foreign direct investment between IMF CDIS and direct reporting system

This mirror data analysis focuses on FDI into Malaysia due to the significant presence of multinational enterprises in the country and increasing complexity of ownership structure and offshoring business operations worldwide. Therefore, the motivation of the study is to validate the current compilation practices with other relevant data sources to detect data gaps to further improve the data coverage, quality as well as exploring potential leverage for data estimation purposes.

In principle, the inward direct investment (i.e. FDI) reported by Malaysia to the IMF for CDIS and IIP publications is comparable with the outward direct investment (i.e. DIA) reported by counterpart reporting economies (i) to the IMF CDIS, as illustrated below:

$$IMF\ CDIS\ inward\ direct\ investment_{Malaysia} \approx IMF\ CDIS\ outward\ direct\ investment_{i}$$

or

$$IIP\ FDI_{Malaysia} \approx IMF\ CDIS\ DIA_{i}$$

On average, from year 2010 – 2021, 37 out of 246 reporting economies reported outward direct investment to Malaysia in the IMF CDIS database while Malaysia disseminated data on inward direct investment for 14 out of these 37 reporting economies, mainly due to confidentiality restriction. In addition, due to its significant exposure with Malaysia, the analysis against Singapore is included using data directly sourced from the publication channel of Singapore’s national statistical office as the information is not available in the IMF CDIS database.

Chart 1 and Table 1 shows the bilateral comparison at aggregated level between inward direct investment reported by Malaysia and outward direct investment reported by 12 – 15 counterpart reporting economies from 2010 to 2021. The total FDI in Malaysia for the same period is included as reference.

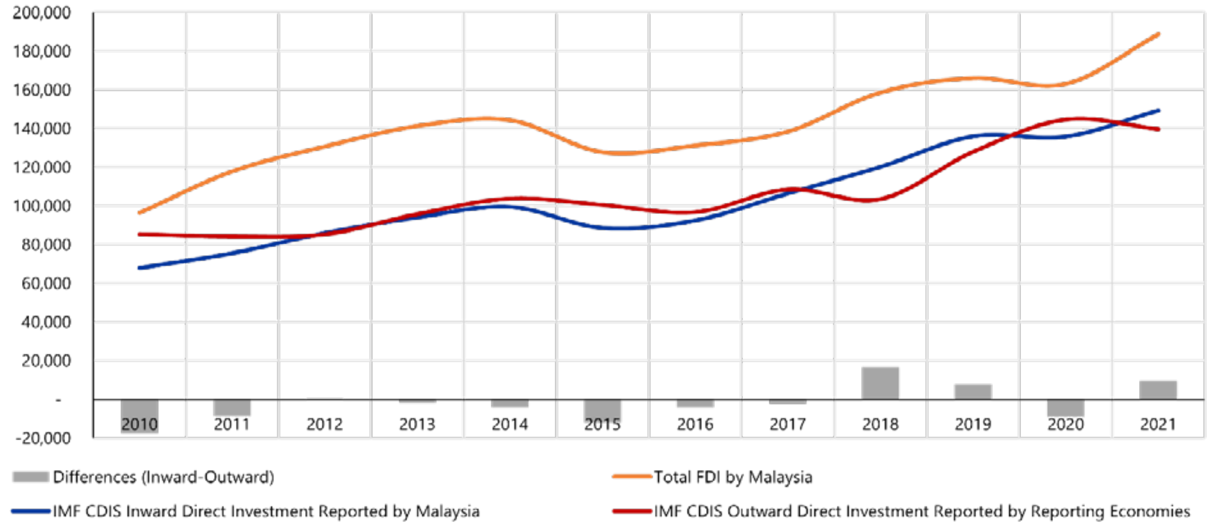
On average, the outward direct investment for these reporting economies accounted for 75% of the total FDI compiled by Malaysia, suggested that the comparison for these economies is sufficient for this study. The observation on the bilateral comparison can be segregated into two main phases as below:

1. **Year 2010 – Year 2016:** The inward direct investment reported by Malaysia is mostly lower than the corresponding mirror data, suggesting an under coverage of surveyed entities and lack of reliable benchmark for data quality assurance.
2. **Year 2017 – Year 2021:** Starting from 2018, the values of inward direct investment by Malaysia are higher, indicating an improvement in Malaysia’s ESS compilation due to implementation of ISS-ESS in 3Q 2017. The new integrated system enables an expansion of data collection scope with higher levels of granularity whilst ensuring efficiency, accuracy and consistencies of ESS.

Comparison between Malaysia’s foreign direct investment and IMF CDIS inward direct investment vis-à-vis IMF CDIS outward direct investment positions[1]

In millions of US dollars

Chart 1



[1] The comparable reporting economies varies from 2010 to 2021 due to confidentiality restrictions by reporting economies i.e. 2010 (12 reporting economies), 2011 (11 reporting economies), 2012 (12 reporting economies), 2013 (13 reporting economies), 2014-2017 (14 reporting economies) and 2018-2021 (15 reporting economies).

Sources: IMF CDIS, Bank Negara Malaysia, Department of Statistics Malaysia and author’s calculation.

Chart 2 shows the relationship between inward direct investment reported by Malaysia and outward direct investment reported by counterpart reporting economies to IMF CDIS for two periods, i.e. 2010 and 2021. In 2010, the total exposure reflected in both data sets are consistent except for 4 reporting economies - Japan and the United Kingdom reported lower exposure, while Singapore and the Netherlands reported higher outward direct investment to Malaysia. Comparison for these bilateral asymmetries after a decade in 2021 shows a significant improvement in Malaysia’s FDI compilation particularly for the Netherlands, Singapore, Japan and the United Kingdom, where the discrepancies are smaller. Hence data points are concentrated along the benchmark line in the chart. On the other hand, the bilateral asymmetries grew larger for Hong Kong and Switzerland, potentially due to the following:

1. **Different reporting of country of investment based on immediate or ultimate counterpart:** As an international financial centre, Hong Kong serves as an important gateway for investment and financing between Mainland China with the rest of the world. Various data sources indicate that roughly two-thirds of China's outward and inward direct investments originate in and pass through the economy (Hong Kong Is China’s Financial Gateway to the World, 2021). Hence, the outward direct investment may be classified under the ultimate investor, China, while inward direct investment reported by Malaysia is based on the immediate country of investor, Hong Kong.

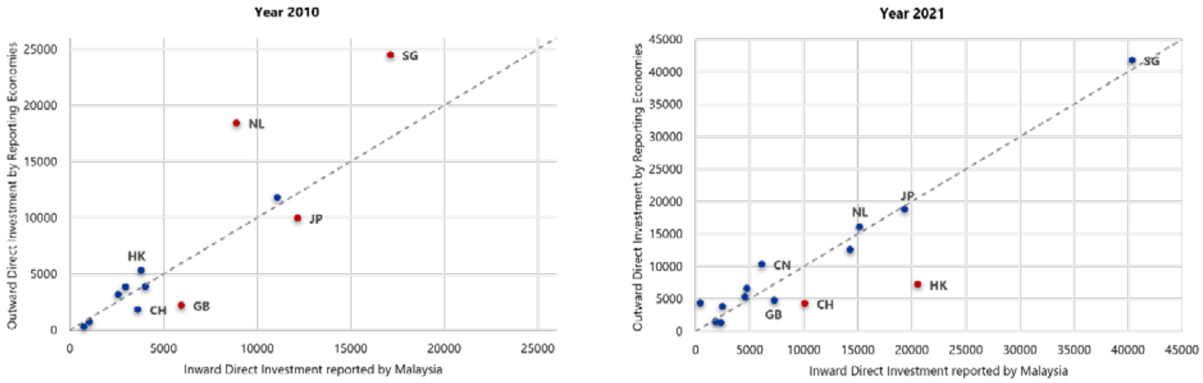
2. **Different valuation methods, data sources and estimation techniques**: Malaysia collects direct investment position based on book value (except where the direct investment enterprise is listed on local bourse) while other reporting economies may have adopted estimation approach constructed using annual data (Angulo & Hierro, 2017).

The exchange of data and metadata between reporting economies could enhance the understanding on the asymmetries and subsequently facilitating its resolution.

Malaysia's inward direct investment vis-à-vis outward direct investment positions for 14 economies reported to IMF CDIS for Year 2010[1] and Year 2021[2]

In millions of US dollars

Chart 2[3]



[1] The IMF CDIS data for outward direct investment are available for 11 reporting economies as per Table 2. Singapore data is sourced directly from Singapore Department of Statistics (DOS).

[2] The IMF CDIS data for outward direct investment are available for 15 reporting economies as per Table 2. Singapore data is sourced directly from DOS.

[3] The dotted lines indicate the meeting points where inward direct investment compiled by Malaysia equals to the outward direct investment reported by reporting economies to IMF CDIS. Data points below the lines reflects inward direct investment compilation by Malaysia is higher and vice versa.

Sources: IMF CDIS, Singapore Department of Statistics and author's calculation.

4. Linkages of Malaysian non-bank deposits between BIS LBS/R and direct reporting system

The motivation of this study is to validate the comprehensiveness of current compilation by leveraging other relevant data sources and understand the reasons of the divergence. This analysis focuses on Malaysian non-bank deposits abroad as conducting a survey on all households' and non-bank enterprises' financial assets abroad is impractical and unfeasible. Furthermore, cross-border transactions have become increasingly complex especially for households due to the rapid revolution of digital banking services as well as enhancement to cross-border payments connectivity.

In principle, the claims of non-banks entities in Malaysia on deposit taking corporations (DTC) abroad, in the forms of deposits, which is classified under the functional category of 'Other Investment' in IIP for Malaysia, is comparable with the liabilities of reporting countries (i) reported in the LBS/R under loan and deposits item vis-à-vis Malaysia, as illustrated below:

$$IIP\ assets_{Malaysia}^{Currency\ and\ deposits} \approx LBS/R\ liabilities_{i}^{Loans\ and\ deposits}$$

Chart 3 and Table 3 (Annex) show the high-level comparison of Malaysian non-bank outstanding deposits between its direct reporting system and LBS/R from 2017 to 1Q 2023, where 38 out of the 48 reporting countries in the LBS/R reported their exposure vis-à-vis Malaysia. The comparison is performed from 2017 onwards due to unavailability of the detailed breakdown prior to 2017.

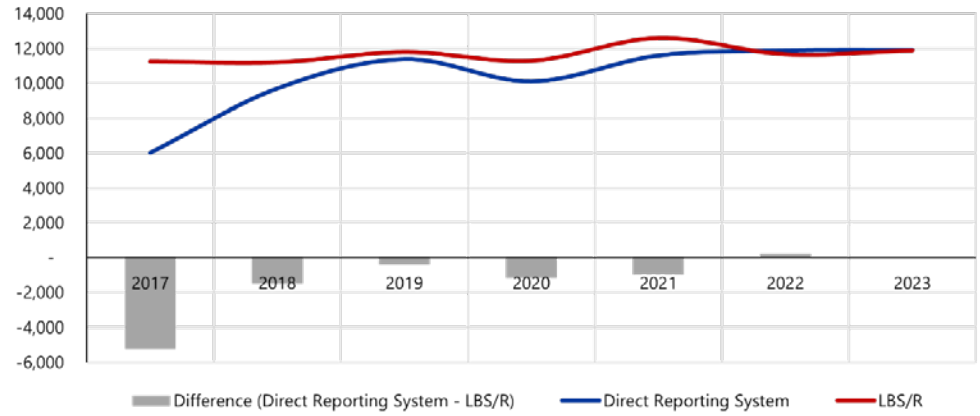
Upon the implementation of new data collection system via ISS-ESS, which was implemented in 3Q 2017, the data compilation has been improved to support the expansion of data scope and granularity to ensure comprehensiveness, accuracy and efficiency. The expansion of data granularity for deposits amongst others, covers individual counterparty and counterparty sector that need to be reported item-by-item by direct reporting entities.

While during its inception in 2017, there was a discrepancy amounting to USD5,225mil, the divergence has progressively improved throughout the years and narrowed in the recent 2 years of 2022 and 2023. It was identified that the discrepancies during the early implementation of ISS-ESS was due to familiarisation with the new reporting requirements as more granular items are required to be reported. On the other hand, the convergence implying a continuous improvement in the data compilation in terms of survey coverage, data scope as well as data quality assurance mechanism. In addition, Malaysia has also developed a methodology to estimate the exposure of households and non-survey non-bank enterprises.

Cross-border Malaysian non-bank deposits between BIS LBS/R and direct reporting system[1]

In millions of US dollars

Chart 3

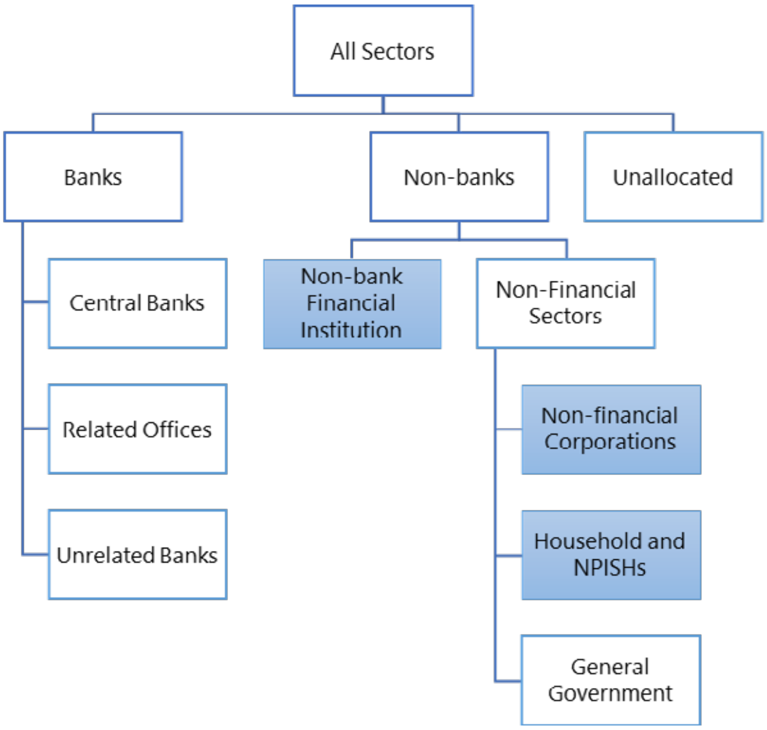


[1]Data as of 1Q 2023.

Sources: BIS locational banking statistics (LBS), Bank Negara Malaysia, Department of Statistics Malaysia and author's calculation.

In addition to the high-level data comparison, further analysis is carried out on the total exposure by depositors' institutional sector and incorporation country of DTCs who accepted the deposits from Malaysian non-bank entities. The reporting countries are required to report their banks' financial assets and liabilities by sector of their counterparty, at a minimum of five sectors: central banks, intragroup, non-bank financial institutions, non-financial sector and unallocated. The detailed breakdown of non-financial sector, which comprises government, non-financial corporations and households, is encouraged items. For this study, the comparable institutional sectors are non-bank financial institutions[2], non-financial corporations[3] and households[4] as shown in Diagram 1.

Sectoral breakdown of LBS — Diagram 1



Source: Author's own illustration.

In general, the divergence observed for households' deposit placed abroad was narrowed down in the recent 3 years from 2021 to 2023, while the discrepancies for non-bank financial institutions and non-financial corporations remain the same throughout the years. Since the access to the details is restricted for the internal use of reporting authorities and eligible data receivers, the graphical data comparison by depositors' institutional sector and counterparty country is not shown in this paper.

[2] Include insurance corporations and pension funds.

[3] Include corporations other than financial corporations.

[4] Include non-profit institutions serving households (NPISHs) such as charities, religious institutions, trade unions and consumer associations.

The potential reasons for the discrepancies are listed below:

1. **Different reporting treatment for purpose of investment, either immediate or ultimate**: Malaysian non-bank entities' deposits in offshore financial centres may not be reported by the counterparty reporting countries as it is potentially further transferred to or subsequently invested in another financial instrument in the rest of the world. Based on detailed assessment at entity level, there is an instance where the deposits are reported by the ultimate reporting countries instead. This is due to the presence of Malaysia's direct investment enterprises in the reporting countries.
2. **Different treatment of residency status**: deposits placement abroad by Malaysian households due to emigration may be treated as deposits by resident in the counterpart countries.

Such granular data comparison provides better insight and understanding on the ultimate destination of deposits placed by Malaysia non-bank entities as well as the purpose of deposit placement abroad.

5. Challenges and limitations

The key challenges and limitations are attributed to (a) periodicity, frequency and timeliness of mirror data publication, (b) unavailability of data from major counterparty economies, (c) reconciliation between flows and positions and (d) metadata comprehensiveness for official statistics.

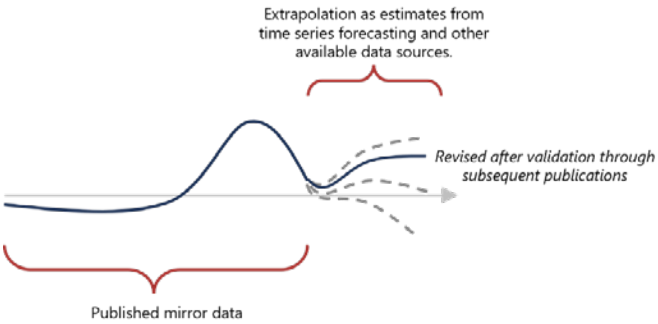
Periodicity, frequency and timeliness of mirror data publication

The annual CDIS data and quarterly IBS data are released on 12-month and 4-month after the end of reference period respectively. In this respect, any identification of data discrepancies identified from the comparison for further analysis and improvement can only be considered in the annual data revision. While this process allows overall improvements to the data accuracy, it is not as useful to perform timely analysis and surveillance on prevailing economic conditions.

Despite delayed availability, back series data could be leveraged alongside other indicators available such as administrative data from central counterparty clearing houses and national registrars, etc. for extrapolation to derive a credible estimate of the total economic transactions with the rest of the world. Having an estimate compensates for missing data points, as it enables the analysts to form preliminary views until the complete dataset becomes available for validation through subsequent publications.

Using extrapolation as estimates

Diagram 2



Source: Author's own illustration.

The discussed time lag does not pose a significant constraint for data from major economies as comparable datasets are likely accessible with higher frequency and within a shorter time frame through their respective national statistics portals. In addition, some countries have further eased the data accessibility by providing data extraction APIs or other techniques allowing public to extract relevant datasets for own analysis in a seamless manner.

Unavailability of data from major counterparty economies

Detailed data at the country, sector and instrument levels of some major counterparty economies are not available for analysis given that participation in CDIS and CPIS are voluntary. For instance, mirror data in year 2021 for major counterparty economies of Malaysia's direct investment which collectively contributed 38.1% and 42.9% for assets and liabilities, respectively, is not available in the IMF CDIS database. Fortunately, these limitations where partially mitigated as the necessary details could be accessed from the national platform.

Although CPIS is not discussed in this paper, it is worth to highlight that the granular details of these major counterparty economies are important for mirror data analysis given their significant exposure of Malaysia, namely the United States (25.4%), Singapore (7.6%), the United Kingdom (5.4%), Hong Kong (5.3%) and Luxembourg (4.3%), which collectively accounted for 48% of the total portfolio investment abroad as of 3Q 2023 as depicted in Diagram 4. However, only Singapore submitted the mirror data for these financial assets to IMF in CPIS Table 4: Reported Portfolio Investment Liabilities by Economy of Non-resident Holder. The granular details were absent in respective national statistics portal too.

Data availability from major counterparty economies

Diagram 3

	Mirror data from	
Top 5 Countries *(as of September 2023)*	IMF/ BIS	Counterparty Country's National Statistics Portal
Inward CDIS (59.0%)		
Singapore (21.1%)	X	✓
Hong Kong* (11.2%)	✓	X
United States^ (11.2%)	✓	✓
Japan^ (9.9%)	✓	✓
Netherlands* (5.5%)	✓	X
Outward CDIS (48.6%)		
Singapore (21.6%)	✓	✓
Indonesia^,# (10.9%)	✓	✓
Netherlands* (6.1%)	✓	X
Cayman Islands (5.7%)	X	X
United Kingdom* (4.4%)	X	X
CPIS Assets (48.1%)		
United States*,# (25.4%)	X	X
Singapore (7.6%)	✓	✓
United Kingdom (5.4%)	X	X
Hong Kong* (5.3%)	X	X
Luxembourg (4.3%)	X	X

Notes:
* Data available by selected counterparty countries only, Malaysia not included.
^ Data available on country by sector.
# Higher periodicity

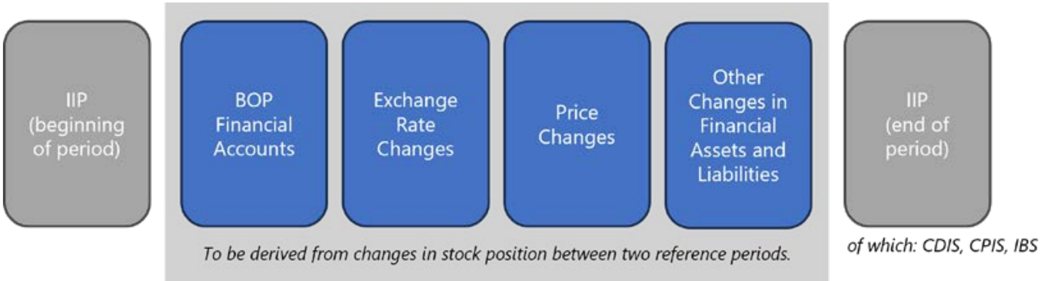
Source: IMF CDIS, IMF CPIS, author's own illustration.

The absence of data has posed a predicament in the mirror data study, particularly in assessing exposure with major counterparty economies. These may stem from difficulties in data collection within the reporting economies or confidentiality constraints imposed by national statistics authorities, preventing data sharing. In such circumstances and when peculiarities observed in the data needs to be addressed, bilateral engagement with official compilers for potential data exchange becomes crucial to advance the study and yield meaningful outcomes.

Reconciliation between flows and positions

The supplementary data presented for the mirror data analysis comprises stock positions, enabling for comparison with the published international investment position (IIP), where both refers to the value of financial assets of residents of an economy that are claims on non-residents and the liabilities of resident of an economy to non-residents, at a point in time. In BPM6, IMF has strongly recommended an integrated approach that reconciles the opening and closing values of the IIP through the financial account (flows arising from transactions) and the other changes in financial assets and liabilities account (other volume changes and revaluation). To incorporate the supplementary data into the BOP statistics publication, it is imperative to separately calculate the foreign exchange (fx) -adjusted flows, price changes for securities as well as other changes in volume where applicable. The first component was calculated and published by BIS in the international banking statistics for country reference.

Integrated approach recommended in BPM6 Diagram 4



Source: Author's own illustration.

To calculate the segregation of flows between two reference periods, data compilers may consider the nature of economic transactions, whether in the form of merchandise trades or remittances and the major settlement currency (and hence the average exchange rate) between the countries for the foreign exchange gain/ loss. Other considerations include major world stock market indices for the price changes of listed securities and global events that affect the volume changes for financial assets and liabilities.

Metadata comprehensiveness for official statistics

Relevant metadata from the compilers and list of the main methodological differences are critical for mirror data analysis in addressing different compilation practices among countries. Some examples include treatment for residency status of short-term and long-term migrants, geographic allocation of direct investment positions (especially where the chain of ownership includes a resident SPE), treatments of instruments, etc.

This information where it is made available through metadata responses from respective economies published by the IMF is heavily relied upon to ascertain the insights obtained from detailed analysis on discrepancies reflected in the mirror data analysis. However, where this information is lacking, a comprehensive understanding on businesses nature through engagement with the direct reporting entities as primary data provider enabled deliberation and hence reconciliation on accuracy of sectoral and country breakdowns recorded in BOP/IIP, particularly on immediate and ultimate destination for the flow of funds. Another instance is, for the analysis on deposits placement abroad by households, descriptors on treatment of residency status of migrants based on their centre of predominant economic interest is important to be known, given the increasing prevalence of digital nomads and evolving emigration dynamics in developing country.

6. Conclusion

Mirror data analysis can complement traditional data analysis by providing a more objective and comprehensive view of external exposures between countries. It provides additional data points in assessing the comprehensiveness of Malaysia's ESS compilation, deriving additional valuable insights on the economic transactions with major counterparty countries. While the comparison on an aggregated basis might suffice to examine the data comprehensiveness, quality and adequate reporting entities, the comparative analysis with focus in more granular level, specifically by counterparty countries resulted in a more profound insight. Notably, the methodological differences in reporting practices may cause the divergence between datasets that can be resolved by introduction of metadata.

Despite the satisfactory results obtained from the study, it is crucial to emphasise that the effectiveness of this approach relies on the availability of granular data published by respective reporting countries through the international organisations or own national statistics platform. Though the participation of reporting countries in providing detailed breakdown are increasing over time, further application of this data assessment method is still limited for Malaysia given the absence of the mirror data from major counterparty countries. Nonetheless, the observed asymmetries could be further analysed via bilateral data exchange with the counterparty countries. In addition, the studies could be extended to observe the relationship of selected major counterparty with other economies similar to Malaysia, to ascertain the potential reason of the discrepancies.

Moving forward, given the evolving financial and economic landscape, such analysis shall not be episodic but assimilated into the operational framework as part of the continuous effort and commitment to ensure a credible national statistic for policy-making, surveillance and research.

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Annex

Malaysia's foreign direct investment and inward direct investment vis-à-vis IMF CDIS's outward direct investment positions[1]

In USD millions | Table 1

Year	Total FDI by Malaysia [1]	IMF CDIS Inward Direct Investment Reported by Malaysia [2]	IMF CDIS Outward Direct Investment Reported by Reporting Economies [3]	Differences (amount) (Inward DI – Outward DI) [4] = [2] - [3]	Differences (percentage) [5] = [4] *100 / [2]
2010	96,400	67,838	85,323	-17,485	-25.8
2011	117,822	75,472	84,225	-8,753	-11.6
2012	130,637	85,902	85,249	653	0.8
2013	141,263	94,012	95,677	-1,666	-1.8
2014	144,243	99,427	103,775	-4,348	-4.4
2015	127,712	88,511	100,441	-11,930	-13.5
2016	131,168	92,399	96,704	-4,305	-4.7
2017	138,396	106,376	108,448	-2,071	-1.9
2018	158,543	120,110	103,473	16,637	13.9
2019	166,006	135,866	127,946	7,920	5.8
2020	162,982	135,738	144,620	-8,882	-6.5
2021	188,612	149,259	139,689	9,570	6.4

[1] The comparable reporting economies are varying from 2010 until 2021 due to confidentiality restrictions by reporting economies i.e. 2010 (12 reporting economies), 2011 (11 reporting economies), 2012 (12 reporting economies), 2013 (13 reporting economies), 2014-2017 (14 reporting economies) and 2018-2021 (15 reporting economies).

Sources: IMF CDIS, Bank Negara Malaysia, Department of Statistics Malaysia and author's calculation.

IMF CDIS: Malaysia's inward direct investment vis-à-vis outward direct investment positions for 14 economies for Year 2010 and Year 2021[1]

In USD millions

Table 2

Year	2020			2021		
Country	Inward Direct Investment Reported by Malaysia [1]	Outward Direct Investment Reported by Reporting Economies [2]	Differences (amount) (Inward DI – Outward DI) [3] = [1] – [2]	Inward Direct Investment Reported by Malaysia [5]	Outward Direct Investment Reported by Reporting Economies [6]	Differences (amount) (Inward DI – Outward DI) [7] = [5] – [6]
AU	2,970	3,843	-874	2,473	3,900	-1,427
CH	3,623	1,836	1,787	10,098	4,337	5,761
CN	…	…	…	6,099	10,355	-4,256
DE	4,021	3,883	138	4,552	5,336	-784
DK	1,026	766	260	2,332	1,371	961
FR	743	319	424	1,828	1,524	304
GB	5,943	2,221	3,722	7,274	4,793	2,481
HK	3,791	5,309	-1,518	20,530	7,280	13,250
JP	12,162	9,979	2,183	19,321	18,839	482
KR	2,576	3,185	-609	4,721	6,612	-1,891
LU	…	…	…	-169	477	-645
NL	8,899	18,436	-9,538	15,143	16,118	-975
SG[2]	17,127	24,528	-7,401	40,358	41,780	-1,421
TH	-172	1,446	-1,618	431	4,376	-3,945
US	11,072	11,791	-719	14,266	12,591	1,675

[1] Three dots ("…") stand for restricted or confidential.

[2] No outward direct investment reported by SG to IMF CDIS. Data is sourced from Singapore Department of Statistics website.

Sources: IMF CDIS, Singapore Department of Statistics and author's calculation.

Malaysian non-bank deposits: liabilities BIS LBS/R vis-à-vis assets direct reporting system

In USD millions

Table 3

Year	Direct Reporting System [1]	LBS/R [2]	Differences (amount) (Direct Reporting System – LBS/R) [3] = [1] - [2]	Differences (percentage) [4] = [3] *100/ [1]
2017	6,030	11,255	-5,225	-86.7
2018	9,706	11,205	-1,499	-15.4
2019	11,388	11,791	-403	-3.5
2020	10,110	11,295	-1,185	-11.7
2021	11,598	12,590	-992	-8.6
2022	11,887	11,661	226	1.9
2023[1]	11,916	11,886	30	0.3

[1] Data as of 1Q 2023.

Sources: BIS locational banking statistics (LBS), Bank Negara Malaysia, Department of Statistics Malaysia and author's calculation.

Malaysia's Experience in using Mirror Data to Complement External Sector Statistics

Nurina Nasaruddin, Zima Mazfahani Mazlan and Choo Ching Yii
Bank Negara Malaysia

External Sector Statistics (ESS) Conference
Madrid, Spain
12 – 13 February 2024

BANK NEGARA MALAYSIA
CENTRAL BANK OF MALAYSIA

Presentation Outline

1. Background
2. Linkages of Malaysia’s FDI between IMF CDIS and direct reporting system
3. Linkages of Malaysian non-bank deposits between BIS LBS/R and direct reporting system
4. Challenges and limitations
5. Conclusion

Background

Focus

Non-bank entities' deposit placement abroad

Foreign direct investment into Malaysia

Objectives

Detect data gaps & asymmetries

Gain valuable insights from other sources

Goals

Comprehensiveness of current survey frame and statistical imputation

Consistency of data at granular level

Economic transactions with the rest of the world

Linkages of Malaysia's FDI between IMF CDIS and direct reporting system

Focus

Foreign Direct Investment (FDI) into Malaysia

Significant presence of multinational enterprises in the country and increasing complexity of ownership structure and offshoring business operations worldwide.

Data linkages

$$\boldsymbol{IMF\ CDIS\ inward\ direct\ investment_{Malaysia}}$$
$$\boldsymbol{\approx\ IMF\ CDIS\ outward\ direct\ investment_{i}}$$

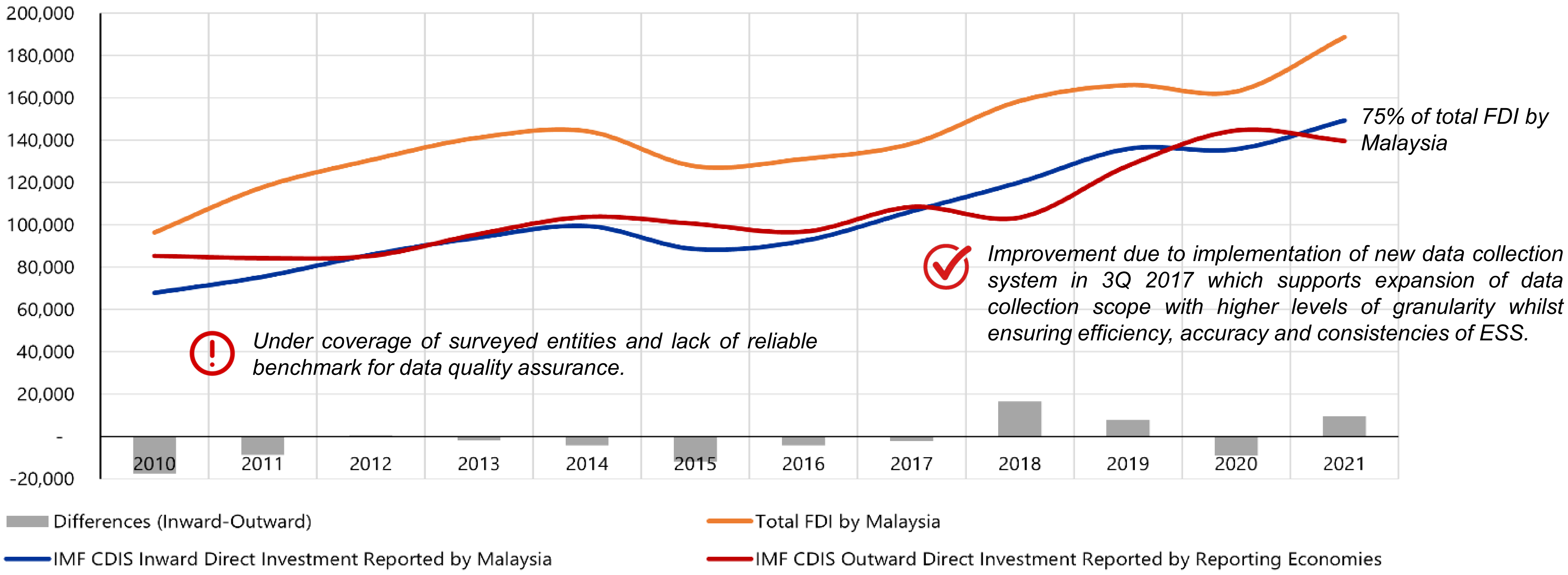
or

$$\boldsymbol{IIP\ FDI_{Malaysia} \approx\ IMF\ CDIS\ DIA_{i}}$$

Inward direct investment (i.e. FDI) reported by Malaysia to the IMF for CDIS and IIP publications is comparable with the outward direct investment (i.e. DIA) reported by counterpart reporting economies (i) to the IMF CDIS.

Linkages of Malaysia’s FDI between IMF CDIS and direct reporting system

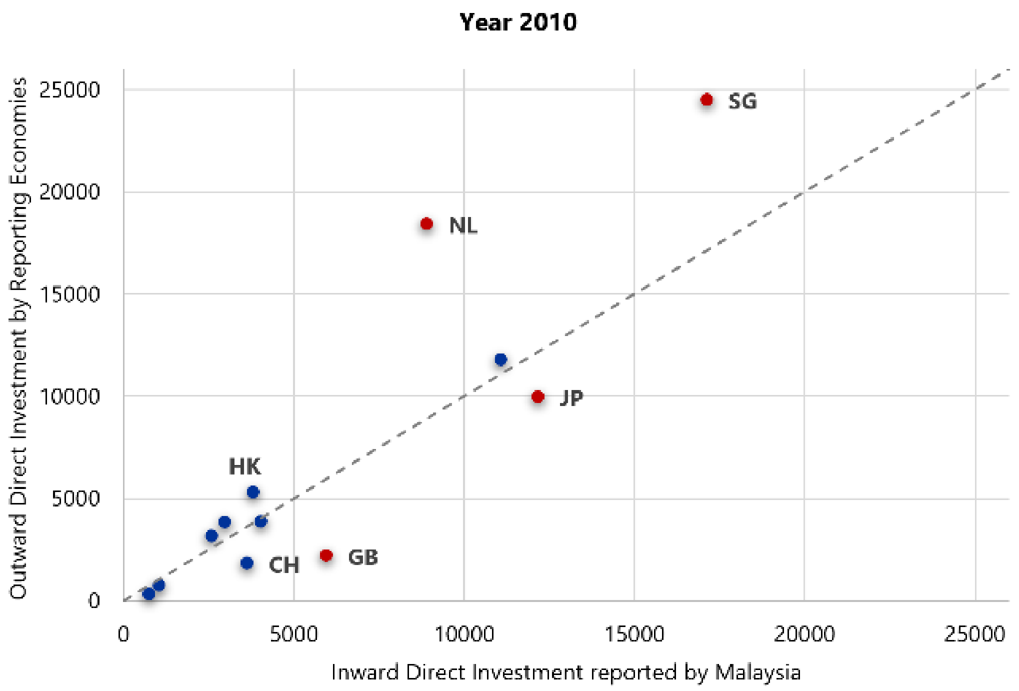
Comparison between Malaysia’s FDI and IMF CDIS inward direct investment vis-à-vis IMF CDIS outward direct investment positions (in USD mil)

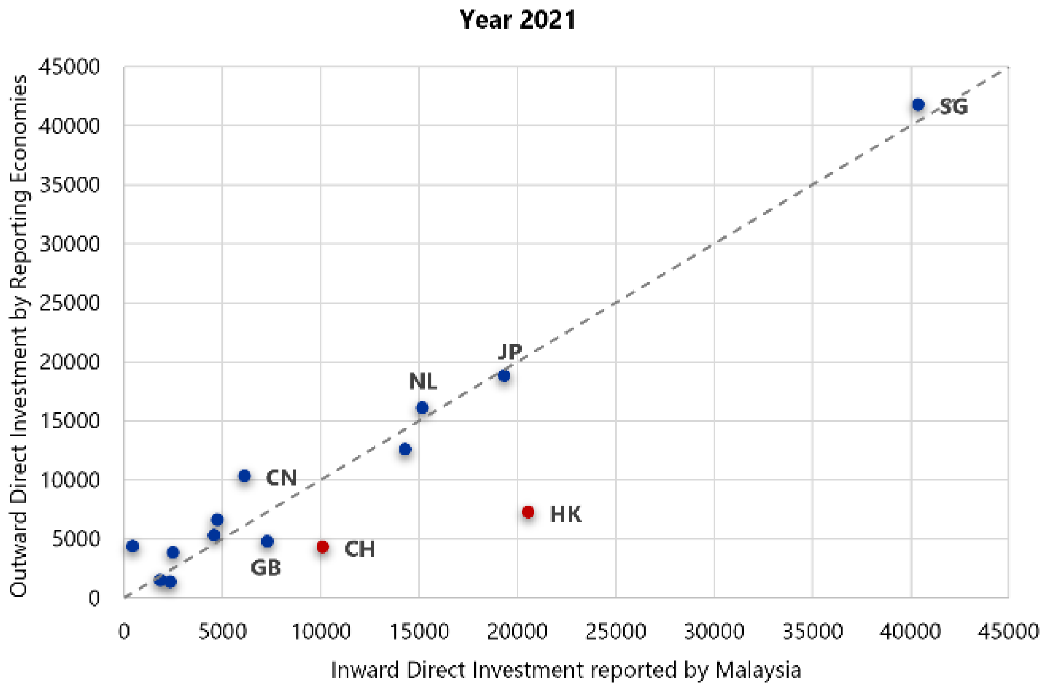


Sources: IMF CDIS, Bank Negara Malaysia, Department of Statistics Malaysia and author’s calculation.

Linkages of Malaysia's FDI between IMF CDIS and direct reporting system

Malaysia's inward direct investment vis-à-vis outward direct investment positions for 14 economies reported to IMF CDIS for Year 2010 and Year 2021 (in USD mil)





Potential reasons for asymmetries with Hong Kong and Switzerland:

i. Different reporting of country of investment based on immediate or ultimate counterpart

ii. Different valuation methods, data sources and estimation techniques

BANK NEGARA MALAYSIA
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Sources: IMF CDIS, Singapore Department of Statistics and author's calculation.

Linkages of Malaysian non-bank deposits between BIS LBS/R and direct reporting system

Focus

Malaysian non-bank deposits abroad

(a) Impractical and unfeasible to survey all households' and non-bank enterprises' financial assets abroad, and

(b) complexity of cross-border transactions for households due to digitalisation of banking services.

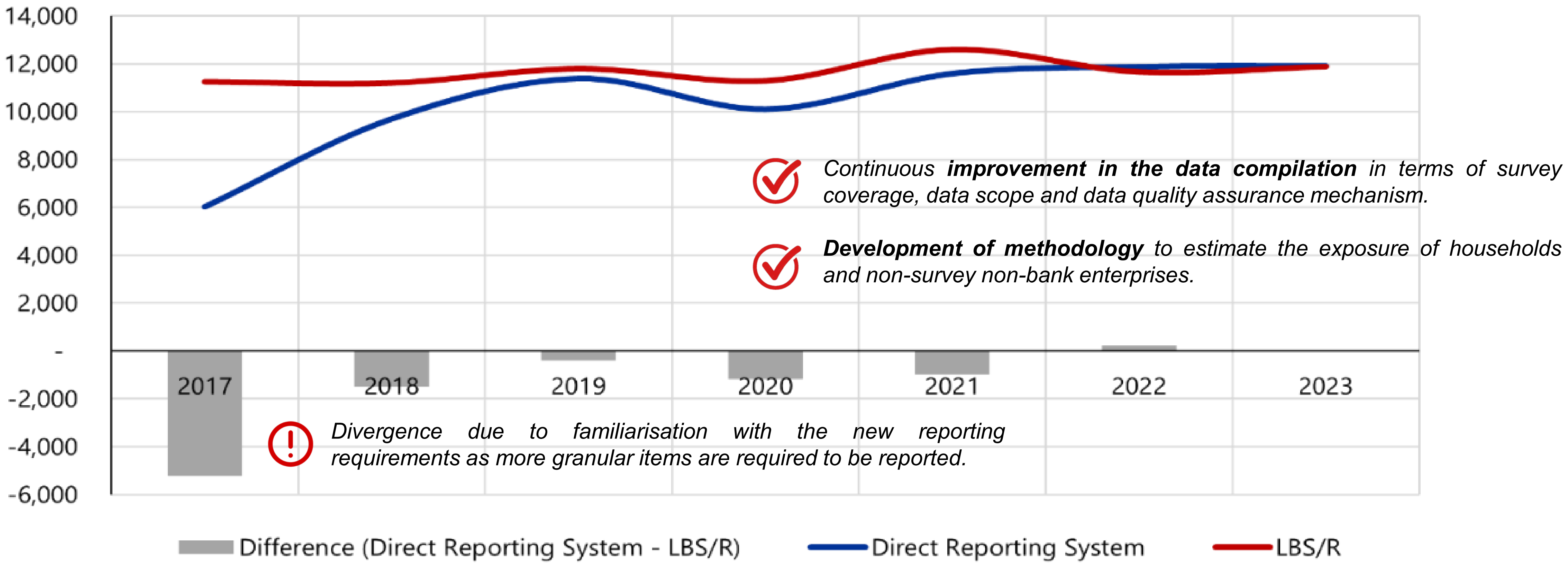
Data linkages

$$\boldsymbol{IIP\ assets}_{\boldsymbol{Malaysia}}^{\boldsymbol{Currency\ and\ deposits}} \approx \boldsymbol{LB\,S/R\ \ liabilities}_{\boldsymbol{i}}^{\boldsymbol{Loans\ and\ deposits}}$$

Claims of non-banks entities in Malaysia on deposit taking corporations abroad, in the forms of deposits, which is classified under the functional category of 'Other Investment' in IIP for Malaysia, is comparable with the liabilities of reporting countries (i) reported in the LBS/R under loan and deposits item vis-à-vis Malaysia.

Linkages of Malaysian non-bank deposits between BIS LBS/R and direct reporting system

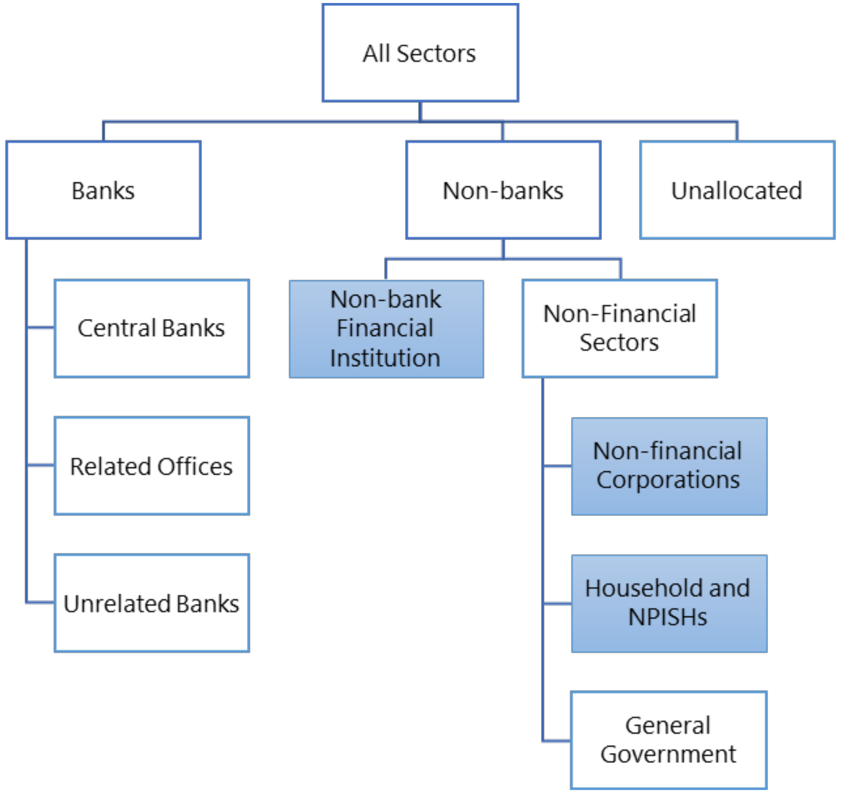
Comparison between direct reporting system and LBS/R reported by 38 reporting countries to BIS (in USD mil)



Sources: BIS locational banking statistics (LBS), Bank Negara Malaysia, Department of Statistics Malaysia and author's calculation.

Linkages of Malaysian non-bank deposits between BIS LBS/R and direct reporting system

Sectoral breakdown of LBS



Sources: Author's own illustration.

Observation on comparison by institutional sector and country of deposit taking corporations that accepted the deposits from Malaysian non-bank entities[1]

1. Divergence observed for **households' deposit placed abroad was narrowed down** in the recent 3 years from 2021 to 2023.
2. Discrepancies for **non-bank financial institutions and non-financial corporations remain the same** throughout the years.

Potential reasons for the discrepancies:

1. Different **reporting treatment for purpose of investment, either immediate or ultimate,** particularly for deposits into offshore financial centres. This transaction may not be reported as deposits into the counterparty reporting countries as it is potentially further transferred to or subsequently invested in another financial instrument in the rest of the world.
2. Different **treatment of residency status** particularly for emigrant that may be treated as deposits by resident in the counterpart countries.

[1] Since access to granular details by institutional sector and country is restricted for the internal use of reporting authorities and eligible data receivers, the graphical data comparison is not shown in this paper.

Challenges and Limitations

Limitations	Mitigation actions to minimise the limitations
A **Periodicity, frequency and timeliness of mirror data publication.**	Leverage on back series data alongside other indicators available to derive a credible estimate of the total economic transactions with the ROW until complete dataset becomes available for validation through subsequent publications.
B **Unavailability of data from major counterparty economies.**	Obtain data from reporting country's national platform or bilateral engagement with official compilers for potential data exchange.
C **Reconciliation between flows and positions.**	Consider nature of economic transactions i.e. in the form of merchandise trades or remittances and major settlement currency for foreign exchange gain/ loss, major world stock market indices for price changes of listed securities and global events that affect the volume changes for financial assets and liabilities.
D **Metadata comprehensiveness for official statistic.**	Comprehensive understanding on businesses nature through engagement with the direct reporting entities enabled deliberation and reconciliation on accuracy of sectoral and country, particularly on immediate and ultimate destination for the flow of funds.

Conclusion

1. Mirror data analysis provides a **more objective and comprehensive view of external exposures between countries.**

2. While aggregated basis comparison may suffice to address the objectives, **comparative analysis at more granular level, specifically by counterparty countries resulted in a more profound insight.**

3. Hence, **effectiveness of this approach relies on the availability of granular data** published by respective reporting countries.

4. The observed asymmetries could be further analysed:
   - **via bilateral data exchange with the counterparty countries.**
   - **by observing relationship of selected major counterparty with other economies similar to Malaysia, to ascertain the potential reason of the discrepancies.**

Thank you!

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