

W1: An Analytical Review of Financial Development Through Foreign Direct Investment (FDI) Dynamics

- Introduction

This paper seeks to provide a scholarly investigation into the dynamics and implications of Foreign Direct Investment (FDI) flows, contextualized within economic developments and socio-economic indicators, spanning various regions across specific timelines.

- Examining cross-sectional and time-series patterns in FDI Flows:

Informed by Levine's seminal work (1997), I analyzed cross-sectional data representing FDI flows from 33 diverse nations or regions during 2021. My findings indicated that 17 nations primarily functioned as net recipients with positive net flows, while 16 operated as net providers with negative net flows. The preeminence of Asia, Oceania, and especially Hong Kong in positive net flows listed in figure 1 was correlated to strategic projects such as China's Belt and Road Initiative in 2021 and subsequent vaccine diplomacy strategies (De Haas & Popov, 2022). Contrastingly, Europe and Japan exhibited negative net flows in figure 1, reflecting their significant contributions in foreign aid, aligned with their global collaboration goals for 2021 (Krugman et al., 2017).

The time-series plot in figure 2, covering 1970-2021, elucidated the evolving FDI patterns of three countries. Notably, India transitioned from a net provider to a net recipient, which might align with its burgeoning economic momentum (Mishkin, 2019). The UK, underpinned by its formidable economic structure, made the opposite transition (Krugman et al., 2017). Australia's consistent status as a net provider is testament to its robust economic foundation and geopolitical positioning (De Haas & Popov, 2022).

Given the considerable shifts in the net flows across countries over time, China's remarkable shift from a net capital importer with positive NetFlow (1980-2010) to a net capital exporter with negative NetFlow (2018-2020) serves as a salient example of obvious structural breaks in the data (Mishkin, 2019; De Haas & Popov, 2022; Krugman et al., 2017).

A synthesis of both data sets provides imperative insights, especially regarding regions undergoing marked economic transitions (Hultgren et al., 2011). Such an integrated analysis is pivotal for understanding global financial trends, aiming at fortifying global economic resilience and prosperity (Ahmed et al., 2023).

- Adjustments in FDI NetFlow analysis: Evaluation of Variables

While absolute values offer initial insights, they might occlude nuanced understanding of FDI netflows. Accounting for variables such as economic size and population density is imperative. Thus, netflows evaluated as a percentage of GDP or relative to per capita GDP can provide a more accurate representation (Levine, 1997; De Haas & Popov, 2022).

- Empirical relation between FDI and GDP Growth: A Correlation Study

A correlation analysis in figure 3 spanning 29 countries from 1970-2021 yields a coefficient of 0.49916 between FDI growth rates and GDP growth. Though this denotes a tangible correlation, establishing causality necessitates rigorous inquiry. I argue that causation between FDI and GDP growth is multifaceted, potentially influenced by factors like political stability, jurisprudential frameworks, human capital investments, and technological advancements (Levine, 1997).

- Socio-Economic Implications of FDI: A Multivariate Correlation Analysis

Engaging in an in-depth assessment by correlation analysis in figure 4 of nations including Australia, Belgium, and the USA, I discern the relationship between per capita FDI and key socio-economic indices (UNCTAD, 2018):

- a. GHG Emissions: A correlation coefficient of 0.1197 insinuates a nuanced positive link between FDI and greenhouse gas emissions (Ritchie et al., 2020).
- b. Income Inequality: A coefficient of -0.2664 implies that surges in FDI might be associated with diminished income inequality (Hasell et al., 2023).
- c. Poverty Metrics: A correlation of -0.3085 suggests a moderate inverse relationship between FDI inflows and poverty indicators (Hasell et al., 2022).
- d. Education Levels: With a coefficient of 0.2231, my study reveals a subtle positive correlation between FDI and formal education attainment (Roser & Ortiz-Ospina, 2016).
- e. Living Standards (Cantril Ladder Score): A coefficient of 0.4339 underscores a moderate positive link, proposing that higher FDI often correlates with superior living conditions (Roser, 2018).

- Conclusion

This scholarly review underscores the intricate dynamics of FDI and its profound implications on a spectrum of economic and socio-economic dimensions.

- References

Ahmed, S. F., Mohsin, A. K. M., & Hossain, S. F. A. (2023). Relationship between FDI Inflows and Export Performance: An Empirical Investigation by Considering Structural Breaks. *Economies*, 11(3), 73.

<https://doi.org/10.3390/economies11030073>

De Haas, R., & Popov, A. (2022). Finance and Green Growth. *The Economic Journal*, 133(650).

<https://doi.org/10.1093/ej/ueac081>

Hasell, J., Arriagada, P., Ortiz-Ospina, E., & Roser, M. (2023). Economic Inequality. *Our World in Data*.

<https://ourworldindata.org/economic-inequality>

Hasell, J., Roser, M., Ortiz-Ospina, E., & Arriagada, P. (2022). Poverty. *Our World in Data*.

<https://ourworldindata.org/poverty>

Hultgren, V., Mariel, P., & Rodríguez González, C. (2010). Structural Breaks and Spatial Linkages in FDI: Further Evidence in OECD Countries. *Open Economies Review*, 22(5), 897–915.

<https://doi.org/10.1007/s11079-010-9190-0>

Krugman, P. R., Obstfeld, M., & Melitz, M. (2017). *International Finance: Theory and Policy, Global Edition*. Pearson Education.

https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722

Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, 35(2), 688–726.

<http://www.jstor.org/stable/2729790>

Mishkin, F. S. (2019). *The economics of money, banking and financial markets* (Tilfth edition, Global edition.). Pearson Education Limited.

https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/12rahnq/alma991031588295305106

Ritchie, H., Roser, M., & Rosado, P. (2020). *Greenhouse gas emissions*. Our World in Data.

<https://ourworldindata.org/greenhouse-gas-emissions>

Roser, M., & Ortiz-Ospina, E. (2016). *Global Education*. Our World in Data.

<https://ourworldindata.org/global-education>

Roser, M. (2018). *The map I need if I want to think about how global living conditions are changing*. Our World in Data.
<https://ourworldindata.org/world-population-cartogram>

UNCTAD. (2018). *UNCTADstat*. Unctad.org.
<https://unctadstat.unctad.org/EN/>

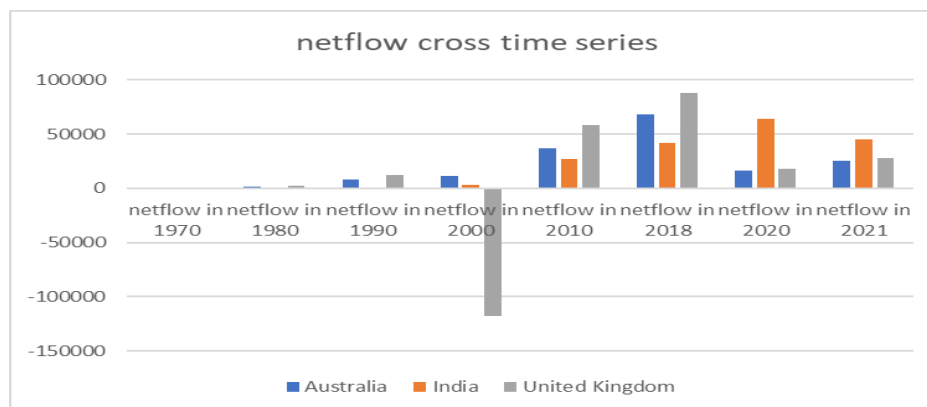
- Appendix:

Figure 1: Maximum of positive net flows and negative net flows in 2021

Max region	Inflow in 2021	outflow in 2021	netflow in 2021
Developing economies	836570.6	438381.6	398188.9
Asia and Oceania	718776.3	618621.2	100155.2
Latin America and the Caribbean	134457.8	41770.22	92687.56
Africa	82990.54	2653.13	80337.41
China, Hong Kong SAR	140696	87450.29	53245.68
Min region	Inflow in 2021	outflow in 2021	netflow in 2021
Developed economies	745739.2	1269212	-523473
Europe	219032.6	551598.5	-332566
World	1582310	1707594	-125284
Japan	24652.03	146782.4	-122130

Source: author

Figure 2: netflow of three countries cross time series



Source: author

Figure 3: The correlation study between FDI growth rates and GDP growth by percent

	Growth of Foreign Investment 1970 to 2021	Growth of GDP 1970 to 2021 by percent
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	by percent	
Growth of Foreign Investment 1970 to 2021 by percent	1	
Growth of GDP 1970 to 2021 by percent	0.499	1

Source: author

Figure 4: The correlation study between per capita FDI and key socio-economic indices

	foreign direct investment per capita	Gini (income inequality)	Share of population with some formal education	Ghg per capita	share of population below poverty line	Cantril ladder score (living condition)
foreign direct investment per capita	1.00					
Gini (income inequality)	-0.27	1.00				
Share of population with some formal education	0.22	0.24	1.00			
Ghg per capita	0.12	0.26	0.46	1.00		
share of population below poverty line	-0.31	-0.16	-0.50	-0.49	1.00	
Cantril ladder score (living standard)	0.43	0.25	0.64	0.60	-0.58	1.00

Source: author

W2: Contrasting Central Bank Currency and Bitcoin: Challenges and Implications

- Similarities between Central Bank Currency and Bitcoin

Referring to figure 1, both Central bank currencies and Bitcoin represent wealth that is influenced by various factors, such as inflation, supply, and demand (Mishkin, 2019; Böhme et al., 2015). Both can be earned through work, with Bitcoin also available through mining or trading (Russo, 2022). Both rely on user trust, which is based on institutional credibility for traditional currencies and technology for Bitcoin (Böhme et al., 2015). Neither has intrinsic value beyond their currency utility. Both can be used as units of account for quotations and calculations, although central bank currency is more widely used in international trade (Krugman et al., 2018). Both can serve as mediums of exchange, but with different liquidity determinants. Both can facilitate anonymous transactions, but Bitcoin offers more privacy (Böhme et al., 2015).

- Challenges Preventing Bitcoin's Domination

In examining the challenges hindering Bitcoin's rise to dominance in the financial landscape, several core arguments emerge. Firstly, while traditional currencies enjoy the solid foundation of governmental backing, lending them credibility, Bitcoin grapples with regional legal ambiguities, which diminish its acceptance (Böhme et al., 2015; Russo, 2022). Furthermore, Bitcoin's inherent volatility, driven by multifaceted influences ranging from technological advancements to market sentiments, contrasts sharply with the relative stability of central bank currencies, which benefit from targeted monetary policies (Böhme et al., 2015; Russo, 2022; Mishkin, 2019). Another concern is the potential misuse of Bitcoin for illicit activities in figure 2, a risk exacerbated by its design that prioritizes anonymity (Böhme et al., 2015). Additionally, trust issues arise from technical vulnerabilities in Bitcoin's infrastructure, a challenge less pronounced with traditional currencies backed by robust technological infrastructures (Böhme et al., 2015; Mishkin, 2019). Market dynamics also pose threats, as Bitcoin's limited market scope makes it prone to speculative forces, unlike more resilient central bank currencies (Böhme et al., 2015; Russo, 2022; Mishkin, 2019). Finally, environmental considerations cannot be ignored; Bitcoin's mining operations in figure 3 present sustainability challenges due to energy consumption from figure 4, in stark contrast to digitalized traditional currencies (Böhme et al., 2015; Russo, 2022; Mishkin, 2019).

- Generalizability to Other Cryptocurrencies

The generalizability of findings related to Bitcoin cannot be ubiquitously extended to other cryptocurrencies due to inherent differences among them. For instance, certain cryptocurrencies, including Ethereum and Polkadot, function not just as payment mediums but also as platforms facilitating smart contracts and decentralized applications (Russo, 2022). This multifunctionality potentially diverges from the traits of central bank currencies. Additionally, the value of some digital assets, like Dogecoin and Shiba Inu, is often driven more by community sentiment and prevailing trends rather than foundational technology or economic principles (Russo, 2022), impacting their stability and credibility. Distinctive issuance mechanisms, supply policies, and environmental implications further differentiate cryptocurrencies (Böhme et al., 2015). Hence, while insights from Bitcoin can offer preliminary understanding, a comprehensive assessment of the diverse digital currency landscape necessitates tailored analyses, especially considering the intricate regulatory and market dynamics (Böhme et al., 2015; Russo, 2022).

- References:

Böhme, R., Christin, N., Edelman, B., & Moore, T. (2015). Bitcoin: Economics, Technology, and Governance. *Journal of Economic Perspectives*, 29(2), 213–238.

<https://doi.org/10.1257/jep.29.2.213>

Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2017). *International finance : theory & policy*. Pearson.

https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets*. Harlow, England London New York Boston San Francisco Toronto Sydney Dubai Singapore Hong Kong Tokyo Seoul Taipei New Delhi Cape Town Sao Paulo Mexico City Madrid Amsterdam Munich Paris Milan Pearson.

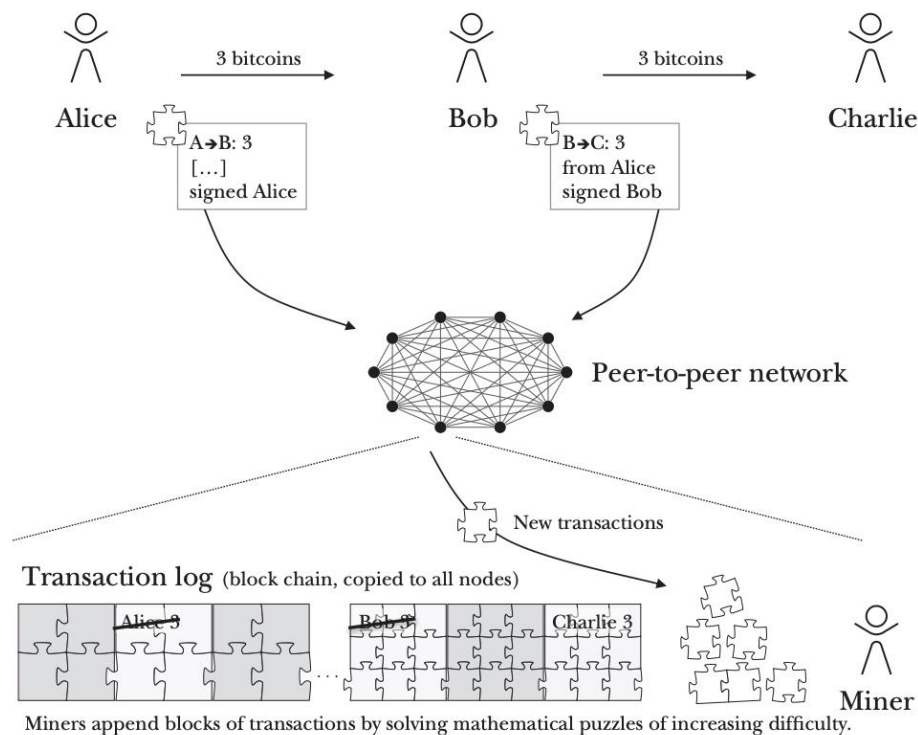
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/12rahnq/alma991031588295305106

Russo, C. (2022, August). *Cryptocurrencies & Climate Change - Imperial CCFI.pdf | PoIred by Box*. Imperialcollegelondon.app.box.com.

<https://imperialcollegelondon.app.box.com/s/2r2zvdkd3pyeiuou1pchrnv8xhs8d8kz>

- Appendix:

Figure 1: Bitcoin's Approach to Transaction Flow and Validation



Source: Rainer Böhme, Nicolas Christin, Benjamin Edelman, and Tyler Moore

Figure 2: Uses of Bitcoin

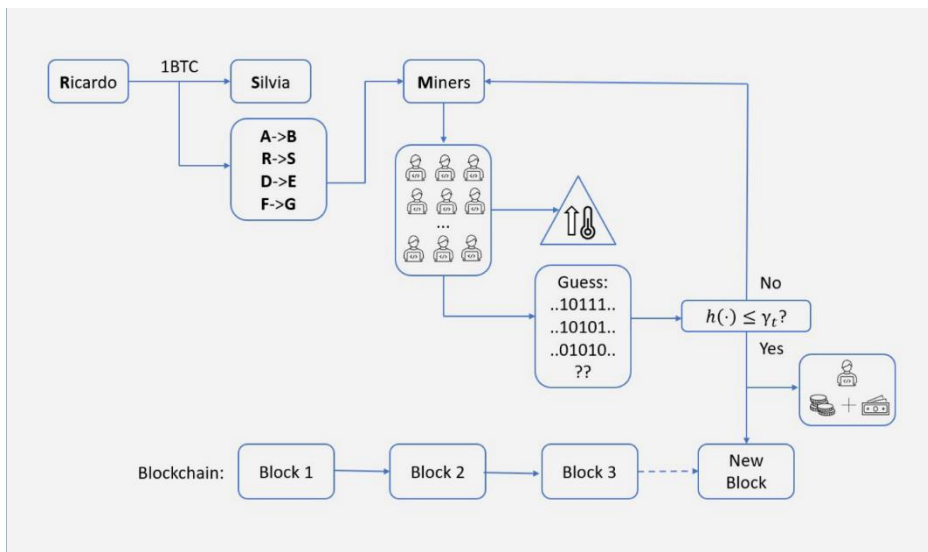
The Ten Most Popular Product Categories on the Silk Road Website in January–July 2012

Category	Number of items	Percentage
Weed	3,338	13.7%
Drugs	2,193	9.0%
Prescription	1,784	7.3%
Benzodiazepines	1,193	4.9%
Books	955	3.9%
Cannabis	877	3.6%
Hash	820	3.4%
Cocaine	630	2.6%
Pills	473	1.9%

Source: Christin (2013).

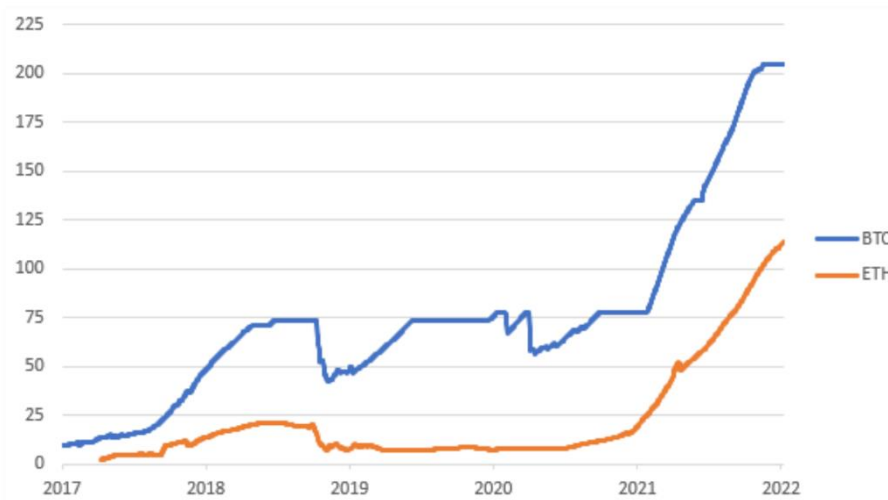
Note: Categories are self-reported by sellers.

Figure 3: PoW Mining Scheme



Source: Carmine Russo (2022, August)

Figure 4: Crypto energy consumption (TWh)



Source: Digiconomist

W3 Task1: Canada's Balance of Payments Over the Years

- Examination of trade in goods and services:

The balance of payments captures all financial transactions between a country and the global community over a set period. For Canada, it tracks earnings from and expenses on international dealings. Based on Figure 1, Canada has consistently seen a current account deficit since 2009, indicating greater overseas expenditures than earnings (Mishkin, 2019). The country's goods trade has mostly been in deficit, with a slight surplus only in 2014 (Baldwin & Yan, 2014). This suggests that Canada's goods exports haven't kept pace with imports, possibly due to rising domestic demand and declining global competitiveness (Beaudry & Portier, 2013). While Canada's service trade also ran at a deficit, it reduced annually, showing growth in service exports, especially in 2018 and 2019, likely because of strengths in sectors like finance, education, and tourism (Huang et al., 2014). Despite some improvements in service trade, the goods trade remains the major cause for the current account deficit. Canada must enhance the quality and diversity of its goods exports to adapt to global market shifts and demands.

- Relationship Between Net Foreign Asset (NFA) and International Investment Income Account (IIA):

A country's NFA and IIA show a positive correlation. Higher NFA often means greater international investment income. This suggests the country earns more from foreign assets than it pays to debt holders (Krugman, Obstfeld, & Melitz, 2017). Data from Government of Canada (2023) confirms this with a 0.822257 correlation coefficient (Mishkin, 2019) in figure 2. For Canada, a rise in NFA corresponds to increased international income, highlighting a successful investment strategy (Baldwin & Yan, 2014). Improved NFA indicates Canada's accumulation of assets over debt, leading to better returns, potentially from higher-yielding or stable overseas opportunities (Beaudry & Portier, 2013; Huang et al., 2014).

- Analysis of Canada's Current Account Deficit and its Capital Inflow Financing Methods.

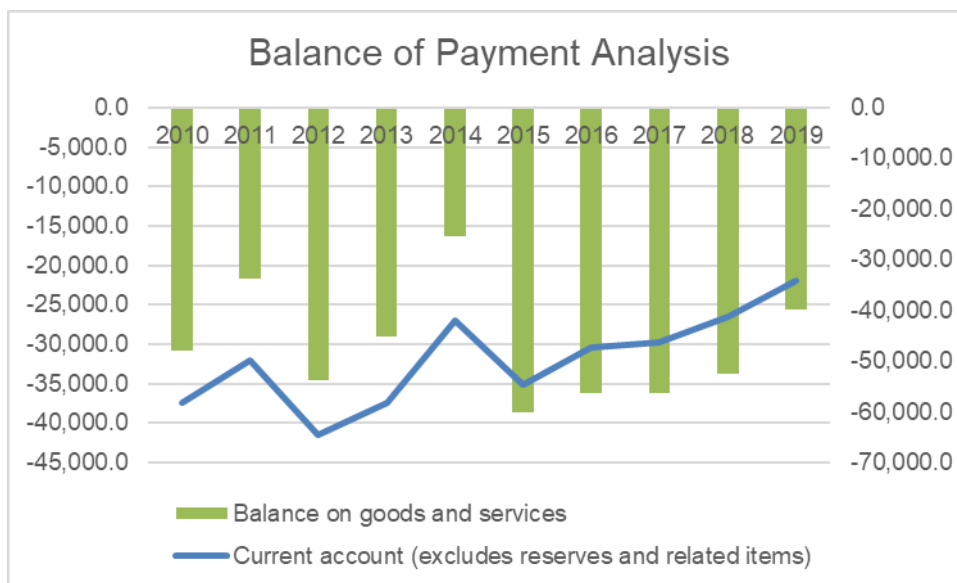
From 2010-2019, Canada experienced yearly current account deficits (Forbes & Warnock, 2012). This indicates the nation spent more in foreign exchanges than it earned. Balancing this requires capital account net inflows. Direct and portfolio investments play crucial roles in financing this deficit (Mishkin, 2019). Foreign entities significantly invested in Canada, increasing direct investment liabilities from \$29,714.7 million to \$48,942.3 million during the period (Baldwin & Yan, 2014) in figure 3. This underscores foreign confidence in Canadian assets. Portfolio investment inflows, comprising Canadian securities and stocks bought by foreigners, saw liabilities drop from \$124,078.3 million to \$26,796.0 million (Huang et al., 2014) in figure 4. This reflects global capital flow dynamics and investors' risk preferences (Beaudry & Portier, 2013). In conclusion, Canada financed its deficits through these investments, showing international investor confidence in its economy (Krugman et al., 2017). Study of task 2 will further explore underlying factors of these capital flows.

- References:

- Baldwin, J., & Yan, B. (2014). *Global Value Chains and the Productivity of Canadian Manufacturing Firms Economic Analysis (EA) Research Paper Series*.
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=e0a33c203faa0545b3af7621ade2bedc3f823b37>
- Beaudry, P., & Portier, F. (2013, September 1). *News Driven Business Cycles: Insights and Challenges*. National Bureau of Economic Research.
<https://doi.org/10.3386/w19411>
- Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235–251.
<https://doi.org/10.1016/j.jinteco.2012.03.006>
- Huang, H., Pang, K., & Tang, Y. (2014). Effects of Exchange Rates on Employment in Canada. *Canadian Public Policy*, 40(4), 339–352.
<https://doi.org/10.3138/cpp.2013-033>
- IMF Data. (2023). Data.imf.org.
<https://data.imf.org/regular.aspx?key=62805740>
- IMF Data. (2023b). Data.imf.org.
<https://data.imf.org/regular.aspx?key=62805744>
- Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2017). *International finance : theory & policy*. Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722
- Mishkin, F. S. (2019). *The economics of money, banking, and financial markets*. Harlow, England London New York Boston San Francisco Toronto Sydney Dubai Singapore Hong Kong Tokyo Seoul Taipei New Delhi Cape Town Sao Paulo Mexico City Madrid Amsterdam Munich Paris Milan Pearson.
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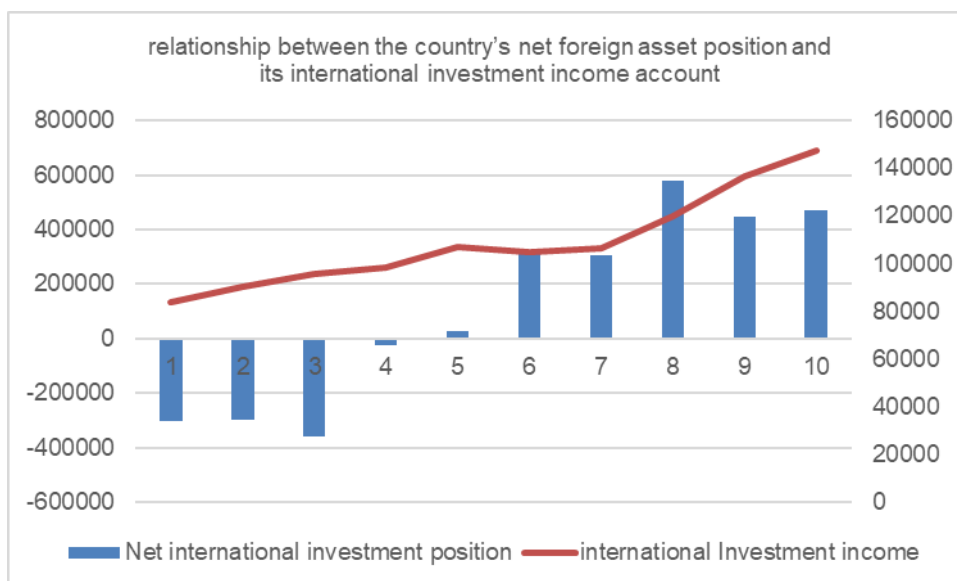
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Figure 1:



Source: author

Figure 2: relationship between NFA and International IIA

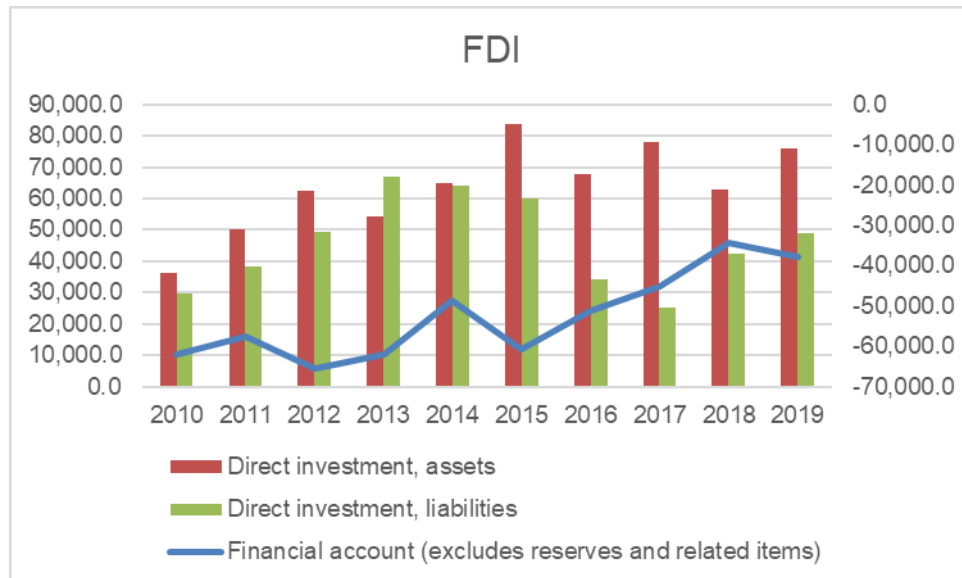


	Net international investment position	international Investment income
Net international investment position	1	

international Investment income	0.822257	1
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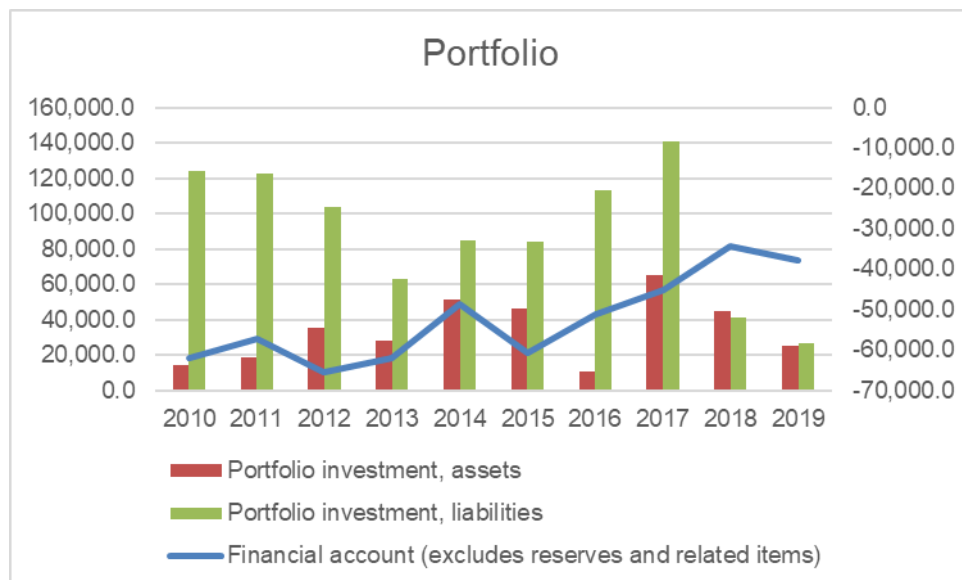
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Figure 3:



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Figure 4:



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Task 2: Navigating Financial Currents: Canada's Balance of Payments Amidst COVID-19

- Introduction:

Canada, the country chosen in Task 1, experienced noticeable shifts in its Balance of Payments due to the COVID-19 pandemic, especially between 2019 and 2021 (Forbes & Warnock, 2012).

- Current Account Dynamics:

The current account deficit deepened from \$34,032.3 million in 2019 to \$35,373.3 million in 2020. Remarkably, 2021 saw a major recovery with a deficit of just \$5,448.2 million in figure 1 (*IMF Data*, 2023). Pandemic-induced global trade disruptions saw goods exports decline from \$448,868.9 million in 2019 to \$390,498.0 million in 2020 in figure 2. However, 2021 witnessed a resurgence, reaching \$507,597.9 million (*IMF Data*, 2023). Similarly, goods imports decreased in 2020 but rebounded in 2021. This transition turned the goods balance from a deficit in 2019-2020 to a surplus in 2021 (Krugman et al., 2017). Service trade was also affected, likely from travel curbs and global service demand reduction. Both exports and imports decreased in 2020, with 2021 imports surpassing exports, enlarging the service deficit in figure 3 (Mishkin, 2019; *IMF Data*, 2023). The primary income stream saw a dip in 2020 but a recovery in 2021. While there was a consistent, albeit minor, capital account deficit from 2019-2022, the financial account reflected a deepening deficit in 2020, improving substantially in 2021. This was evident in trends of direct investment and portfolio investment dynamics (Baldwin & Yan, 2014; Beaudry & Portier, 2013).

- Capital and Financial Account Trends

The capital account remained in deficit across all years, albeit small in magnitude from -67.05 to -29.93 (*IMF Data*, 2023). This suggests that the pandemic hasn't triggered a significant shift in capital transfers to or from Canada.

The financial account, revealing direct and portfolio investment patterns by figure 4, highlighted some intriguing findings: Assets for direct investments experienced a surge in 2021 at \$96,076.1 million, indicating Canadian firms expanded their ventures abroad, possibly capitalizing on global opportunities brought about by the pandemic. Liabilities, which represent foreign investments in Canada, also grew, but at a lesser rate. In contrast, there was a stark change in portfolio assets, with 2021 seeing a massive increase to \$132,331.0 million from the \$25,231.0 million in 2019 (*IMF Data*, 2023). This suggests that Canadian investors diversified their portfolios during the pandemic, possibly seeking higher returns or hedging against risks. On the liabilities side, the growth indicates a strong foreign confidence in Canadian markets.

- Conclusion:

The COVID-19 pandemic exacerbated Canada's balance of payments deficits in 2020. But, by 2021, recovery signs were evident, hinting at Canada's economic resilience and attractiveness to international investors post-pandemic.

- Reference:

Baldwin, J., & Yan, B. (2014). *Global Value Chains and the Productivity of Canadian Manufacturing Firms Economic Analysis (EA) Research Paper Series*.
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=e0a33c203faa0545b3af7621ade2bedc3f823b37>

Beaudry, P., & Portier, F. (2013, September 1). *News Driven Business Cycles: Insights and Challenges*. National Bureau of Economic Research.
<https://doi.org/10.3386/w19411>

Forbes, K. J., & Warnock, F. E. (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics*, 88(2), 235–251.
<https://doi.org/10.1016/j.jinteco.2012.03.006>

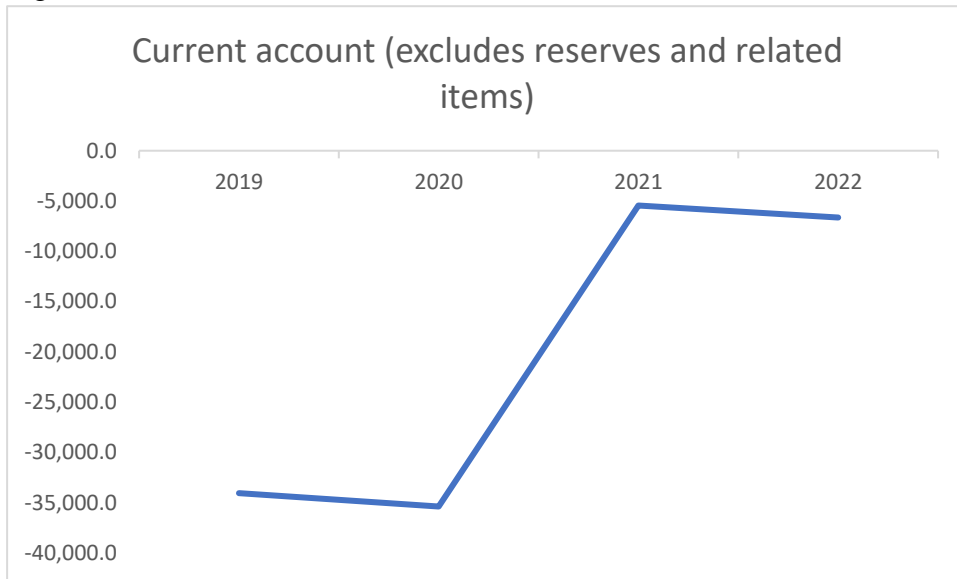
IMF Data. (2023). Data.imf.org.
<https://data.imf.org/regular.aspx?key=62805740>

Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2017). *International finance : theory & policy*. Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets*. Harlow, England London New York Boston San Francisco Toronto Sydney Dubai Singapore Hong Kong Tokyo Seoul Taipei New Delhi Cape Town Sao Paulo Mexico City Madrid Amsterdam Munich Paris Milan Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/12rahnq/alma991031588295305106

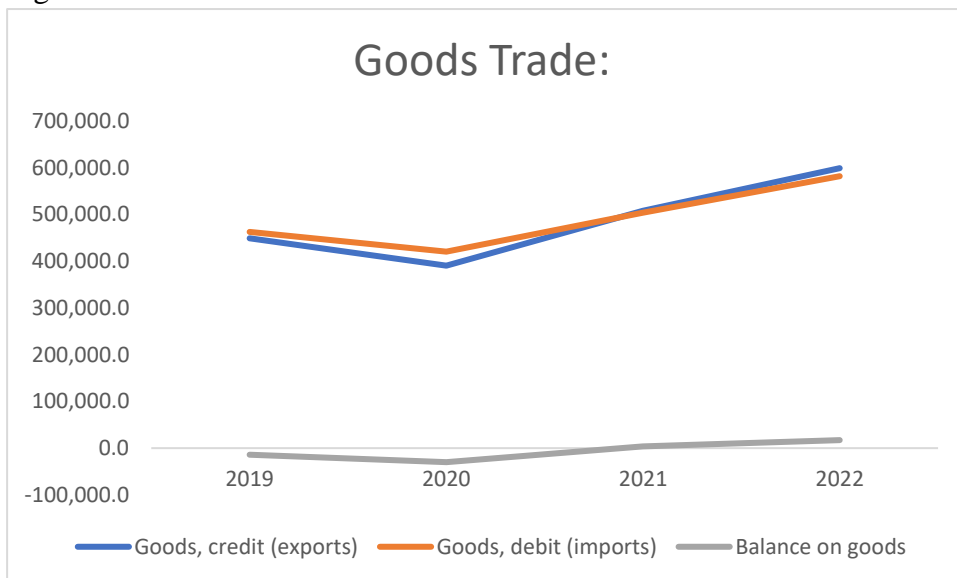
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Figure 1:



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Figure 2:



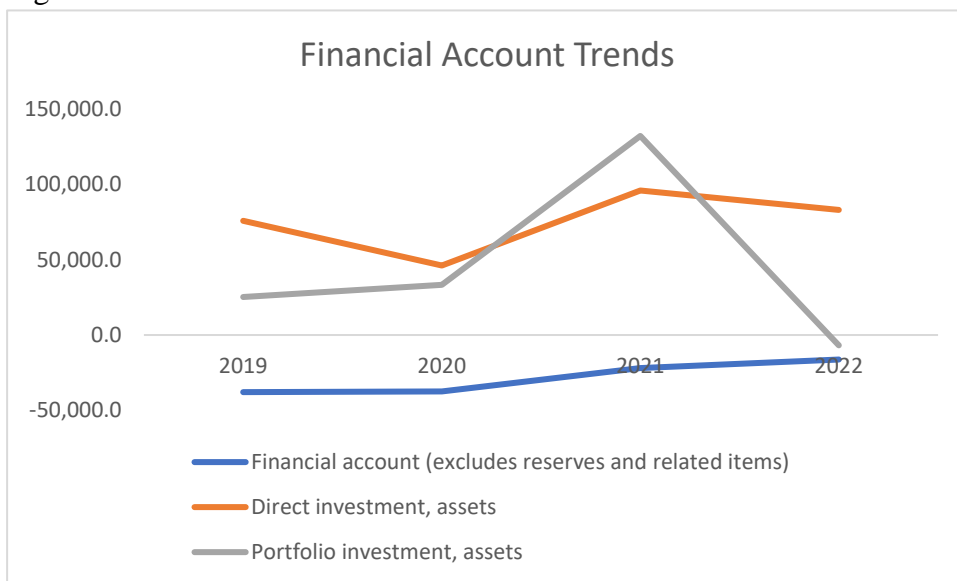
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Figure 3:



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Figure 4:



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W4 Task1: Time-Series Analysis of the AUD/USD Exchange Rate from 2007 to 2022

The AUD/USD exchange rate is pivotal in assessing the strength and trajectory of the Australian economy relative to the U.S. economy (Mishkin, 2019). Examining this rate over time can unveil patterns, fluctuations, and underlying trends, offering insights into the economic dynamics of both nations (Krugman, Obstfeld, & Melitz, 2018).

- Overall Trend:

Between 2007 and 2022, the AUD/USD saw significant fluctuations in figure 1 (Yahoo Finance, 2023). Beginning the period at an average of 0.8391 in 2007, it rose to a peak in 2011 with an average of 1.0326. This implies that the Australian dollar was stronger against the U.S. dollar during this period (Mishkin, 2019). After 2011, there was a noticeable downward trend, bottoming out at 0.6949 in 2022.

- Short-Term Fluctuations:

In figure 2 (2007 to 2010), the AUD appreciated against the USD, reaching its pinnacle in Q2 2008 (Yahoo Finance, 2023). However, the onset of the global financial crisis in late 2008 led to a dramatic depreciation, with its value plunging to an average of 0.6728 in Q4 (Dell, Jones, & Olken, 2014). The subsequent years, 2009-2010, saw a swift resurgence. The rate soared from 0.6653 in Q1 2009 to 0.9879 by Q4 2010, largely thanks to Australia's speedy economic recovery and a surge in its mineral resources sector (Mishkin, 2019). Between 2011 and 2015 shown by figure 1, the rate experienced a slow descent, possibly influenced by the decelerating Chinese economy impacting Australian exports and a surging U.S. economy (Krugman et al., 2018). During 2016-2020, the exchange rate largely remained stable, orbiting the 0.75 region (Mishkin, 2019). However, it reached its lowest in the first half of 2020, a dip likely precipitated by global apprehensions surrounding the COVID-19 pandemic (Dell et al., 2014). The years 2021-2022 brought mixed trends. The AUD saw an appreciation initially in 2021 but a decline set in during the latter half of the year, persisting into 2022 influenced by both global economic ambiguities and domestic determinants (Krugman et al., 2018).

- Quarterly Patterns:

While broader annual trends in the exchange rate of AUD against the USD are discernible (Mishkin, 2019), delving into quarterly data provides and 3 more granulated insights (Krugman et al., 2018). For example, in 2011 there was a notable rise in Q2 with the rate reaching 1.0625 in figure 2 while during 2018, there was a steady decline each quarter, from 0.7862 in Q1 to 0.7174 in Q4 in figure 3 (Mishkin, 2019). Analyzing the quarterly data from 2007 to 2022 reveals variations: 2007's Q4 saw a significant high at 0.89, while the end of 2008 marked a dip to 0.6728 in figure 2 (Krugman et al., 2018). By contrast, 2020 started with a low of 0.6595 in Q1 but gradually improved to 0.7312 by Q4 (Mishkin, 2019) in figure 3. However, despite these specific examples, a consistent quarterly pattern remains elusive across the entirety of the data (Krugman et al., 2018).

- Conclusion:

The AUD/USD exchange rate from 2007 to 2022 showcases the intertwined nature of global and regional economic events with currency valuations (Dell et al., 2014). The rate is reflective of economic cycles, global crises, commodity price fluctuations, and central banking policies of both nations (Mishkin, 2019). Analyzing these patterns can not only provides a retrospective view but also inform predictions, allowing policymakers, investors, and businesses to strategize for the future (Krugman et al., 2018).

- Reference:

Dell, M., Jones, B. F., & Olken, B. A. (2014). What Do We Learn from the Weather? The New Climate-Economy Literature†. *Journal of Economic Literature*, 52(3), 740–798.
<https://doi.org/10.1257/jel.52.3.740>

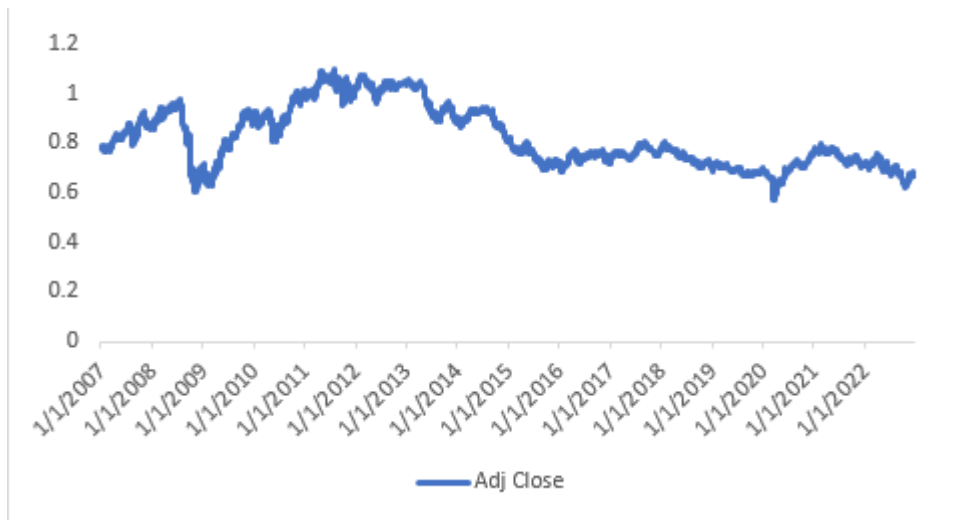
Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2017). *International finance : theory & policy*. Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets*. Harlow, England London New York Boston San Francisco Toronto Sydney Dubai Singapore Hong Kong Tokyo Seoul Taipei New Delhi Cape Town Sao Paulo Mexico City Madrid Amsterdam Munich Paris Milan Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/12rahnq/alma991031588295305106

Yahoo Finance. (2023). *Business, Investments, Stocks & Quotes - Yahoo Finance*. Yahoo Finance.
<https://au.finance.yahoo.com/>

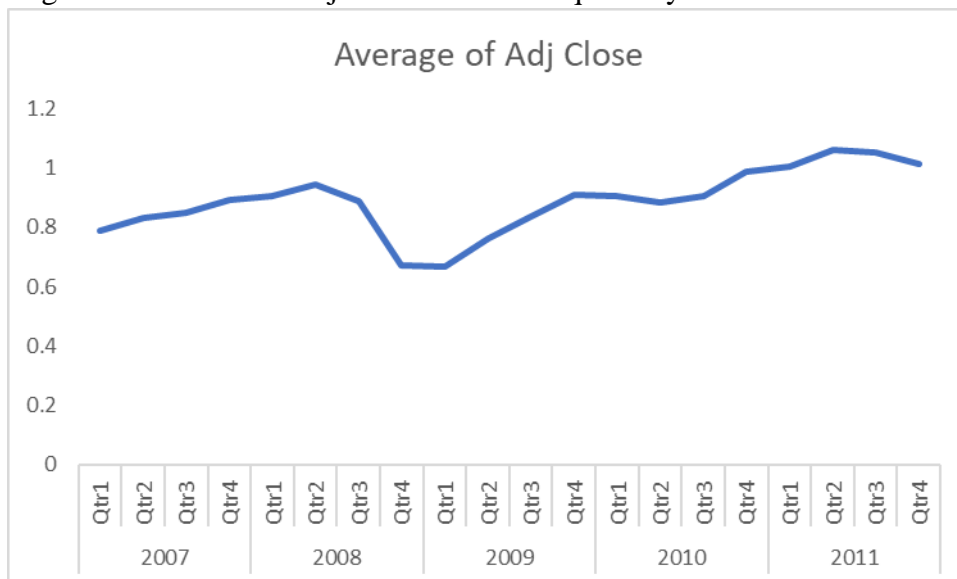
- Appendix:

Figure 1: AUD/USD Adj close exchange rate



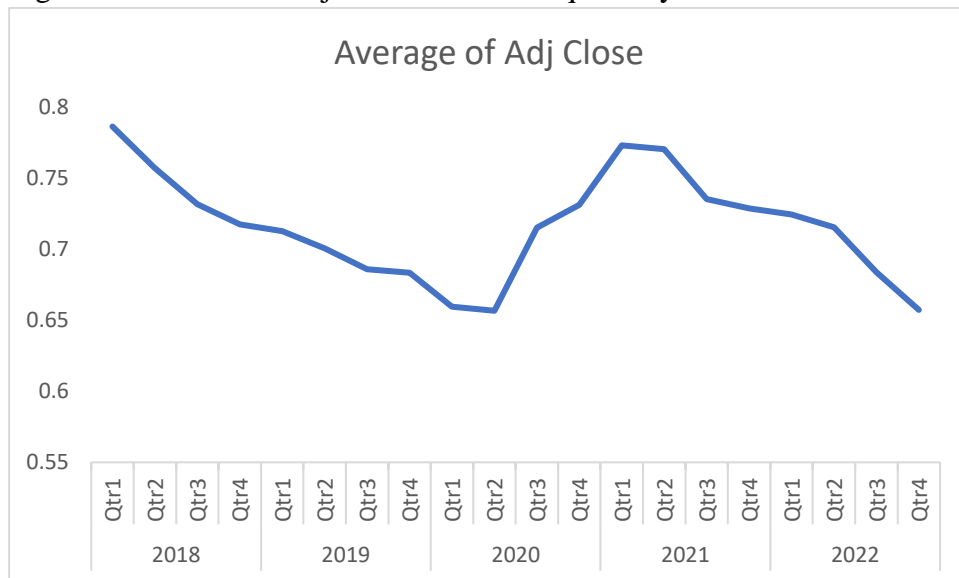
Source: author

Figure 2: AUD/USD Adj close 2007-2011 quarterly



Source: author

Figure 3: AUD/USD Adj close 2018-2022 quarterly



Source: author

Task2: Cross-Rate Calculation for Currency Pairs

- Introduction:

The concept of a cross-rate comes into play when you want to exchange one currency for another, but neither of the currencies is the US dollar (or some other base currency) (Mishkin, 2019). To determine the cross-rate, one can use the US dollar (or the base currency) as an intermediary (Krugman, Obstfeld, & Melitz, 2018), we need to understand how to calculate the cross-rate.

- Formula for Cross-rate Calculation:

Given primary rates of two currency pairs from Yahoo Finance (2023), A/USD and B/USD in figure 1, the cross-rate between A and B can be calculated as:

$$\{\text{Cross-rate (A/B)}\} = \{\text{Rate (B/USD)}\} \div \{\text{Rate (A/USD)}\}$$

- Example Calculation:

The cross-rate for CAD/ AUD using the table in figure 1 with exchange rate of USD in 13/07/2018 from Yahoo Finance (2023):

From the table of primary rates we collect CAD/USD = 1.3165 and AUD/USD = 1.3506
Using the formula: $\{\text{Cross-rate (CAD/AUD)}\} = \{\text{Rate (AUD/USD)}\} \div \{\text{Rate (CAD/USD)}\}$
 $[\{\text{Cross-rate (CAD/AUD)}\} = 1.3165 \div 1.3506 = 0.9751]$

So, the CAD/AUD cross-rate is approximately 0.9751.

Now, let's display the full table with primary rates and calculated cross-rates in figure 2:
The cross-rates for all possible currency pairs can be computed similarly (Krugman et al., 2018). This matrix would be a 10x10 table with the main diagonal being direct exchanges and the other entries being cross-rates (Mishkin, 2019). It's also important to note that the reciprocal of each cross-rate (e.g., AUD/CAD) can be found by taking the inverse of the rate (e.g., $1/0.9751=1.0259$) (Krugman et al., 2018).

- Conclusion:

Cross-rates provide a method to determine the exchange rate between two non-base currencies using a common base currency as an intermediary (Dell, Jones, & Olken, 2014). This is especially helpful in financial markets where not all possible currency pairs might be directly quoted, but the base currency rates are readily available (Mishkin, 2019).

- References

Dell, M., Jones, B. F., & Olken, B. A. (2014). What Do We Learn from the Weather? The New Climate-Economy Literature†. *Journal of Economic Literature*, 52(3), 740–798.
<https://doi.org/10.1257/jel.52.3.740>

Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2017). *International finance : theory & policy*. Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/2rsddf/cdi_askews_holts_vlebooks_9781292238722

Mishkin, F. S. (2019). *The economics of money, banking, and financial markets*. Harlow, England London New York Boston San Francisco Toronto Sydney Dubai Singapore Hong Kong Tokyo Seoul Taipei New Delhi Cape Town Sao Paulo Mexico City Madrid Amsterdam Munich Paris Milan Pearson.
https://sydney.primo.exlibrisgroup.com/permalink/61USYD_INST/12rahnq/alma991031588295305106

Yahoo Finance. (2023). *Business, Investments, Stocks & Quotes - Yahoo Finance*. Yahoo Finance.
<https://au.finance.yahoo.com/>

Appendix:

Figure 1: primary rates of given countries

13/07/2018	
	USD
Australia	1.3506
Canada	1.3165
E.U.	0.8572
H.K.	7.8493
India	68.4932
Japan	112.3596
Mexico	18.9753
Singapore	1.3633
Switzerland	1.0027
Thailand	33.2226

Source: author

Figure 2: cross-rates for all possible currency pairs

13-Jul-18											
	USD	THB	CHF	SGD	MXN	JPY	INR	HKD	EUR	CAD	AUD
Australia	1.3506	0.0407	1.3470	0.9907	0.0712	0.0120	0.0197	0.1721	1.5756	1.0259	
Canada	1.3165	0.0396	1.3129	0.9656	0.0694	0.0117	0.0192	0.1677	1.5358		0.9751
E.U.	0.8572	0.0258	0.8549	0.6288	0.0452	0.0076	0.0125	0.1092		0.6511	0.6349
H.K.	7.8493	0.2363	7.8281	5.7575	0.4137	0.0699	0.1146		9.1570	5.9623	5.8140
India	68.4932	2.0616	68.3082	50.2397	3.6096	0.6096		8.7260	79.9041	52.0274	50.7329
Japan	112.3596	3.3820	112.0562	82.4157	5.9213		1.6404	14.3146	131.0787	85.3483	83.2247
Mexico	18.9753	0.5712	18.9241	13.9184		0.1689	0.2770	2.4175	22.1366	14.4137	14.0550
Singapore	1.3633	0.0410	1.3596		0.0718	0.0121	0.0199	0.1737	1.5905	1.0356	1.0098
Switzerland	1.0027	0.0302		0.7355	0.0528	0.0089	0.0146	0.1277	1.1698	0.7617	0.7427
Thailand	33.2226		33.1329	24.3688	1.7508	0.2957	0.4850	4.2326	38.7575	25.2359	24.6080
U.S.		0.0301	0.9973	0.7335	0.0527	0.0089	0.0146	0.1274	1.1666	0.7596	0.7407

Source: author