

Proposal for a Balanced and Stable International Monetary System

Abdurrahman Arum Rahman
Founder of Global Currency Initiative

GCI Working Paper
No. 3-2022

Proposal for a Balanced and Stable International Monetary System

Abdurrahman Arum Rahman
Global Currency Initiative - Jember, Indonesia

Abstract

This paper proposes a new model of a shared international monetary system (IMS) that could potentially make the IMS balanced and stable. We call it an “organic system”. The organic system issues a cross-border means of payment called “organic currency”. The organic currency is only for international transactions between member countries. Domestic transactions continue to use their respective national currencies. Non-member countries cannot use organic currency. Organic (international) and national currencies are interchangeable using an “auto-balancing” exchange rate that follows the fundamentals and balance sheet of each member country. The auto-balancing could naturally balance and stabilize the IMS. We utilize a 3-dimensional simulation of trade and investment involving 5 countries, 20 products, and a 12-month (5x20x12 model) to test the workability of the system. The results show that this model could provide international liquidity to all (member) countries in the world sustainably, eliminate global imbalances to the roots, and make the IMS naturally stable. The simulation also shows that the current accounts, balance sheets, and FX reserves of all member countries tend to be self-sufficient. We implant a digital-and-decentralized system in the very core of the system, which works semi-automatically. This system is flexible; it can start from anywhere in the world and any country may join.

Keywords: international monetary system; balanced and stable international monetary system; reforming the international monetary system; international currency; central bank digital currency; auto-balancing exchange rate; eliminate global imbalances; Keynes bancor.

JEL Classification: E40, E50, F40

This paper contains a simulation attachment in the form of an Excel spreadsheet that can be replicated.

GCI Working Paper No 3-2022
Global Currency Initiative
<https://globalcurrencyinitiative.org/en/>
Jember, Indonesia
2022

1 Introduction

Our international monetary system (IMS) which is the lifeblood of global economic activity is not as good as it seems. According to Joseph E. Stiglitz, winner of the 2001 Nobel Prize in Economics, the global monetary and financial system has been making the world economy prone to crises for decades. Crises occur regularly and tend to repeat in various parts of the world. “The question is not whether it will be another crisis or not, but where it will be” (Stiglitz, 2003, p. 54). Then, the report of the UN Commission of Experts in 2009 also stated that the crises were “human-made” and originated from the IMS itself (United Nations, 2009). The main problem in our current IMS is imbalances and instability. Both stem from the very core of the system itself.

First, global imbalances

Since the end of Bretton Woods, the foreign balance sheets of most countries in the world have been unbalanced. Some of them have large surpluses in the long term while most of the remaining have deficits. This makes the world economy unbalanced and unstable. Imbalances accumulate energy. When some economic structures are unable to withstand this accumulated energy, some of them fault and a crisis occurs. According to Caballero & Krishnamurthy (2008) and Obstfeld & Rogoff (2009), global imbalances in the 2000s had a strong relationship with the 2008 North Atlantic crisis originating from the United States. The global imbalances also became the background for 1994 Latin American and 1998 Asian crises (Razin & Milesi-Ferretti, 1996). Various other findings show more or less the same results (Merrouche & Nier, 2010) and (Chinn, Eichengreen, & Ito, 2014) in various parts of the world.

At least, two main factors cause global imbalances. *First* is the “asymmetrical IMS” where some countries called the “center” issue international currencies (in this case the US with a little extra from the Euro) while other countries called the “periphery” use those currencies. This asymmetric IMS requires the US (center) to be

in deficit to keep dollars circulating abroad. Meanwhile, it requires other peripheral countries to have a surplus so they pile up enough FX reserves to carry out cross-border transactions. This situation creates unavoidable and permanent global imbalances. This kind of imbalance is actually not sustainable in the long run because the size of the center is getting smaller compared to the peripherals. The United States' confidence to provide global liquidity is shrinking as its share of the global economy shrinks ([Mann, 2002](#)), ([Eichengreen, 2006](#)), ([Obstfeld & Rogoff, 2007](#)) and ([CEPR, 2011](#)).

Second, the current exchange rates are mostly inaccurate (misaligned), where some peripheral countries undervalue their national currencies to boost exports and gain economic growth ([Gagnon, 2012](#)) and ([Cabezas & De Gregorio, 2019](#)). This practice is known as "modern mercantilism". This puts most of the other peripheral countries into deficits. Peripheral countries should have a surplus to collect FX reserves to stabilize their IMS. However, in reality, most of them are in deficit due to this practice. As a result, global imbalances are also intensifying among the peripheral countries and tend to be long-term.

Based on [The World Bank \(2022a\)](#) data, from 1965 – 2020, about a third of the countries in the world had a trade surplus and the other two-thirds had a deficit. Peripheral countries with continuous deficits are vulnerable to crises. Five (Pakistan, Sri Lanka, Lebanon, Turkiye, and Zambia) from seven (the five countries plus Venezuela and Suriname) countries experienced economic crises outside of wartime in 2021 and 2022, have trade deficits in the long term or have cumulative current account deficit ([The World Bank, 2022a](#)) and ([The World Bank, 2022b](#)).

Many efforts have been conducted by various international bodies such as the IMF, WTO, and many "elite multilateral" bodies such as the G5, G7, G10, G20, and others to reduce global imbalances for decades. All of them have too little impact to reduce the imbalances ([Ocampo, 2017, pp. 87-107](#)).

Second, instability

Our current IMS is naturally unstable and, therefore, makes the world economy unstable too. There are at least two main causes. *First*, the global imbalances as mentioned above cause the system to be naturally unstable. Most instability comes from deficit peripheral countries where their monetary systems are vulnerable. Since the crisis is contagious through multiple channels ([Fratzscher, 1998](#)), ([Caramazza, Ricci, & Salgado, 2004](#)), and ([Aloui, Ben-Aïssa, & Nguyen, 2011](#)), eventually, the entire world economy has become vulnerable too.

The *second* is exchange rate volatility caused by speculation. According to [Kruger \(1996\)](#), most of the money transactions in the world have no real underline economic activity and most of them are speculations. If we compare the latest data released by [BIS \(2022\)](#) and [WTO \(2022\)](#) it appears that the amount of world trade is less than 1% of money trade. This means that a very large proportion of money transactions have no underlines and most of them are speculation. Real transactions are like surfing a huge wave of speculations. There are a lot of empirical research proves that speculation tends to follow sentiment, causing prices to rise and fall excessively and increase volatility ([De Long, Shleifer, Summers, & Waldmann, 1990](#)), ([Barberis, Shleifer, & Vishny, 1998](#)), and ([Howe, 2018](#)). By combining field evidence and experimental models called SKAT (Stages of Knowledge Ahead Theory), [Pope & Selten \(2011\)](#) concluded that it is highly unlikely that the current IMS can achieve a balanced equilibrium and a stable exchange rate. Under these circumstances, the exchange rates, monetary, and financial systems, are naturally unstable. It would be strange if under these conditions they were stable.

A new model of IMS

We propose a new model of IMS that might potentially be able to address the two main problems above comprehensively. Its name is an “organic system”. The organic system is an IMS that is jointly developed by all member countries in the

world and becomes part of their respective national currencies. The organic system issues international means of payment called “organic currency”. The organic currency is only for international transactions between member countries. Non-member countries cannot use organic currency. Domestic transactions continue to use their respective national currencies. The international (organic) and national currencies are interconvertible under the exchange rate called an “auto-balancing”. The auto-balancing follows the economic fundamentals of each country and a neutral foreign balance sheet. This system could provide international liquidity and FX reserves to all member countries efficiently and sustainably. The organic system is digital, using (semi)automated and (semi)decentralized technologies (Chapter 2).

Based on the analysis and simulation in Chapter 3, this system could potentially eliminate the two main problems of IMS above, namely global imbalances and instability at their roots. This system is symmetrical in which international currency is issued in each member country based on the needs of international transactions between them so that the issuance does not cause an imbalance. There is no need for a particular country to deficit just to provide international liquidity to other countries. Then, the auto-balancing exchange rate makes the trade, current accounts, and balance sheets of all member countries tend to be relatively balanced. Thus, this system could naturally eliminate global imbalances permanently.

The auto-balancing exchange rate only follows the economic fundamentals of each member country. Noise transactions and speculations do not affect the exchange rate. Our simulations show that, under the auto-balancing exchange rate, trade neutralizes capital flows and keeps the current account and balance sheet relatively neutral too. Therefore, the auto-balancing exchange rate could potentially balance and stabilize the current accounts, balance sheets, and FX reserves of all member countries with or without capital flows. This system could also potentially make the exchange rates and the IMS naturally stable.

Some pieces of literature

Over the decades, many ideas to reform the IMS have sprung up. These ideas spread widely from light reforms (without changing the current international currency) to radical reconstructions (changing the current international currency). Light reforms generally focus on increasing cooperation or deepening coordination between the main countries in the world, namely the US, the Euro, China, Japan, and others ([Stiglitz & Greenwald, 2010](#)), ([CEPR, 2011](#)), ([Ocampo, 2017](#)), and many others. Included in the light reforms is the strengthening of the SDR (Special Drawing Rights) as the main supplement to FX reserves and international liquidity ([IMF, 2010](#)) and ([IMF, 2011](#)).

In 2009, The UN Commission of Experts recommended a wide range of reforms, spreading from light reforms to radical reconstructions. For light reforms, the commission encouraged deepening inter-governments cooperation, enhancing current international liquidity facilities such as SDR-IMF and swaps between central banks, and enhancing the existing international and regional organizations. As for the radical reforms, the commission also recommended the creation of a global reserve currency and a global reserve bank. These (radical) reforms should take place gradually, openly, and voluntarily ([United Nations, 2009](#)).

Another radical notion is the merging of the world's major currencies, namely the US dollar, euro, and Japanese yen into a single currency – DEY ([Mundell, 2003](#)). In the past, Mundell did not include the Chinese Renminbi because, at that time, the Renminbi was still relatively small, not as big as it is now. If the proposal is made right now, perhaps the Renminbi is more relevant than the Japanese yen. The other idea of merging is [Cooper \(2006\)](#) which proposes merging the OECD currencies to become the world currency. Meanwhile, [Moore \(2004\)](#) proposed dollarization and euroization, namely countries in the world adopt dollars and euros as their currencies. Another idea is the creation of a single world currency, which is promoted by [Bonpasse \(2006\)](#) with the idea of 3G, namely global currency, global central bank, and global union. Then, to eliminate (underrated) exchange rate cost and risk, [Pope & Selten \(2011\)](#) also

recommended a single currency for all countries in the world and other deep-global coordination to maintain exchange rate stability.

The radical idea closest to the organic model is bancor (Keynes, 1969). Keynes developed this model more than 70 years ago. And, in almost all respects, it is still the most comprehensive and radical notion. The following are the main ideas in Bancor as documented in some works of literature.

Countries in the world form the International Currency Union (ICU). The ICU then establishes International Clearing Bank (ICB). The ICB functions as the world's central bank. The ICB issues an interstate payment unit called a "bancor". At an early stage, Keynes recommended bancor only be used among central banks; the public cannot use it. Upgrading the bancor into a real international currency used by the public requires further research. Bancor value is pegged to gold. The exchange rate of bancor and national currencies is fixed with adjustments. The adjustment is made when the exchange rate cause imbalances. Member countries receive a bancor allocation of one year of international trade. For member countries, bancor allocations do not require collateral for gold or other international assets. Non-member countries do not get an allocation but can buy bancor with gold. To use the bancor facilities, both member and non-member countries must have an account in ICB. To maintain the balance of the balance sheets of all member countries, Keynes set limits on both surplus and deficit. Member countries that have a surplus or deficit of more than $\frac{1}{4}$ of the quota will pay an interest fee of 1%. Member countries that have a surplus or deficit of more than $\frac{1}{2}$ of the quota will pay 2%. The ICB also asks them to adjust the exchange rate so that the surplus and deficit will not continue. Member countries can increase their quotas by depositing gold, or they can buy bancor with gold. But it can't be the other way around; they cannot sell bancor to buy gold. Bancor is the first notion regarding an international currency managed democratically by all member countries in the world.

Several other ideas continue or are relatively similar to Keynes. Among them is [Davidson \(2004\)](#) who officially declares to continue Keynes's ideas. Davidson is more moderate than Keynes by eliminating the bancor and the world central bank because he considers that they are too complicated and perhaps unnecessary. He just adopts the bancor way of working and adjusts it to the current economic and geopolitical conditions. Davidson's ideas are more mild than radical. Another similar idea is [Stiglitz \(2006\)](#) and [Greenwald & Stiglitz \(2009\)](#) who propose a global reserve system or "global greenback" which is also similar to how bancor works. The global currency and global reserve system proposed by the UN Commission of Experts ([United Nations, 2009](#)) in general also have some similarities and differences to how bancor works.

2 The Organic System

The organic system is as radical as Bancor or maybe more. It issues a real international currency (used by the public) and is jointly managed by all member countries in the world democratically. It also proposes the world central bank that lives side by side with the national central banks of all member countries. The organic system has some similarities and differences with bancor. One of its original main components is the "auto-balancing" exchange rate which is supposed to systematically balance and stabilize the system.

2.1 Governance

Member countries establish an intergovernmental body such as the United Nations of International Monetary (UNIM). Ideally, the UNIM coordinates or is under the UN. Then the UNIM later establishes the World Central Bank (WCB). UNIM oversees the journey of the WCB and the WCB is accountable to UNIM. All member states have proportional voting rights based on their use of organic currency.

The WCB has a representative office in each member country called the World Central Bank National (WCBN) for example WCBN Indonesia, WCBN England, and

others. The day-to-day operations of the world's central banks are in WCBNs. The WCB is only an administrative headquarter where the main policies are made. WCBNs cooperate with the national central banks (NCBs) of each member country. Each WCBN and NCB operates at least one supercomputer, which then becomes the core of the system.

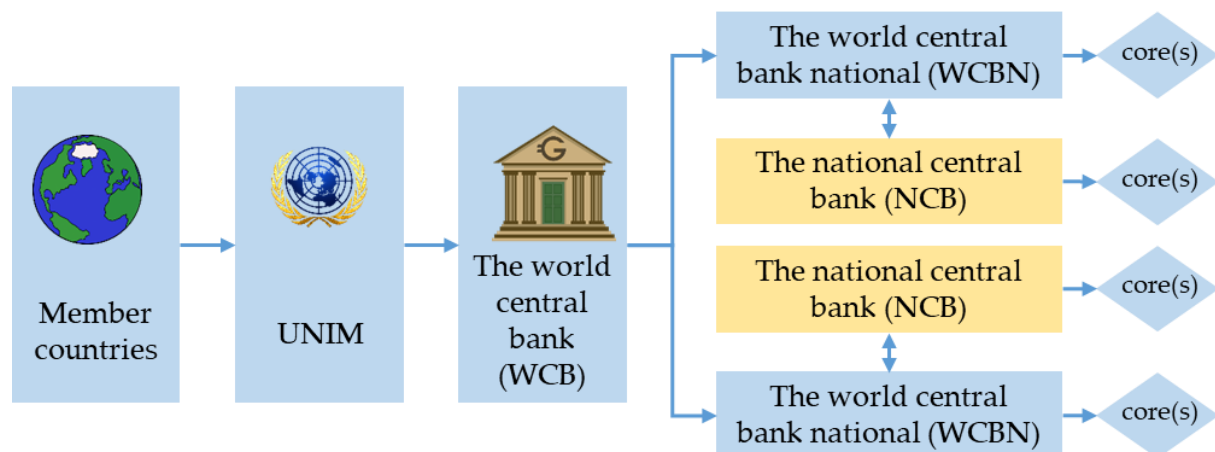


Figure 1 The organizational structure of the organic system

We have two options for financing the operations. *First*, member state fees finance the operations. The amount of the contribution is proportional to the average amount of organic currency issued in each member country each year. *Second*, the public and business entities that utilize the services can also finance the system. The financing model is the subject of future discussion.

The organic system is a closed system, that only member countries can utilize the services. While the membership is open, all countries can join. The system is flexible; it can start from any part of the world and any country may join.

2.2 Ideal amount, allocation, issuance, distribution, and control

Ideal amount and allocation

Each member country gets an allocation of organic international currency based on the number of its international transactions. There are two options. The *first* is to follow Keynes's recommendation, which is a year of international trade. The

second is to use the “rule of thumb” of FX reserves of industrialized countries for decades, which is 3 months of trade. The amount of this allocation is called the “ideal amount”. It is called so, because, in principle, it is still possible for member countries to use organic currency above the ideal amount as will be explained in the control section afterward.

Issuance

The issuance of organic currency from WCBN to NCB is as follows:

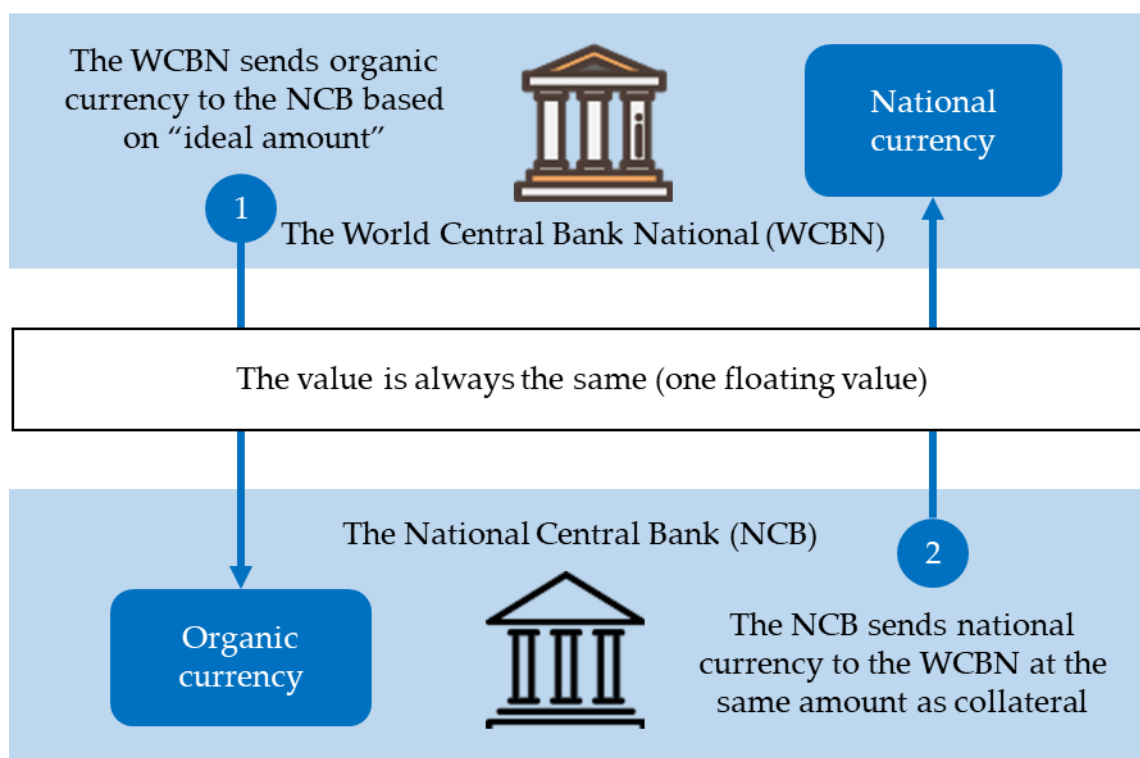


Figure 2 Issuance of organic currency from world central banks to national central banks

1. The WCBN sends organic currency to the NCB based on the ideal amount above.
2. As collateral, the NCB sends the national currency to the WCBN in the same amount.

The amount of organic currency issued in each member country is always equal to the national currency guarantee provided to WCBN. If the national currency depreciates against the organic currency, for example, the NCB sends the shortfall to

WCBN so that the collateral value equals the organic currency again. On the other hand, when the value of the national currency appreciates against the organic currency, the WCBN returns the excess to the NCB. Thus, each unit of organic international currency issued in all member countries is 100% guaranteed by the national currencies of all member countries. Therefore, this system is called organic, which means it is guaranteed 100% with the national currency and becomes part of the national currency system of each country. The organic system does not stand alone but becomes part of the national monetary system of each country.

Distribution

Distribution of organic currency from NCB to the public is direct without intermediation as below:

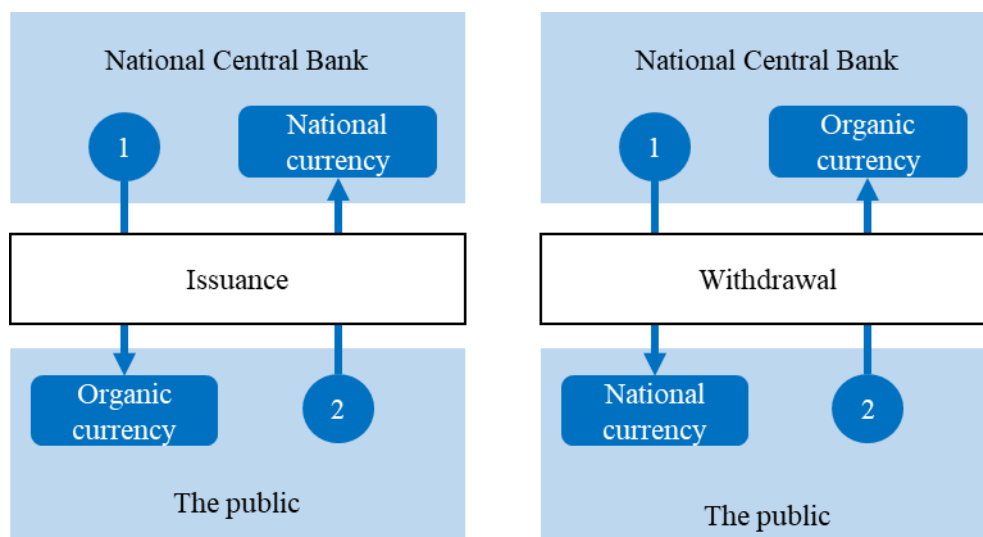


Figure 3 Distribution of organic currency from national central banks to the public

1. *Distribution*. When the general public and other business entities need organic currency, they can buy directly from NCB with the national currency. Revenue from the sale of organic currency (seigniorage) belongs to the government.
2. *Withdrawal*. When the public and other business entities no longer need organic currency, they can sell it directly to NCB. The withdrawal cost (negative seigniorage) becomes the cost of the government.

With digital technology as will be explained afterward, the general public and other business entities can create accounts directly at WCBN and NCB. They can make transactions (money exchange, transfer, and payment) on those accounts directly.

Control

This system controls the circulation of organic currency directly or through “direct control”. *First*, when the amount of organic currency in circulation is still within the range of the “ideal amount” above, the government or the NCB will not intervene. The circulation of money is left to the market. When people need it, they can buy it from the NCB. And vice versa, when they don't need it, they can sell it to the NCB. No intervention is required. *Second*, when the amount of organic currency in circulation exceeds the ideal amount above, the government or NCB intervenes by imposing a tax on storing or saving organic currency.

In principle, the usage of organic currency over the above ideal amount is detrimental to the country itself. Please note that the use of organic currency to import excessively from abroad is not possible by the exchange rate system as will be explained in the exchange rate section afterward. Thus, the usage of organic currency above the ideal amount will only reduce the usage of the national currency for domestic transactions. Since the organic currency is under the control of the world's central banks, this will reduce the ability of the national central banks or governments to control the national monetary system.

2.3 Digitization, automation, and decentralization

The organic system is digital, using current cryptographic, semi-autonomous, and semi-decentralized technologies ([Rahman, 2022a, pp. 300-310](#)) and ([Rahman, 2022b](#)). Digital currency is a currency that is “printed”, stored, and managed in the form of a “digital code”. With digital form, transactions can achieve very high speed and efficiency, surpassing the speed of transactions of all other current forms of money. Automation is a process or technology that runs on its own without human

intervention or with minimum supervision. The advantage of automation is that the system can work more quickly, objectively, and efficiently. The organic system is semi-automated; technical work is fully automated while non-technical ones still use human intervention. Decentralization is a system that operates with many centers instead of just a single center. The advantage of decentralization is that the system can still run normally with some centers working while others are not. Almost all day-to-day operations of the system are decentralized in supercomputers (which are the cores of the system) operated by WCBNs and NCBs. The following is an outline of the decentralized system in the organic system:

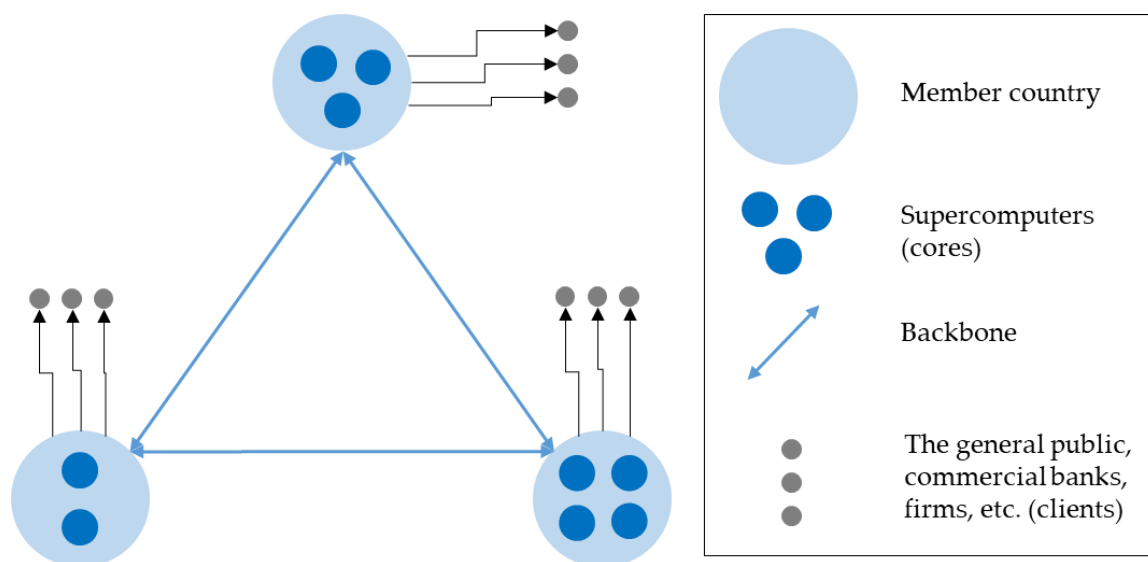


Figure 4 Decentralization in the organic system

Cores

There are two types of core in the organic system. *First*, member states, WCBN, and NCB are organizationally the cores. They are all equal and proportional based on voting rights. *Second*, each WCBN and NCB operates at least one supercomputer. Technically, those supercomputers are the cores of the system. The software in all supercomputers is parallel. Thus, some cores can back up the damage or disruption in other cores. The system can still work normally when some cores are out of work and some work normally.

Main network

All cores are connected to the main network called the backbone.

Client

The general public, commercial banks, firms, and all kinds of equipment connected to the main network are clients. Clients can get all services in the system.

Services

The main services available to the public are accounts, savings, transfer or payment, and money exchange. If member countries' contributions finance the operation of the system, then all main services are free of charge. In principle, the system can also open up to business services created by third parties or “add-ons” attached to the main services. Commercial banks and other service providers can fill this opportunity. It is also open to future discussion.

2.4 Exchange rates

The exchange rate is the most important part of the organic system. The exchange rate is not only a benchmark for exchanging money but also, more than that, to maintain the balance and stability of the entire system. To achieve this, the organic system uses its own exchange rate, which is called “auto-balancing”. The auto-balancing equation consists of two components, i.e. (1) a “true exchange rate” and (2) a “balancing factor”. A detailed description of how this equation developed is in (Rahman, 2022a, pp. 323-347) and (Rahman, 2022c). The equation is as follows:

$$E = \frac{\overline{PI}}{\overline{PX}} \cdot \frac{GDP+Surplus\ FBS}{GDP+Deficit\ FBS} \dots \text{equation 1}$$

E : Exchange rate of national currency

\overline{PI} : Weighted average price of imported goods and services (tradable) in international currency.

\overline{PX} : Weighted average price of exported goods and services (tradable) in national currency.

GDP : Gross domestic product of the previous year

Surplus FBS : Surplus foreign balance sheet

Deficit FBS : Deficit foreign balance sheet

First component

The *first component*, namely $(\overline{PI})/(\overline{PX})$, is the equation of the true exchange rate or the real-actual exchange rate. It is called so because the equation describes the real and actual purchasing power of money abroad where the average price of tradable domestic and foreign goods and services is equal. There is a difference between the true exchange rate and the real exchange rate. At the real exchange rate, we include the prices of all goods and services, both tradable and non-tradable. While the true exchange rate only counts exported and imported goods and services or tradable.

We can also write the first component in statistical mode as:

$$E.M_{Local} = M_{Global} \text{ if } \overline{PI} = \overline{PX} \dots \text{equation 1a}$$

$E.M_{Local}$: Exchange rate of national currency

M_{Global} : International currency

Below is how the true exchange rate works:

1. The true exchange rate keeps competitiveness between countries relatively balanced, not too weak and not too strong. When the average price of tradable goods and services of two or more countries is equal, their comparative advantages (trade competitiveness) are relatively balanced.
2. When they trade (in a condition of relatively balanced comparative advantages), their trade tends to be relatively balanced, not excessive surplus and not an excessive deficit. Limited surpluses and deficits are still possible but not excessive.

Our simulations will prove the above two hypotheses. Besides, a lot of empirical research results proved this hypothesis either, directly or indirectly, namely aligned exchange rates (average prices at home and abroad are relatively equal) make trade tend to be relatively balanced; and conversely, misaligned exchange rates make trade unbalanced. [Rodrik \(2008\)](#), for example, found that undervalued exchange rates in developing countries caused trade surpluses and made economic growth faster. Meanwhile, overvalued developing countries experienced the opposite. Then [Bleaney & Tian \(2014\)](#) who researched 87 countries also found that real depreciation (undervalued) caused a significant increase in the balance of payments. Meanwhile, [Rasbin, Ikhsan, Gitaharie, & Affandi \(2021\)](#) found that when the Indonesia rupiah was undervalued (almost all periods) the trade tended to be in a surplus and when it was ideal (aligned) in 1993-1996, the trade tended to be balanced. Various other empirical research results also found more or less the same evidence ([OECD, 2011](#)), ([Kharroubi, 2011](#)), ([Tandon, 2014](#)), and ([Neumann & Tabrizy, 2021](#)).

Second component

Please note that the first component above can eliminate major imbalances. However, minor imbalances may still occur. And these small imbalances will continue to accumulate. Therefore, we need a second component that can reduce or stop the accumulation. The *second component*, namely $(GDP + \text{Surplus FBS}) / (GDP + \text{Deficit FBS})$, is a balancing factor for the foreign balance sheet (FBS). Currently, the best description of FBS is IIP (the International Investment Position) developed by the IMF ([Lambert & Paul, 2002](#)). It works on the balance sheet by reducing the remaining imbalances or stopping their growth.

For example, when the balance sheet is surplus, the second component raises the exchange rate of the national currency. This causes the next trade to tend to be in deficit or reduce the surplus. On the other hand, when the balance sheet is in deficit, it lowers the exchange rate so that the next trade tends to have a surplus or reduce the deficit. It brings the balance sheet back to a relatively neutral state.

As the simulations will prove later, the second component also makes trade neutralize capital flows and other international transfers. For example, when capital flows cause a country's current account to be in continuous surplus, they will enlarge the balance sheet. Thus, the second component will increase the exchange rate of the national currency so that the country's trade tends to be in deficit and neutralizes capital flow and other transfers. Thus, the second component makes trade and capital flows neutralize each other.

3 The Simulations

The major component in international economic activity is trade and capital movement or investment. Meanwhile, the purpose of the IMS is to facilitate these international economic activities. To optimize functionalities, the system should be balanced and stable. Failing in achieving both of these things, crises and faults will often occur.

Therefore, we developed a 3-dimensional simulation of trade and investment consisting of 5 countries, 20 products, and in a span of 12 months (a year) or a 5x20x12 model. This simulation can provide a simple picture of how this system works. The simulation also tests whether the system can be self-balanced and stable or not.

3.1 A 3-dimensional simulation 5x20x12

There are five countries, namely Indonesia, Malaysia, Thailand, the Philippines, and Singapore. Each produces and consumes 20 goods of A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, and T. We assume the cost of production equals the price. We also assume that the price is linear whatever the quantity. The price of each product in each country is determined randomly with a range using the national currency of each country (Indonesia 140-280 Indonesian rupiah, Malaysia 40-80 Malaysian ringgit, Thailand 340-680 Thai baht, Philippines 520-1040 Philippine pesos, and Singapore 20-40 Singapore dollars). The number of production and consumption of each country is 10 items per type of goods per month. All factors of production can

be transferred between goods within a country, so they can double their production capacity, consume half of them, and export the other half. All countries can import to get goods at a lower price or export to get a larger market share. The two countries whose goods are cheaper export to the two more expensive countries. Meanwhile, a country whose prices are in the middle, only produces and consumes itself, neither exports nor imports.

We use the auto-balancing exchange rate (equation 1) to determine exchange rates between currencies. The exchange rate automatically adjusts every month following the balance sheet. Each country gets an allocation of FX reserves of 3,000 I\$ (international dollars). This amount is about 3 months of international trade.

3.2 Balancing the system

We want to test whether this system can be self-balanced or not. The results are as follows:

First, the comparative advantages of each country tend to be relatively balanced

Table 1 Comparison of comparative advantages in true exchange rates and misaligned exchange rates in organic system simulation

A		B					C					D				
Goods/products		Price random generator with range					Price in I\$ under autobalancing exchange rate					Price in I\$ under under/overvalued exchange rate				
No.	Goods	Indonesia	Malaysia	Thailand	Philippines	Singapore	Indonesia	Malaysia	Thailand	Philippines	Singapore	Indonesia	Malaysia	Thailand	Philippines	Singapore
1	A	201	61	462	808	27	13.74	13.95	14.26	15.01	13.25	11.45	12.68	14.26	16.68	16.56
2	B	223	44	410	892	33	15.25	10.06	12.65	16.58	16.19	12.71	9.15	12.65	18.42	20.24
3	C	153	45	508	761	33	10.46	10.29	15.68	14.14	16.19	8.72	9.36	15.68	15.71	20.24
4	D	157	78	547	630	27	10.74	17.84	16.88	11.71	13.25	8.95	16.22	16.88	13.01	16.56
5	E	207	65	368	642	22	14.15	14.87	11.36	11.93	10.80	11.80	13.51	11.36	13.26	13.49
6	F	191	46	520	912	30	13.06	10.52	16.05	16.95	14.72	10.88	9.56	16.05	18.83	18.40
7	G	260	63	509	925	33	17.78	14.41	15.71	17.19	16.19	14.82	13.10	15.71	19.10	20.24
8	H	216	55	417	542	35	14.77	12.58	12.87	10.07	17.17	12.31	11.44	12.87	11.19	21.47
9	I	279	69	345	758	34	19.08	15.78	10.65	14.09	16.68	15.90	14.35	10.65	15.65	20.85
10	J	205	51	499	1017	39	14.02	11.66	15.40	18.90	19.14	11.68	10.60	15.40	21.00	23.92
11	K	258	73	471	585	21	17.64	16.70	14.53	10.87	10.30	14.70	15.18	14.53	12.08	12.88
12	L	153	55	389	555	28	10.46	12.58	12.00	10.31	13.74	8.72	11.44	12.00	11.46	17.17
13	M	213	68	546	728	34	14.56	15.55	16.85	13.53	16.68	12.14	14.14	16.85	15.03	20.85
14	N	252	68	350	875	33	17.23	15.55	10.80	16.26	16.19	14.36	14.14	10.80	18.07	20.24
15	O	143	77	502	978	22	9.78	17.61	15.49	18.17	10.80	8.15	16.01	15.49	20.19	13.49
16	P	198	78	342	735	32	13.54	17.84	10.55	13.66	15.70	11.28	16.22	10.55	15.18	19.63
17	Q	256	76	580	946	26	17.51	17.38	17.90	17.58	12.76	14.59	15.80	17.90	19.53	15.95
18	R	179	77	538	873	22	12.24	17.61	16.60	16.22	10.80	10.20	16.01	16.60	18.03	13.49
19	S	265	76	675	828	30	18.12	17.38	20.83	15.39	14.72	15.10	15.80	20.83	17.10	18.40
20	T	232	43	420	616	30	15.86	9.83	12.96	11.45	14.72	13.22	8.94	12.96	12.72	18.40

In Table 1 above, column B (price random generator with range) is active. Each click always generates random numbers (prices) within the range. In these random prices, we want to test whether the comparative advantages of all countries are still equal or not. In doing so, we utilize two types of exchange rates, i.e. true (aligned) exchange rate (column C) and misaligned exchange rate (column D). In misaligned

exchange rates, Indonesia was undervalued by 20%, Malaysia was undervalued by 10%, Thailand normal, the Philippines was overvalued by 10%, and Singapore was overvalued by 20%. The green cell means the good is cheaper, the red one is more expensive, and the colorless one is in the middle. The green cells are the comparative advantages and the red ones are the comparative disadvantages.

Then we compare the results. As we can see in column C (true exchange rates), all countries have relatively balanced green and red cells. Regardless of the price of domestic and foreign goods, the auto-balancing exchange rate always responds by equalizing the averages of the two. As a result, the comparative advantages of all countries tend to be relatively equal. This is consistent with our hypothesis that when the average price of tradable domestic goods is the same as abroad, then the comparative advantages of these countries tend to be relatively equal. Thus, their competitiveness also tends to be relatively equal.

Now, we can compare this to misaligned exchange rates. As we can see, in column D (misaligned exchange rate), most countries have unequal green and red cells. Undervalued countries (Indonesia and Malaysia) tend to have more green cells (comparative advantages) while overvalued ones (Philippines and Singapore) tend to have more red cells (comparative disadvantages). The greater the misalignment, the greater the inequality. In this simulation, the effect of misalignment in comparative advantages is clearly visible.

Second, when comparative advantages are relatively equal, then the trade also tends to be relatively balanced

Our next hypothesis is when comparative advantages are relatively equal, trade also tends to be relatively balanced. As shown in the image below, under the true exchange rates, when they trade, then their trades tend to be relatively balanced.

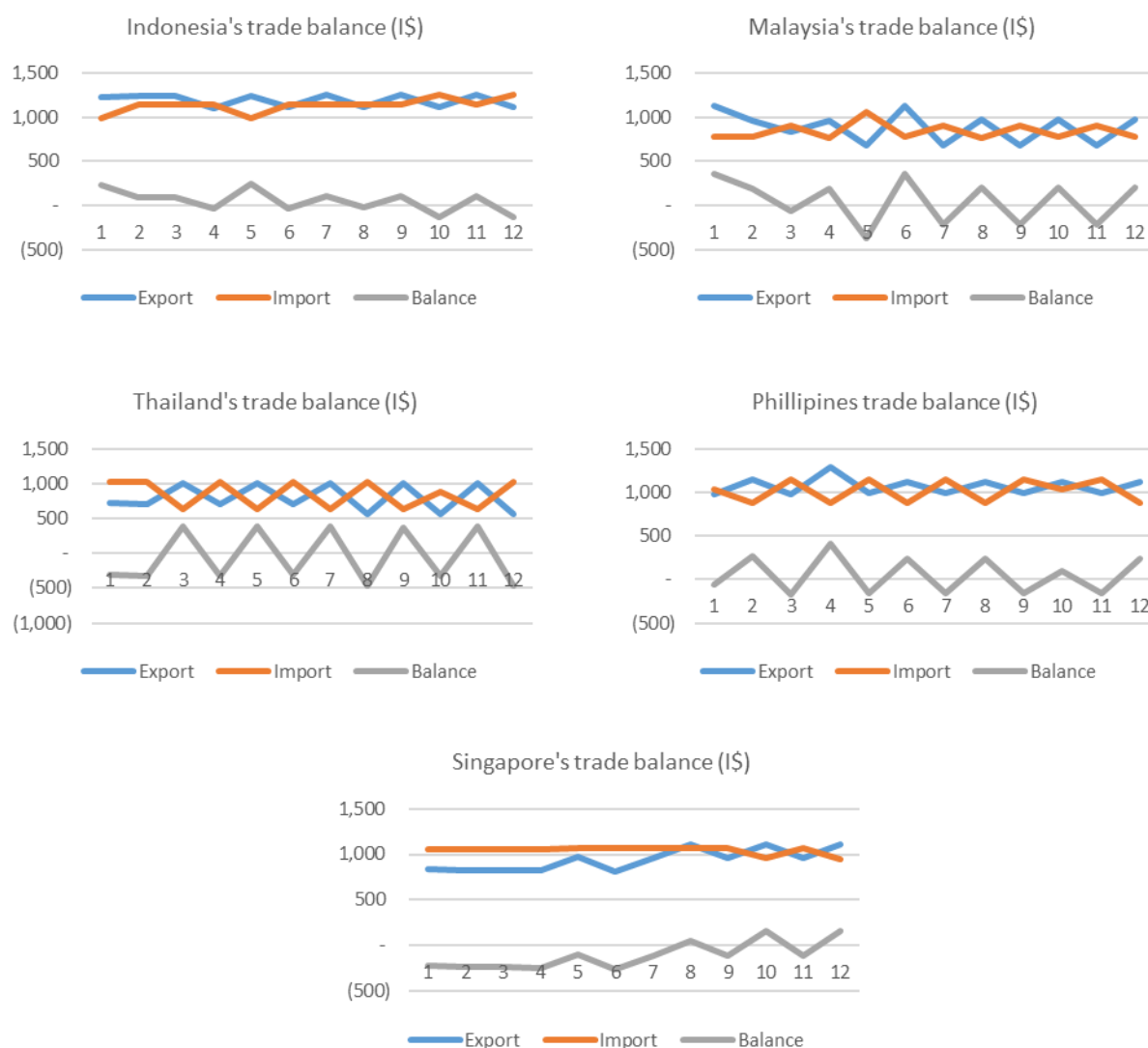


Figure 5 Exports, imports, and trade balances of member countries in organic system simulation

In the real world, perfect equality of competitiveness never exists. It's the same as a perfect market (competition), which also never exists. There are always imperfections in the real world. Therefore, in the real world, small imbalances persist. As we can see in Figure 5 above, the trade of all these countries is relatively balanced but not perfect. Minor imbalances still exist. These small imbalances are accumulative so that in the long term they can disrupt the balance sheet of each country. This is where the second component $(GDP + Surplus BS)/(GDP + Deficit BS)$ works. It reduces the imbalance or stops its growth so that the imbalance does not agglomerate and does not damage the balance sheet. As we can see in the picture above, the export and import lines of all countries cross each other so that surpluses and deficits

neutralize each other. In each country, a surplus turns into a deficit and a deficit turns into a surplus so the trade balances of all countries neutralize each other as shown in the image below. In short, the auto-balancing exchange rate (with its two components) makes the trade balances of all member countries tend to be relatively balanced or neutral.

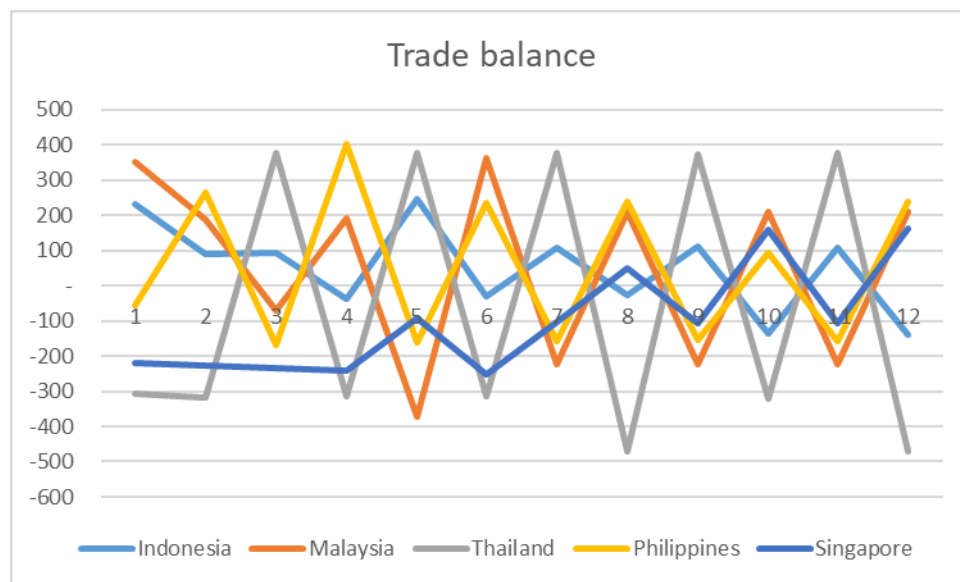


Figure 6 Trade balances of member countries in organic system simulation

Trade balance accumulates in the balance sheets and FX reserves. Assumed cross-border transactions are only trade, when the trade is relatively balanced, then the balance sheets and FX reserves of each member country also tend to be relatively balanced; no country accumulates FX reserves excessively and no country dries up too. Under these conditions, no country in the world needs to owe to other countries just to cover FX reserves. They are all self-sufficient. As we can see in Figure 7 below, 3 months of FX reserves are enough and self-sufficient.

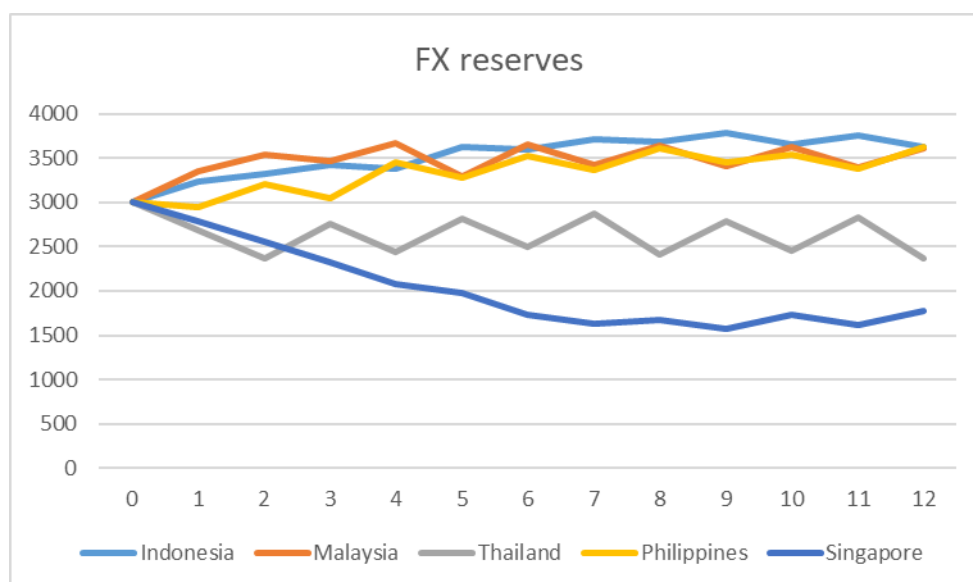


Figure 7 FX reserves balances of member countries in organic system simulation

Investment and capital flows

We expand the simulation by incorporating investment and capital flows. It should be noted that in our modern global economy, at a certain level, investment and capital flows could affect the balance sheets and FX reserves more severely than trade. We want to know whether the organic system is still able to maintain balance in the presence of capital flows.

It is assumed that Indonesia makes a direct investment in Singapore in the form of capital goods of 1,000 I\$ in the first month. In this case, Indonesia recorded export of capital goods of 1,000 I\$ to Singapore and vice versa. Meanwhile, Malaysia made a portfolio investment in the Philippines for 1,000 I\$ also in the first month. In this case, Malaysia recorded an investment outflow of 1,000 I\$ and the Philippines recorded an inflow of the same amount. Both investments have an ROI of 120% per year and investors withdraw their yields every month. The cash flow from the FX reserves side will look like this in Table 2 below:

Table 2 Capital flows and yields of member countries in organic system simulation

	FX RESERVES FLOW (ASSETS)											
	1	2	3	4	5	6	7	8	9	10	11	12
Indonesia	-	100	100	100	100	100	100	100	100	100	100	100
Malaysia	- 1,000	100	100	100	100	100	100	100	100	100	100	100
Thailand	-	-	-	-	-	-	-	-	-	-	-	-
Philippines	1,000	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100
Singapore	-	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100	- 100

These investment/capital flows and profit transfers (remittance) affect the current account and balance sheet, which makes Indonesia and Malaysia surpluses while the Philippines and Singapore are in deficit. In the long term, this flow makes the balance sheets of the four countries unbalanced; and they are cumulative.

The second component in the auto-balancing exchange rate then responds; namely (1) increasing the exchange rates of the Indonesian rupiah and Malaysian ringgit while (2) lowering the Philippine peso and Singapore dollar. As a result, in the long term, the trade of Indonesia and Malaysia tends to be in deficit while the Philippines and Singapore tend to be in a surplus.

Table 3 Trade balances of member countries after responding to capital flows in organic system simulation

	TRADE BALANCE											
	1	2	3	4	5	6	7	8	9	10	11	12
Indonesia	233	- 397	- 273	- 139	- 165	110	- 275	- 141	110	- 134	- 163	- 138
Malaysia	352	172	- 224	212	- 493	209	- 345	211	- 343	- 87	- 226	210
Thailand	- 309	- 186	404	- 469	517	- 468	518	- 467	380	- 470	517	- 468
Philippines	- 57	399	85	235	124	103	- 24	236	- 162	408	- 22	239
Singapore	- 220	12	8	162	17	46	126	160	15	283	- 106	158

As we can see in Table 3 above, trade in Indonesia and Malaysia tends to be in deficit (more red than green), while the Philippines and Singapore tend to have a surplus (more green than red). In this table, we can see that trade flows neutralize capital flows so that the current accounts and balance sheets of all countries remain relatively neutral. Thus, the auto-balancing exchange rate makes trade flows and capital flows neutralize each other (see Appendix).

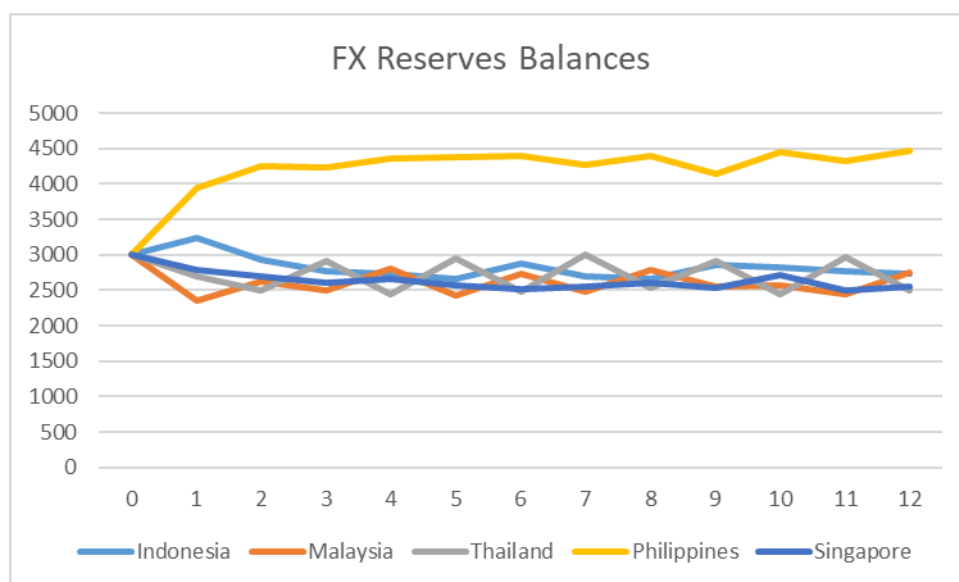


Figure 8 FX reserves balance after capital flows of member countries in organic system simulation

This also has implications for FX reserves. When trade and investment neutralize each other, the current account and the balance sheet tend to be neutral. While the FX reserves of all countries also tend to be neutral and stable, no country accumulates excessively and no country dries up. As shown in Figure 8 above, the FX reserves of all countries are still relatively stable and self-sufficient; no country needs to owe to other countries just to meet the needs of FX reserves. The figure above also shows that the Philippines has relatively abundant FX reserves because it receives foreign capital flows in the form of cash, which are generally short-term (portfolio). Thus, the Philippines is always ready if that foreign capital comes out suddenly (reversal).

Here's the big picture. In this simulation, the auto-balancing exchange rate makes the competitiveness (comparative advantages) of all countries tend to be relatively equal. Regardless of the price of goods and services domestically and abroad, the comparative advantages always tend to be relatively equal. As a result, the trade tends to be relatively balanced too.

Then, when there is an investment or capital flow that affects the balance sheet, the exchange rate responds and makes the trade neutralizes capital flows. Investor

countries that receive profit inflows from their investments tend to experience trade deficits so that their current accounts tend to remain neutral. Meanwhile, investee countries that experience an outflow of profit tend to experience a trade surplus so that the current account also tends to remain neutral. In this way, the current accounts, the balance of payments, balance sheets, and FX reserves of all countries are always relatively balanced and self-sufficient.

Comparison with bancor

The Keynes bancor also has a balancing system. Keynes considered the imbalance in the balance of payment (BoP) as a “balance of terror” which damaged the balance sheets of countries in the world (Keynes, 1935). While the IMS at that time, did not have a balancing factor. Therefore, he embedded a balancing system in the very core of the bancor, namely: if member countries experience a surplus or deficit of more than $\frac{1}{4}$ of the quota, then the ICB will charge them interest costs (Keynes, 1969). Thus, countries in the world will be encouraged to balance their trade and current account. Trade and current account imbalances will cost them interest. The balancing factor in bancor could be effective in balancing trade but might be less effective in balancing capital flows. Therefore, Keynes still recommended capital control to maintain the balance sheet (Crotty, 1983).

The organic system works differently. *First*, auto-balancing works automatically and continuously; it does not depend on member state policies. Thus, in the organic system, the exchange rate always balances the current account and balance sheet, regardless of the policies of the member countries. *Second*, auto-balancing works on both trade and capital flow, so, at some level, capital control may not be necessary.

It should be noted that in this simulation, the size of capital flow is about a third of the allocation of FX reserves (1,000I\$/3,000I\$). This system will only work properly if the size of the capital flow is less than the FX reserves. Conversely, the system will

not be effective if the capital flow is bigger than the FX reserves. The greater the ratio of capital flows to FX reserves, the more vulnerable the system. Conversely, the smaller the ratio, the stronger the system.

3.3 Stabilizing the exchange rates and the whole system

This simulation can also test whether the system can stabilize the exchange rates and the whole system or not. *First*, by making the balance sheets of all countries relatively balanced as stated above, the first source of instability, namely global imbalances can be eliminated. And *secondly*, auto-balancing also stabilizes the exchange rates directly, by following the fundamentals. Equation 1 shows that the exchange rate only follows the fundamentals (the price of tradable goods and services) and the balance sheet of each country. Non-fundamental factors such as short-term capital flows and speculation do not affect the exchange rate. The result is that the exchange rates of all countries are relatively stable whether there is investment flow (B) or not (A) as shown in the figure below:

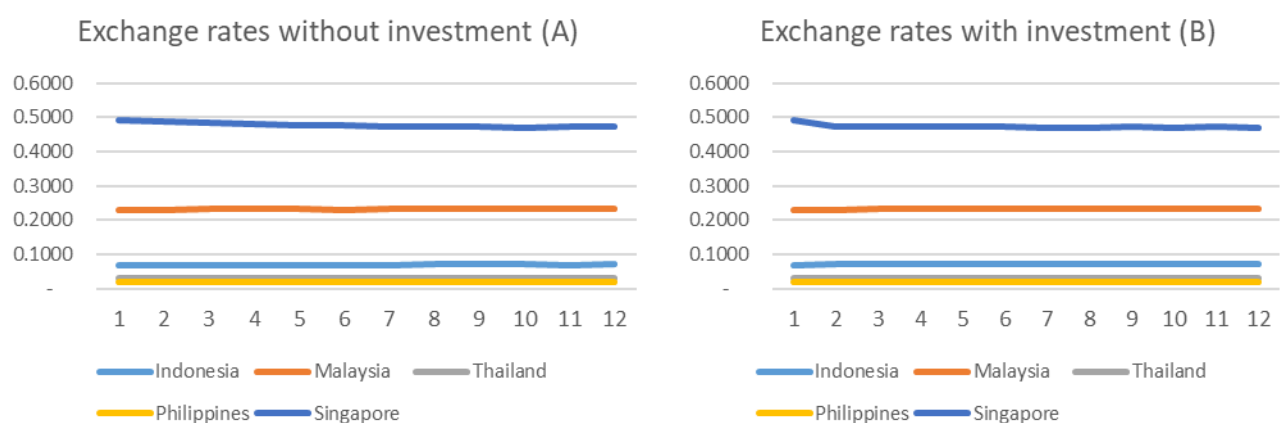


Figure 9 Exchange rates of member countries in organic system simulation with and without investment flow

It should be noted that the main sources of exchange rate volatilities in the modern economy are speculation and short-term capital flows inter countries. Short-term capital flows are generally speculative-motivated so that they are actually the “same creature” (Rahman, 2022a, p. 207). Research results from many experts proved this both empirically and theoretically. After the 97-98 Asian crisis, Rodrik & Velasco

(1999) developed a model that links short-term capital flows and currency crises. They found empirical evidence that short-term capital flows (especially backflows) lead to severe exchange rate volatilities and eventual crises. Then, still related to the Asian crisis 97-98, [Chang & Velasco \(2001\)](#) found that the crisis occurred in emerging markets when international banks were “illiquid” due to short-term capital outflows. They dried up the cash flow. Foreign investors panic and crises ensued. Then, with a similar model, [Hutchison & Noy \(2006\)](#) found a short-term reversal of capital flows causing sudden stops in many developing countries.

In the organic system, speculators can still speculate. However, their actions do not affect the exchange rate. Because the exchange rate only follows the fundamentals and balance sheet of each country. Thus, as shown in Figure 9 above, the exchange rates are generally stable whether there are capital flows or not. In short, the organic system stabilizes the exchange rate and the system by eliminating the two main sources of instability, namely imbalances and speculation.

Into the anatomy of volatility

To see how capital flows (especially short-term) raise volatility, let's compare how the current (non)system and the organic system act in the presence of capital flow. We can see the anatomy of volatility in the dynamics of both.

First, the current (non)system

The current (non)system does not have a balancing factor for capital flow. Capital can move in and out of a country and the system does not respond sufficiently to maintain and anticipate a disturbance in the balance sheet and exchange rate. As a result, equilibrium could be disturbed, exchange rates could fluctuate, and crises might occur. When capital comes in, in general, FX reserves overflow, and the national currency exchange rate rises ([Hau & Rey, 2006](#)) and ([Combes, Kinda, & Plane, 2012](#)). Then imports increase and there is dependence on foreign capital. A new (temporary) equilibrium is formed where foreign capital finances imports and the balance of

payments (BoP) (Calvo, Leiderman, & Reinhart, 1994). Meanwhile, imbalances continue to accumulate.

This dependence cannot last forever. In general, countries in the world experience up and down economic cycles. Coupled with external factors, this cycle can change investor sentiment. When sentiment turns negative, while the (deficit) imbalance has accumulated, investors may pull their investment out. In many cases, capital outflows occur suddenly and in very large amounts (Rodrik, 1998) and (Rodrik & Velasco, 1999). Then, in such a short time, another new equilibrium is formed where foreign capital can no longer finance the deficit. Meanwhile, the system is still depending on the former equilibrium where foreign capital finance the deficit.

Mexico's BoP crisis is a comprehensive example of this equilibrium-shifting phenomenon due to foreign capital flows (Calvo & Mendoza, 1996). In general, the 1994 Latin American and 1998 Asian crises had relatively similar anatomy. Various policies to maintain balance are generally far from sufficient or too late. In many cases, unmanageable short-term capital flows can create disruptions to balance sheets and exchange rates, which in turn give rise to self-fulfilling crises (Obstfeld, 1994). In short, since the current non-system does not have a balancing factor, capital flows can shift the equilibrium, accumulate imbalances, and eventually give rise to volatility and crises.

Second, the organic system

The organic system has a balancing factor that works when capital flow occurs in the first place. It always responds to all capital flows that affect the balance sheet in real time. Therefore, when a capital reversal occurs suddenly, the system is ready and can still work properly.

Let us take an example in the simulation above. When Malaysia invests in the Philippines in cash, the Philippines experience a flood of international liquidity (abundant FX reserves). From an accounting perspective, cash (portfolio) investment

does not affect the balance sheet because it adds credit and debit at once. In the Philippines' balance sheet, FX reserves (assets) increased and foreign-owned assets (debt) also increased by the same amount. Therefore, as in the example above, this (cash) capital flow does not affect the balance sheet and exchange rate and, in the end, does not affect the trade balance. The equilibrium does not shift. The system keeps the Philippines' FX reserves abundant.

Then, when the investment profits flow out from The Philippines, this affects the current account as well as the balance sheet. The auto-balancing responded by lowering the Philippine peso's exchange rate. As a result, trade tends to be in a surplus and offset profits outflow. In the end, the Philippines' FX reserves remain abundant. Following economic cycles (or something unexpected happened), investors may withdraw their capital. Since the Philippines' FX reserves remain abundant, the sudden reversal of foreign capital is not a problem. The Philippines' FX reserves are more than sufficient to pay for all the outflows of foreign capital. Exchange rates are also not affected. Therefore, in the organic system, short-term capital flows and speculation do not affect the exchange rate so the system should remain stable.

As for the case of Indonesia and Singapore, the organic system gave a different response. Indonesia invests in Singapore in the form of capital goods. Both countries will record trade; Indonesia exports capital goods and Singapore imports by the same amount. This directly affects the balance sheets of the two; Indonesia has a surplus and Singapore has a deficit. Therefore, auto-balancing immediately responds by rising the Indonesian rupiah exchange rate and lowering the Singapore dollar right after the investment (trade) transaction took place. Afterward, Indonesia tends to have a deficit, and Singapore has a surplus. So, trade directly neutralizes investment flows (trade) and transfers profits right from the beginning. As a result, as we can see in Tables 2, 3, and Figure 8 above, the current accounts, balance sheets, and FX reserves of the two countries remain relatively balanced, stable, and self-sufficient.

4 Conclusion

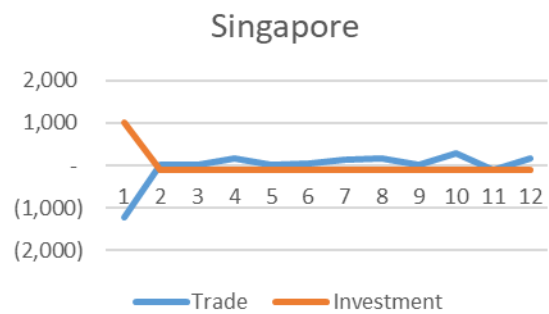
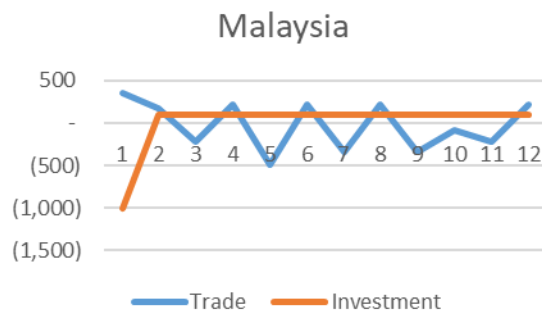
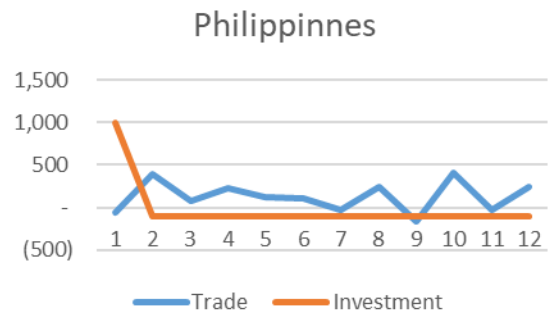
We developed a new model of a symmetrical IMS called the organic system or organic IMS. The organic IMS is developed and managed by all member countries in the world democratically. The system issues an international currency that is part of and coexists with the national currency of each country. This model could potentially provide international liquidity sustainably and efficiently. No country charges other countries for international liquidity needs. And no country needs to be in deficit to provide international liquidity.

The organic system uses its own exchange rate, which is called auto-balancing. The auto-balancing is the most important part of the organic system. It is not only an exchange rate benchmark but also maintains the balance and stability of the system. Auto-balancing keeps trade competitiveness or comparative advantage between countries always neutral so that their trade is also relatively neutral, not excessive surplus and not an excessive deficit. The auto-balancing also keeps the balance sheets of all countries relatively neutral. This makes the flow of capital and trade tend to neutralize each other.

Based on our 3-dimensional trade and investment simulation, a 5x20x12 model, the organic system makes the balance sheets of all member countries tend to be relatively balanced and eliminate global imbalances to the root and permanently. Then, the system also makes the exchange rate only follow the fundamentals and balance sheets of each member country. In this way, the exchange rate becomes stable and thus the system becomes stable too. Based on our best analyses and understanding, the organic system could potentially make the IMS naturally balanced and stable. In this model, we implant a digital-and-decentralized system in the very core of the system, which works automatically, or semi-automatically, and cannot be intervened. International transactions outside the system are still possible and do not affect the balance of the system. However, it reduces the effectiveness. This system can start anywhere in the world and any country may join.

Appendix

Trade and investment/capital flows neutralize each other



References

- Aloui, R., Ben-Aïssa, M. S., & Nguyen, D. K. (2011). Global financial crisis, extreme interdependences, and contagion effects: The role of economic structure? *Journal of Banking & Finance*, 35(1), 130-141. doi:10.1016/j.jbankfin.2010.07.021
- Barberis, N., Shleifer, A., & Vishny, R. W. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307-343. doi:10.3386/W5926
- BIS. (2022). *Triennial Central Bank Survey: Global Foreign Exchange Market Turnover in 2022*. Monetary and Economic Department. Basel: BIS. Retrieved from <https://www.bis.org>
- Bleaney, M., & Tian, M. (2014). Exchange Rates and Trade Balance Adjustment: A Multi-Country Empirical Analysis. *Open Economies Review*, 25, 655-675. doi:10.1007/s11079-014-9310-3
- Bonpasse, M. (2006). *The Single Global Currency; Common Cents for the World* (#15 of the 2006 edition ed.). Newcastle: Single Global Currency Association. Retrieved from www.singleglobalcurrency.org
- Caballero, R. J., & Krishnamurthy, A. (2008). Global Imbalances and Financial Fragility. *The American Economic Review*, 99(2), 584-588. doi:10.1257/AER.99.2.584
- Cabezas, L., & De Gregorio, J. (2019). Accumulation of reserves in emerging and developing countries: mercantilism versus insurance. *Review of World Economics*, 155, 819-857. doi:10.1007/s10290-019-00353-2
- Calvo, G. A., & Mendoza, E. G. (1996). Mexico's balance-of-payments crisis: a chronicle of a death foretold. *Journal of International Economics*, 41(3-4), 235-264. doi:10.1016/S0022-1996(96)01436-5
- Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1994). The Capital Inflows Problem: Concepts and Issues. *Contemporary Economic Policy*, 12(3), 54-66. doi:10.1111/j.1465-7287.1994.tb00434
- Caramazza, F., Ricci, L., & Salgado, R. (2004). International financial contagion in currency crises. *Journal of International Money and Finance*, 23(1), 51-70. doi:10.1016/j.jimonfin.2003.10.001
- CEPR. (2011). *Reforming the International Monetary System*. Washington, D.C.: CEPR. Retrieved from <https://cepr.org>
- Chang, R., & Velasco, A. (2001). A Model of Financial Crises in Emerging Markets. *Quarterly Journal of Economics*, 116(2), 489-517. doi:10.1162/00335530151144087
- Chinn, M. D., Eichengreen, B., & Ito, H. (2014). A Forensic Analysis of Global Imbalances. *Oxford Economic Papers*, 66(2), 465-490. doi:10.1093/oep/gpt027
- Combes, J.-L., Kinda, T., & Plane, P. (2012). Capital flows, exchange rate flexibility, and the real exchange rate. *Journal of Macroeconomics*, 34(4), 1034-1043. doi:10.1016/j.jmacro.2012.08.001
- Cooper, R. N. (2006). Proposal for a Common Currency among Rich Democracies. *International Economics and Economic Policy*, 3, 387-394. doi:10.1007/s10368-006-0062-4
- Crotty, J. R. (1983). On Keynes and Capital Flight. *Journal of Economic Literature*, 59-65. Retrieved from <http://www.jstor.org>
- Davidson, P. (2004). The Future of the International Financial System. *Journal of Post Keynesian Economics*, 26(4), 591-605. Retrieved from <https://www.jstor.org>
- De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise Trader Risk in Financial Markets. *Journal of Political Economy*, 98(4), 703-738. doi:10.1086/261703

- Eichengreen, B. (2006). *Global Imbalances and the Lessons of Bretton Woods* (1 ed., Vol. 1). Cambridge: The MIT Press. Retrieved from <https://mitpress.mit.edu>
- Fratzscher, M. (1998). Why are currency crises contagious? A comparison of the Latin American Crisis of 1994–1995 and the Asian Crisis of 1997–1998. *Review of World Economics*, 134(4), 664–691. doi:10.1007/BF02773292
- Gagnon, J. E. (2012). Combating Widespread Currency Manipulation. *Policy Brief PB 12 - 19* (pp. 1–9). Washington, DC: PIIE. Retrieved from <https://www.piie.com>
- Greenwald, B. C., & Stiglitz, J. E. (2009). A Modest Proposal for International Monetary Reform. *Initiative for Policy Dialogue Working Paper Series*. New York: Initiative for Policy Dialogue. doi:10.7916/D8V98H8Q
- Hau, H., & Rey, H. (2006). Exchange Rates, Equity Prices, and Capital Flows Get access Arrow. *The Review of Financial Studies*, 19(1), 273–317. doi:10.1093/rfs/hhj008
- Howe, J. S. (2018). Evidence on Stock Market Overreaction. *Financial Analysts Journal*, 42(4), 74–77. doi:10.2469/faj.v42.n4.74
- Hutchison, M. M., & Noy, I. (2006). Sudden Stops and the Mexican Wave: Currency Crises, Capital Flow Reversals and Output Loss in Emerging Markets. *Journal of Development Economics*, 79(1), 225–248. doi:10.1016/j.jdeveco.2004.12.002
- IMF. (2010). Reserve Accumulation and International Monetary Stability. *IMF Policy Papers*. Washington DC: IMF. Retrieved from <https://www.imf.org>
- IMF. (2011). Enhancing International Monetary Stability—A Role for the SDR? *IMF Policy Papers*. Washington DC: IMF. Retrieved from <https://www.imf.org>
- Keynes, J. M. (1935). *General Theory of Employment, Interest and Money*. New York: Macmillan. Retrieved from <https://www.palgrave.com>
- Keynes, J. M. (1969). The Keynes Plan; Proposals for an International Clearing Union. In IMF, *The International Monetary Fund 1945–1965* (Vol. III, pp. 19–36). Washington DC: IMF. Retrieved from <https://www.elibrary.imf.org>
- Kharroubi, E. (2011, September). The Trade Balance and the Real Exchange Rate. *BIS Quarterly Review*, 33–42. Retrieved from <https://www.bis.org>
- Kruger, M. (1996). Speculation, Hedging and Intermediation in the Foreign Exchange Market. *Bank of Spain Working Paper*. Madrid: Bank of Spain. Retrieved from <https://www.bde.es>
- Lambert, F., & Paul, L. (2002). The International Investment Position : Measurement Aspects and Usefulness for Monetary Policy and Financial Stability Issues. *IMF Committee on Balance of Payments Statistics* (pp. 1–24). Washington DC: IMF. Retrieved from <https://www.imf.org>
- Mann, C. L. (2002). Perspectives on the U.S. Current Account Deficit and Sustainability. *Journal of Economic Perspectives*, 16(3), 131–152. doi:10.1257/089533002760278758
- Merrouche, O., & Nier, E. (2010). What Caused the Global Financial Crisis? — Evidence on the Drivers of Financial. *IMF Working Paper* (pp. 1–64). Washington, D.C.: IMF. Retrieved from <https://www.imf.org>
- Moore, B. J. (2004). A Global Currency for a Global Economy. *Journal Of Post Keynesian Economics*, 26(4), 631–653. doi:10.1080/01603477.2004.11051415

- Mundell, R. A. (2003). The International Monetary System and the Case for a World Currency. *Distinguished Lectures Series n. 12*. Warsaw: WSPiZ and TIGER. Retrieved from <https://tiger.edu.pl>
- Neumann, R., & Tabrizy, S. S. (2021). Exchange Rates and Trade Balances: Effects of Intra-Industry Trade and Vertical Specialization. *Open Economies Review*, 32, 613–647. doi:10.1007/s11079-020-09612-4
- Obstfeld, M. (1994, February). The Logic of Currency Crises. *NBER Working Paper*, pp. 1-54. doi:10.3386/w4640
- Obstfeld, M., & Rogoff, K. (2007). The Unsustainable U.S. Current Account Position Revisited. In *G7 Current Account Imbalances: Sustainability* (pp. 339-376). Chicago: University of Chicago Press. Retrieved from <https://www.nber.org>
- Obstfeld, M., & Rogoff, K. (2009). Global Imbalances and the Financial Crisis: Products of Common Causes. *Asia Economic Policy Conference* (pp. 1-72). San Francisco: Federal Reserve Bank of San Francisco. Retrieved from <https://core.ac.uk>
- Ocampo, J. A. (2017). *Resetting the International Monetary (Non)System*. London: Oxford University Press. Retrieved from <https://library.oapen.org>
- OECD. (2011). *Comparative Advantage and Trade Performance: Policy Implications*. Paris: OECD Publishing. doi:10.1787/5kg3vwb8g0hl-en
- Pope, R., & Selten, R. (2011). Managed Floats to Damp World-Wide Exchange Rate Liquidity Shocks Like 1982-5, 2006-9: Field and Laboratory Evidence for the Benefits of a Single World Currency. *The Open Economies Journal*, 4(1), 1-38. doi:10.2174/1874919401104010001
- Rahman, A. A. (2022a). *Initiating a True International Currency*. Jember: GCI. Retrieved from <https://books.google.co.id>
- Rahman, A. A. (2022b). A Conceptual Model for a Decentralized Central Bank Digital Currency. *GCI Working Paper No 1-2022* (pp. 1-30). Jember: GCI. doi:10.33774/coe-2022-3t83l-v2
- Rahman, A. A. (2022c). The Basic Laws of Trade: Reconstructing the Theory of International Trade. *GCI Working Paper No 2-2022* (pp. 1-41). Jember: GCI. doi:10.33774/coe-2022-qjrf5-v5
- Rasbin, R., Ikhsan, M., Gitaharie, B. Y., & Affandi, Y. (2021). Real Exchange Rate Misalignments: The Case of the Indonesian Rupiah. *Bulletin of Monetary Economics and Banking*, 24(3), 441 - 464. doi:10.21098/bemp.v24i3.1268
- Razin, A., & Milesi-Ferretti, G. M. (1996). Current Account Sustainability: Selected East Asian and Latin American Experiences. *IMF Working Paper* (pp. 1-50). Washington DC: IMF. Retrieved from <https://www.imf.org>
- Rodrik, D. (1998). Who Needs Capital-Account Convertibility? *Essays in international finance*, (pp. 55-75). Retrieved from <https://ies.princeton.edu>
- Rodrik, D. (2008). The Real Exchange Rate and Economic Growth. *Brookings Papers on Economic Activity, Fall 2008*, 365-439. doi:10.1353/ECA.0.0020
- Rodrik, D., & Velasco, A. (1999). Short-Term Capital Flows. *NBER Working Papers* (pp. 1-44). Cambridge: NBER. Retrieved from <http://www.nber.org>
- Stiglitz, J. E. (2003). Dealing with Debt: How to Reform the Global Financial System. *Harvard International Review*, 25(1), 54-59. Retrieved from <https://www0.gsb.columbia.edu>

- Stiglitz, J. E. (2006). Reforming the Global Reserve System. In J. E. Stiglitz, *Making Globalization Work* (pp. 245 - 268). New York: W W. Norton & Company, Inc.
- Stiglitz, J. E., & Greenwald, B. (2010). Towards A New Global Reserve System. *Journal of Globalization and Development*, 1(2), 1-24. doi:0.2202/1948-1837.1126
- Tandon, S. (2014). Trade Balance and the Real Exchange Rate: An Empirical Analysis of Multilateral and Bilateral Relationship. *Foreign Trade Review*, 49(2), 117–139. doi:10.1177/0015732514525222
- The World Bank. (2022a). *Net trade in goods and services (BoP, current US\$)*. Retrieved from The World Bank: <https://data.worldbank.org>
- The World Bank. (2022b). *Current account balance (BoP, current US\$)*. Retrieved from <https://data.worldbank.org>
- United Nations. (2009). *Report of the Commission of Experts of the President of the United Nations General Assembly on Reforms of the International Monetary and Financial System*. New York: United Nations. Retrieved from <https://www.un.org>
- WTO. (2022). *World Trade Statistical Review 2022*. Geneva: WTO. Retrieved from <https://www.wto.org>